

May 2022

CSE - 3 Sem

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech.(CSE) / (IT) (Sem.-3)**  
**DIGITAL CIRCUITS & LOGIC DESIGN**

Subject Code : BTCS-303

M.Code : 56593

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Answer briefly :

- 1) Compare Synchronous with Asynchronous circuits.
- 2) Why do we need parity checks?
- 3) Write use of Karnaugh Maps.
- 4) Draw a 1\*4 de-multiplexer.
- 5) Write the truth table of SR Flip Flop
- 6) Draw D type of Flip Flop.
- 7) What is Quine-McCluskey method?
- 8) Define level triggering.
- 9) What is dynamic RAM cell?
- 10) What is a Mealy circuit?



### SECTION-B

- 11) What are Excess 3 code? How it works?
- 12) Design a combination circuits for a full subtractor and explain it in detail.
- 13) What are shift registers? Explain the shift left operation.
- 14) How Field Programmable Gate Array (FPGA) are used in IntegratedCircuit {IC}?
- 15) Explain the principle and operation of CMOS.

### SECTION-C

- 16) Discuss the De-Morgan Theorem laws. Explain the minimization of Boolean expression using POS by taking an example.
- 17) Explain Modulo-n counter and draw its logic diagram and timing diagram.
- 18) What are the types of analog to digital converter techniques? Explain dual slope in detail.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CSE) (AI & ML) (Sem.-3)

B.Tech. (CSE) (Internet of Things and Cyber Security including Block  
Chain Technology/Artificial Intelligence & Machine Learning)/

B.Tech. (CE/CSE) (PIT)

**MATHEMATICS-III**

Subject Code : BTAM-304-18

M.Code : 76438

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Solve the following :

a) Show that the function  $f(x,y) = \begin{cases} \frac{x^3 + 2y^3}{x^2 + y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0) \end{cases}$

b) Show that the function  $z = \frac{\frac{1}{x^4} + \frac{1}{y^4}}{\frac{1}{x^5} + \frac{1}{y^5}}$  is homogeneous and state its degree.

c) Evaluate  $\int_1^3 \int_1^3 xy^2 dx dy$ .

d) What do you mean by convergent infinite series.

e) Discuss the behavior of the series  $\sum_{n=1}^{\infty} \frac{n(n+1)}{(n+2)^2}$ .



- f) Find the integration factor of the different equation :  $x dx + y dy = 0$ .
- g) Solve the differential equation :  $y = px + \cos p$ ,  $\left( p = \frac{dy}{dx} \right)$ .
- h) Find the particular integral of the equation :  $\frac{d^2 y}{dx^2} - 3 \frac{dy}{dx} + 2y = \cosh x$ .
- i) Define Legendre's Linear differential equation.
- j) Write down the solution of  $\frac{dx}{dy} + Px = Q$ , where P and Q are functions of y alone.

### SECTION-B

2. If  $u = x^3 + y^3 + z^3 + 3xyz$ , prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} = 3u$ .
3. What is the value of  $\iint x y dx dy$  over the positive quadrant of the circle  $x^2 + y^2 = 1$ ?
4. Test for convergence or divergence the series  $\sum \frac{1}{n} \tan \frac{1}{n}$ .
5. Solve the differential equation :  $\frac{dy}{dx} \left( \frac{dy}{dx} + 1 \right) = x(x+y)$ .
6. Solve  $(y^2 + 2x^2 y) dx + (2x^3 - xy) dy = 0$ .



### SECTION - C

7. Evaluate  $\iiint z (x^2 + y^2 + z^2) dV$  where  $V = \{(x, y, z) ; x^2 + y^2 \leq a^2, 0 < z < h\}$ .
8. Apply the method of variation of parameter to solve  $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 2y = e^x \tan x$ .
9. Solve the differential equation :  $x^3 \frac{d^3 y}{dx^3} + 2x^2 \frac{d^2 y}{dx^2} - 2y = 10 \left( x + \frac{1}{x} \right)$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

- f) Find the integration factor of the different equation :  $x dx + y dy = 0$ .
- g) Solve the differential equation :  $y = px + \cos p$ ,  $\left(p = \frac{dy}{dx}\right)$ .
- h) Find the particular integral of the equation :  $\frac{d^2 y}{dx^2} - 3 \frac{dy}{dx} + 2y = \cosh x$ .
- i) Define Legendre's Linear differential equation.
- j) Write down the solution of  $\frac{dx}{dy} + Px = Q$ , where P and Q are functions of y alone.

### SECTION-B

2. If  $u = x^3 + y^3 + z^3 + 3xyz$ , prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} = 3u$ .
3. What is the value of  $\iint x y dx dy$  over the positive quadrant of the circle  $x^2 + y^2 = 1$ ?
4. Test for convergence or divergence the series  $\sum \frac{1}{n} \tan \frac{1}{n}$ .
5. Solve the differential equation :  $\frac{dy}{dx} \left( \frac{dy}{dx} + 1 \right) = x(x+y)$ .
6. Solve  $(y^2 + 2x^2 y) dx + (2x^3 - xy) dy = 0$ .



### SECTION - C

7. Evaluate  $\iiint z (x^2 + y^2 + z^2) dV$  where  $V = \{(x, y, z); x^2 + y^2 \leq a^2, 0 < z < h\}$ .
8. Apply the method of variation of parameter to solve  $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 2y = e^x \tan x$ .
9. Solve the differential equation :  $x^3 \frac{d^3 y}{dx^3} + 2x^2 \frac{d^2 y}{dx^2} - 2y = 10 \left( x + \frac{1}{x} \right)$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



### SECTION-B

- (11) What are the considerations in the selection of a memory type for a particular purpose?
- (12) Explain the instruction cycle in detail.
- (13) Discuss the stack organization in detail.
- (14) What are memory reference instructions? How are they different from input-output instructions?
- (15) Explain asynchronous communication in detail.

### SECTION-C

- (16) Distinguish between micro-programmed and hardwired controlled CPU.
- (17) Explain the memory hierarchy in detail.
- (18) Compare RISC and CISC architectures.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CSE/ECE/IT) (Sem.-3)**  
**OBJECT ORIENTED PROGRAMMING USING C++**

Subject Code : BTCS-305

M.Code : 56595

Date of Examination : 05-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Answer briefly :**

- 1) What is the use of inline member functions?
- 2) How is the order of invocation of destructors different from constructors?
- 3) What is meant by precedence rule for evaluation of expressions?
- 4) What are the major features of structured languages?
- 5) What does polymorphism mean in C++ language?
- 6) What is generic class?
- 7) What do you mean by data hiding?
- 8) What is the importance of scope resolution in C++?
- 9) Can a function be defined inside the main() function?
- 10) How memory is allocated dynamically in C++?





## SECTION-B

- 11) What is the main difference between array of pointer and pointer to an array? Explain with the help of a suitable example.
- 12) Write a program in C which implements tower of Hanoi using recursion.
- 13) Write a program to search a key string in an array of strings, if a key string is found then return its position and then replace that key string by any string using pointers.
- 14) How abstract classes help in solving ambiguities in Multipath inheritance?
- 15) Why do we need virtual functions? Explain with the help of an example.

## SECTION-C

- 16) Explain how base class member functions can be invoked in a derived class if the derived class also has a member function with the same name. How are stream operators overloaded in CPP?
- 17) Write a program to copy the content of a data file to another file. Make use of the exception handling conditions also.
- 18) What is the need of copy constructors? How do you implement them in C++? Differentiate between the copy constructors and overloaded assignment operator with the help of an example.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE/IT) (Sem.-3)

**MATHEMATICS-III**

Subject Code : BTAM-302

M.Code : 70808

Date of Examination : 06-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Write briefly :**

- 1) Define analytic functions and write its Cauchy-Riemann equations.
- 2) Write Euler's formula of Fourier series.
- 3) Write the Laplace transform of  $t^2 \sin 2t$ .
- 4) Define the Homogenous partial differential equations.
- 5) What is the mean and variance of the Binomial distribution?
- 6) Define Null and Alternative hypothesis.
- 7) Define Laplace transforms.
- 8) Define Eigen value and Eigen vector.
- 9) What is the difference between Euler's and Modified Euler's methods for solving the differential equations?
- 10) Write the difference between chi-square and  $t$ -distributions.



### SECTION-B

- 11) Express  $f(x) = x \sin x$ ,  $0 < x < 2\pi$  as a Fourier series.
- 12) Find the Laplace transform of  $\frac{\cos at - \cos bt}{t}$
- 13) Solve the linear partial differential equation:  
$$x^2(y-z)\frac{\partial z}{\partial x} + y^2(z-x)\frac{\partial z}{\partial y} = z^2(x-y)$$
- 14) a) The probability that a pen manufactured by a company will be defective is  $1/10$ . If 12 such pens are manufactured, find the probability that at least two will be defective.  
b) Suppose that the life length of the two bulbs B1 and B2 have distribution  $N(x; 40, 36)$  and  $N(x; 45, 9)$  respectively. If the bulb is to be used for 45-hour period, which bulb is to be preferred? If it is to be used for 48-hour period, which bulb is to be preferred? Given that  $P(Z < 0.83) = 0.7967$ ,  $P(Z < 1.33) = 0.9082$ ,  $P(Z < 1.00) = 0.8143$ .
- 15) The nine items of a sample have the following values:  
45 47 50 52 48 47 49 53 51

Does the mean of these differ significantly from the population mean of 47.5? Given that critical value of  $t$  at 8 degree of freedom is 2.31.

### SECTION-C

- 16) a) Show that the function  $f(z) = \sqrt{|xy|}$  is not analytic at the origin even though Cauchy-Riemann equations are satisfied thereof.  
b) Apply Gauss Jordan method to solve the equations  
 $x+y+z=9$ ,  $2x-3y+4z=13$ ,  $3x+4y+5z=40$
- 17) Determine the largest eigen value and the corresponding eigen vector of the matrix  $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$  using the power method. Take  $[1, 0, 0]^T$  as initial eigen vector.
- 18) Apply Runge-Kutta method to find an approximate value of  $y$  for  $x = 0.2$  in steps of 0.1, if  $\frac{dy}{dx} = x + y^2$ , given that  $y = 1$ , where  $x = 0$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE/IT) (Sem.-3)

**MATHEMATICS-III**

Subject Code : BTAM-302

M.Code : 70808

Date of Examination : 06-08-22

Time : 3 Hrs.

Max. Marks : 60

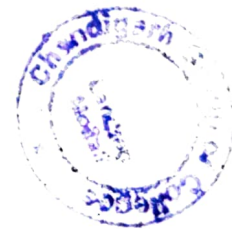
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

- 1) Define analytic functions and write its Cauchy-Riemann equations.
- 2) Write Euler's formula of Fourier series.
- 3) Write the Laplace transform of  $t^2 \sin 2t$ .
- 4) Define the Homogenous partial differential equations.
- 5) What is the mean and variance of the Binomial distribution?
- 6) Define Null and Alternative hypothesis.
- 7) Define Laplace transforms.
- 8) Define Eigen value and Eigen vector.
- 9) What is the difference between Euler's and Modified Euler's methods for solving the differential equations?
- 10) Write the difference between chi-square and  $t$ -distributions.



### SECTION-B

- 11) Express  $f(x) = x \sin x$ ,  $0 < x < 2\pi$  as a Fourier series.
- 12) Find the Laplace transform of  $\frac{\cos at - \cos bt}{t}$
- 13) Solve the linear partial differential equation:  
$$x^2(y-z)\frac{\partial z}{\partial x} + y^2(z-x)\frac{\partial z}{\partial y} = z^2(x-y)$$
- 14) a) The probability that a pen manufactured by a company will be defective is  $1/10$ . If 12 such pens are manufactured, find the probability that at least two will be defective.  
b) Suppose that the life length of the two bulbs B1 and B2 have distribution  $N(x; 40, 36)$  and  $N(x; 45, 9)$  respectively. If the bulb is to be used for 45-hour period, which bulb is to be preferred? If it is to be used for 48-hour period, which bulb is to be preferred? Given that  $P(Z < 0.83) = 0.7967$ ,  $P(Z < 1.33) = 0.9082$ ,  $P(Z < 1.00) = 0.8143$ .
- 15) The nine items of a sample have the following values:  
45 47 50 52 48 47 49 53 51

Does the mean of these differ significantly from the population mean of 47.5? Given that critical value of  $t$  at 8 degree of freedom is 2.31.

### SECTION-C

- 16) a) Show that the function  $f(z) = \sqrt{|xy|}$  is not analytic at the origin even though Cauchy-Riemann equations are satisfied thereof.  
b) Apply Gauss Jordan method to solve the equations  
$$x+y+z=9, 2x-3y+4z=13, 3x+4y+5z=40$$
- 17) Determine the largest eigen value and the corresponding eigen vector of the matrix  
$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$
 using the power method. Take  $[1, 0, 0]^T$  as initial eigen vector.
- 18) Apply Runge-Kutta method to find an approximate value of  $y$  for  $x = 0.2$  in steps of 0.1, if  $\frac{dy}{dx} = x + y^2$ , given that  $y = 1$ , where  $x = 0$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

B.Tech Sem - 4  
CSE

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (AI & ML / CE / CSE) / B.Tech CSE (Internet of Things & Cyber Security Including Block Chain Technology) / PIT B.Tech CSE (Sem.-4)

**DESIGN & ANALYSIS OF ALGORITHMS**

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 09-07-22

B.Tech  
P.T.U Que

Time : 3 Hrs.

Max Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Answer briefly :

1. Give an example of dynamic programming approach.
2. What do you understand by algorithm evaluation?
3. What is NP-complete problem?
4. What is asymptotic time complexity?
5. What is the basic principal of divide-and-conquer?
6. List the various applications of DFS and BFS.
7. How the Prim's algorithm is better in finding the Minimal spanning tree in comparison to the Kruskal's method?
8. What are heuristics? What are their characteristics?
9. What are the various steps in the design of an algorithm?
10. Are the sub solutions overlapping in dynamic programming approach?



## SECTION-B

11. Explain the Big-Oh computation for each of the following control structures:
- Sequencing
  - If-then-else
  - “for” loop
  - “While” loop
  - Recursion
12. Solve the following instance of the knapsack problem using branch and bound technique (assume  $W = 3$ )

Items	w	v
11	1	2
12	2	3
13	3	4

13. Apply Prim's Algorithm and Kruskal algorithm to the graph to obtain **minimum spanning tree**. Do these algorithms generate same output-Justify.
14. Explain the concepts of P, NP and NP completeness.
15. What are NP hard problems? Write short notes on the procedures of the following approximation algorithms to solve TSP using suitable examples.
- Nearest Neighbor algorithm.
  - Twice-around-the-tree algorithm.

## SECTION-C

16. Write an algorithm for merging two sorted arrays into one array. Explain with suitable examples.
17. Modify the Dijkstra's algorithm to solve All-Pairs-Shortest-Path problem.
18. Find the Big-Oh notations for the following functions :
- $f(n) = 78889$
  - $f(n) = 6n^2 + 135$
  - $f(n) = 7n^2 + 8n + 56$
  - $f(n) = n^4 + 35n^2 + 84$

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE/IT) (Sem.-4)

**DISCRETE STRUCTURES**

Subject Code : BTCS-402

M.Code : 71106

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Answer briefly :

- 1) In degree
- 2) Ring
- 3) Directed Graph
- 4) Euler circuit
- 5) Ordered set
- 6) Chromatic number
- 7) Equivalence relation
- 8) Postfix notation
- 9) Surjection
- 10) Semi group.





### SECTION-B

- 11) Show that the intersection of the two left ideals of a ring is again a left ideal of a ring.
- 12) Solve the recurrence relation,  $a_n + 5a_{n-1} + 6a_{n-2} = 3n^2 - 2n + 1$ .
- 13) Explain the following with example Homomorphism and Isomorphism.
- 14) Consider  $G = \{1, 5, 7, 11\}$  under multiplication modulo 12 is  $G$  cyclic? Also, find all subgroups of  $G$ .
- 15) Prove that a graph  $G$  with  $e = v - 1$  that has no circuit is a tree.

### SECTION-C

- 16) Write detailed note on :  
Cut Points, Simple Graphs, Multigraphs.
- 17) Define minimum spanning tree. Explain Prim's algorithm to find minimum spanning tree.
- 18) Prove that the sum of all degree of all the vertices in a graph is equal to twice the number of edges in a graph.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

1. Give a
2. Determ
3. How m  
each w
4. Define
5. Write d
6. Is there
7. Define a
8. Give an  
circuit.
9. What will

Roll No.

Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (Artificial Intelligence & Machine Learning/ Computer Engineering / Computer Science & Engineering / Information Technology/ CSE (Internet of Things and Cyber Security including Block Chain Technology/Artificial Intelligence & Machine Learning)) (Sem.-4)

**DISCRETE MATHEMATICS**

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Answer briefly :**

1. Give an example of a relation which is reflexive but neither symmetric nor transitive.
2. Determine the domain and range of the relation  $R = \{(x, y) : x \in \mathbb{N}, y \in \mathbb{N} \text{ and } x+y=10\}$
3. How many 8- letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?
4. Define permutation groups.
5. Write down the truth table of  $(p \leftrightarrow q) \leftrightarrow r$ .
6. Is there a simple graph G with six vertices of degree 1, 3, 4, 6, 7?
7. Define a complete binary tree.
8. Give an example of a connected graph that has an Euler circuit but no Hamiltonian circuit.
9. What will be the chromatic number of complete graph with n - vertices?



10. Define equivalent sets.

### SECTION-B

11. Show that intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable example.
12. The set  $C^*$  of all non-zero complex numbers form an infinite abelian group under the operation of multiplication of complex numbers.
13. a) How many people must you have to guarantee that at least 5 of them will have birthday on the same month.  
b) Find the number of positive integers from 1 to 500 which are divisible by at least one of 3, 5 and 7.
14. a) Prove that  $(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$   
b) Prove the validity of the following argument:

If a man is bachelor, he is happy.

If a man is happy, he dies young.

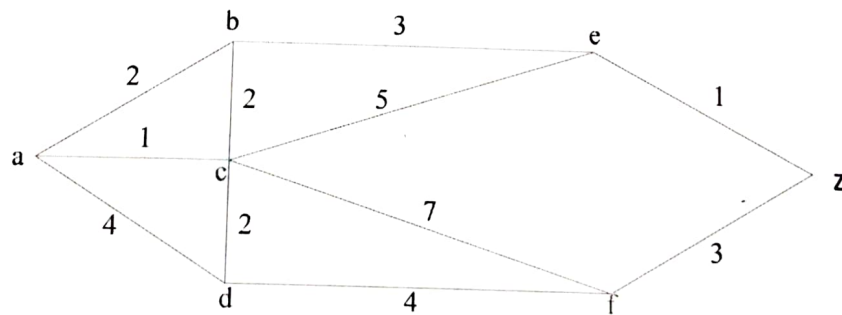
Therefore bachelors die young.



15. Show that a graph  $G$  with  $n$  vertices and  $(n - 1)$  edges and no circuit is connected.

### SECTION C

16. Find the shortest path between  $a$  and  $z$  using Dijkstra's algorithm for the following graph:



17. a) Prove that every finite integral domain is a field.  
b) Simplify the Boolean expression  $f(x, y, z) = (x \wedge y \wedge z) \vee (x \wedge y \wedge z)$ . And find its conjunctive normal forms.

18. A function  $f$  is defined on the set of integers as follows:

$$f(x) = \begin{cases} 1+x & 1 \leq x < 2 \\ 2x-1 & 2 \leq x < 4 \\ 3x-10 & 4 \leq x < 6 \end{cases}$$

- a) Find the domain of the function.
- b) Find the range of the function.
- c) Find the value of  $f(4)$ .
- d) State whether  $f$  is one - one or many one function.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Explain different addressing modes used in central processing unit.
3. What are the advantages and disadvantages of hardwired and microprogrammed design approaches?
4. What is DMA? Give an example, where DMA mode of data transfer is useful.
5. Discuss the role of cache coherency in parallel processors?
6. How the data is represented in computer architecture? Explain with example

## SECTION-C

7. Briefly explain the block diagram and instruction set of 8085 processor? How 8085 is different from 8086?
8. What is the need of replacement algorithms in memory organization? Explain with example.
9. Discuss the role of pipelining for data processing in computer organization. How it increases the throughput?

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CSE/IT) (Sem.-4)

**MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING**

Subject Code : BTCS-404

M.Code : 56607

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Explain the following :

- a. Asynchronous
- b. Data Bus
- c. DAD Instruction
- d. 2-byte Instruction
- e. Status Register
- f. Flags
- g. Operand
- h. RST2.5
- i. PUSH Instruction
- j. Emulator

## SECTION-B

2. How traffic light systems can be controlled by microprocessor? Explain.
3. What is the use of DMA controller?
4. What do you understand by subroutine? Explain.
5. Describe serial and parallel data transfer techniques.
6. Write an assembly language program to swap two numbers.

## SECTION-C

7. Discuss in detail the instruction formats and its types with example.
8. Draw and explain the working of 8251 USART in detail.
9. Explain, how stepper motor can be interfaced with 8085.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) / (AI&ML) / (CE) / (CSE) (IOT) (Sem.-4)

**OPERATING SYSTEM**

Subject Code : BTCS-402-18

M.Code : 77628

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

1. PCB
2. Protection
3. Threshold
4. System Calls
5. Soft RTS
6. Multi-programming OS
7. Waiting Time
8. Logical Address
9. Preemptive
10. Frame.



## SECTION-B

11. What is an Operating System and its services?
12. Explain the FIRST fit, and Worst fit allocation algorithms with the help of example.
13. Explain Belady's Anomaly.
14. Write a detailed note on paging and segmentation.
15. List down various protection problems that an operating system might have to deal.

## SECTION-C

16. A block manager for a variable size region strategy has a free list of blocks of size 600, 1400, 1000, 2200, 1600 and 1050 bytes. What block size will be selected to honor a request for 1605 bytes using best fit policy?
17. What is thrashing? How it is eliminated?
18. What is Page Fault? Explain the process with the help of diagram. Also, define swapping.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
CSE - 4 Sem

Roll No.

Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (Artificial Intelligence & Machine Learning/ Computer Engineering / Computer Science & Engineering / Information Technology/ CSE (Internet of Things and Cyber Security including Block Chain Technology/Artificial Intelligence & Machine Learning)) (Sem.-4)

**DISCRETE MATHEMATICS**

Subject Code : BTCS-401-18

M.Code : 77626

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Answer briefly :

1. Give an example of a relation which is reflexive but neither symmetric nor transitive.
2. Determine the domain and range of the relation  $R = \{(x, y) : x \in \mathbb{N}, y \in \mathbb{N} \text{ and } x+y=10\}$
3. How many 8- letter words can be made using the letters of the words "TRIANGLE", if each word is to begin with T and end with E?
4. Define permutation groups.
5. Write down the truth table of  $(p \leftrightarrow q) \leftrightarrow r$ .
6. Is there a simple graph G with six vertices of degree 1, 3, 4, 6, 7?
7. Define a complete binary tree.
8. Give an example of a connected graph that has an Euler circuit but no Hamiltonian circuit.
9. What will be the chromatic number of complete graph with n - vertices?



10. Define equivalent sets.

### SECTION-B

11. Show that intersection of two partial order relations is a partial order relation. But union of two partial order relations need not be a partial order relation. Give suitable examples.

12. The set  $C^*$  of all non-zero complex numbers form an infinite abelian group under operation of multiplication of complex numbers.

13. a) How many people must you have to guarantee that at least 5 of them will have birthday on the same month.

b) Find the number of positive integers from 1 to 500 which are divisible by at least one of 3, 5 and 7.

14. a) Prove that  $(p \wedge q) \vee r = (p \vee r) \wedge (q \vee r)$

b) Prove the validity of the following argument:

If a man is bachelor, he is happy.

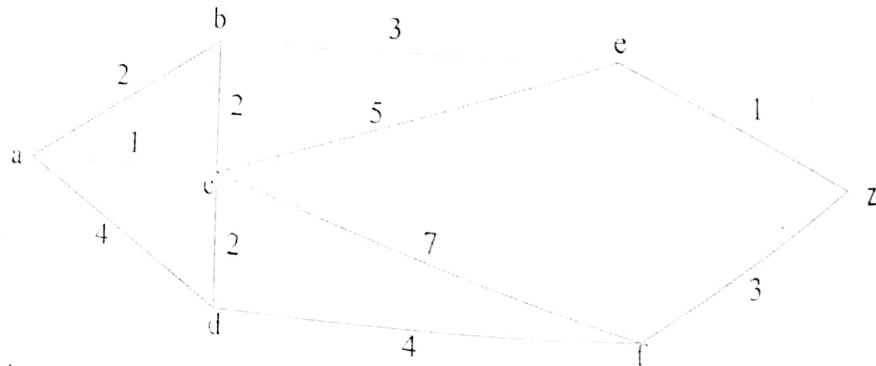
If a man is happy, he dies young.

Therefore bachelors die young.

15. Show that a graph  $G$  with  $n$  vertices and  $(n - 1)$  edges and no circuit is connected.

### SECTION C

16. Find the shortest path between  $a$  and  $z$  using Dijkstra's algorithm for the following graph.



17. a) Prove that every finite integral domain is a field.

b) Simplify the Boolean expression  $f(x, y, z) = (x \wedge y \wedge z) \vee (x \wedge y \wedge \bar{z})$ . And give its conjunctive normal forms.

18. A function  $f$  is defined on the set of integers as follows:

$$f(x) = \begin{cases} 1+x & 1 \leq x < 2 \\ 2x-1 & 2 \leq x < 4 \\ 3x-10 & 4 \leq x < 6 \end{cases}$$

- Find the domain of the function.
- Find the range of the function.
- Find the value of  $f(4)$ .
- State whether  $f$  is one - one or many one function.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-4)

**APPLIED THERMODYNAMICS**

Subject Code : BTME-401-18

M.Code : 77546

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

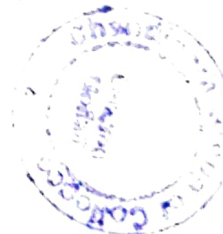
**SECTION-A**

**1. Write briefly :**

- a) What is meant by saturation temperature and saturation pressure?
- b) Give the classification of steam turbines.
- c) Distinguish between impulse and reaction turbines.
- d) What is steady flow energy equation as applied to steam nozzles? Explain its use in the calculation of a steam velocity at the exit of a nozzle.
- e) Explain the effect of friction on the performance of a steam nozzle.
- f) What is the main difference between boiler mountings and boiler accessories?
- g) What are differentiating features between a water tube and fire tube boiler?
- h) Compare supercharger with turbo charger.
- i) Define stoichiometric air-fuel ratio.
- j) Define draught, what is the use of draught in thermal power plants?

**SECTION - B**

2. Dry saturated steam enters a steam nozzle at a pressure of 15 bar and is discharged at a pressure of 2 bar. If the dry fraction of discharge steam is 0.96, what will be the final velocity of steam? Neglect initial velocity of steam. If 10 % of heat drop is lost in friction, find the percentage reduction in the final velocity.
3. "Auto ignition is responsible for knocking in S.I. engines or not?" Justify your answer by suitable diagram.



4. In a De Laval turbine steam issues from nozzle with a velocity of 1200 m/s the angle is  $20^\circ$ , the mean blade velocity is 400 m/s, and the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine per hour is 1000 kg. Take velocity co-efficient as 0.8. Calculate

- Blade angles
- Relative velocity of steam entering the blade
- Tangential force on the blade
- Power developed
- Blade efficiency

5. What is the significance of critical pressure ratio for nozzle of a steam turbine? Obtain analytically its value in terms of the index of expansion.
6. Steam enters a nozzle passing a mass flow of 14 kg/s at a pressure of 30 bar and temperature of  $300^\circ\text{C}$ . After expansion to an exit pressure of 5 bar, the exit velocity is 800 m/s. (a) Determine the nozzle efficiency and exit area (b) If the losses occur only in the divergent portion, determine the velocity of steam at the throat.

### SECTION – C

7. During the trial of a four-stroke cylinder gas engine the following data were recorded. Determine the Indicated mean effective pressure and Indicated power

- Area of indicator diagram =  $565.8 \text{ mm}^2$
- Length of indicator diagram = 74.8 mm
- Spring index = 0.9 bar/mm
- Cylinder diameter = 220 mm
- Stroke length = 430 mm
- Number of explosions/min = 100

8. In a reaction turbine, the fixed blades and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are  $35^\circ$  and of the discharging tips are  $35^\circ$  and the discharging tips  $20^\circ$ . Find the power developed per pair of blades for steam consumption of 2.5 kg/s, when the blade speed is 50 m/s. If heat drop per pair is 10.04 kJ/kg, find the efficiency of the pair.
9. Why there is no chimney in case of locomotive boilers? Can we correlate maximum discharge rate of gases through the chimney for a given height of the chimney. Drive an expression.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. Explain different addressing modes used in central processing unit.
3. What are the advantages and disadvantages of hardwired and microprogrammed design approaches?
4. What is DMA? Give an example, where DMA mode of data transfer is useful.
5. Discuss the role of cache coherency in parallel processors?
6. How the data is represented in computer architecture? Explain with example

Roll No.

Total

Time

INST

1.

2.

3.

## SECTION-C

7. Briefly explain the block diagram and instruction set of 8085 processor? How 8085 is different from 8086?
8. What is the need of replacement algorithms in memory organization? Explain with example.
9. Discuss the role of pipelining for data processing in computer organization. How it increases the throughput?

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) / (AI&ML) / (CE) / (CSE) (IOT) (Sem.-4)

**OPERATING SYSTEM**

Subject Code : BTCS-402-18

M.Code : 77628

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

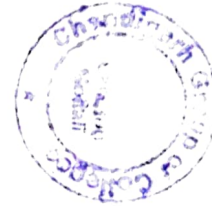
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

1. PCB
2. Protection
3. Threshold
4. System Calls
5. Soft RTS
6. Multi-programming OS
7. Waiting Time
8. Logical Address
9. Preemptive
10. Frame.



## SECTION-B

11. What is an Operating System and its services?
12. Explain the FIRST fit, and Worst fit allocation algorithms with the help of example.
13. Explain Belady's Anomaly.
14. Write a detailed note on paging and segmentation.
15. List down various protection problems that an operating system might have to deal.

## SECTION-C

16. A block manager for a variable size region strategy has a free list of blocks of size 600, 1400, 1000, 2200, 1600 and 1050 bytes. What block size will be selected to honor a request for 1605 bytes using best fit policy?
17. What is thrashing? How it is eliminated?
18. What is Page Fault? Explain the process with the help of diagram. Also, define swapping.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CSE/IT) (Sem.-4)

**MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING**

Subject Code : BTCS-404

M.Code : 56607

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Explain the following :

- a. Asynchronous
- b. Data Bus
- c. DAD Instruction
- d. 2-byte Instruction
- e. Status Register
- f. Flags
- g. Operand
- h. RST2.5
- i. PUSH Instruction
- j. Emulator



## SECTION-B

2. How traffic light systems can be controlled by microprocessor? Explain.
3. What is the use of DMA controller?
4. What do you understand by subroutine? Explain.
5. Describe serial and parallel data transfer techniques.
6. Write an assembly language program to swap two numbers.

Roll No. [ ]  
Total No. [ ]  
B.Tech.  
Sec [ ]

Time : [ ]

## SECTION-C

7. Discuss in detail the instruction formats and its types with example.
8. Draw and explain the working of 8251 USART in detail.
9. Explain, how stepper motor can be interfaced with 8085.

INSTR

1. S

e

2. S

3.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (AI & ML / CE / CSE) / B.Tech CSE (Internet of Things & Cyber Security Including Block Chain Technology) / PIT B.Tech CSE  
(Sem.-4)

## DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 09-07-22

Time : 3 Hrs.

Max Marks : 60

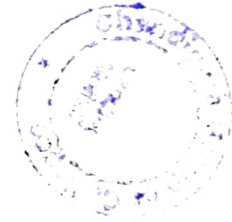
### INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

### SECTION-A

Answer briefly :

1. Give an example of dynamic programming approach.
2. What do you understand by algorithm evaluation?
3. What is NP-complete problem?
4. What is asymptotic time complexity?
5. What is the basic principal of divide-and-conquer?
6. List the various applications of DFS and BFS.
7. How the Prim's algorithm is better in finding the Minimal spanning tree in comparison to the Kruskal's method?
8. What are heuristics? What are their characteristics?
9. What are the various steps in the design of an algorithm?
10. Are the sub solutions overlapping in dynamic programming approach?



SECTION-B

11. Explain the Big-Oh computation for each of the following control structures
- (i) Sequencing
  - (ii) If-then-else
  - (iii) "for" loop
  - (iv) "While" loop
  - (v) Recursion
12. Solve the following instance of the knapsack problem using branch and bound (assume  $W = 3$ )

Roll No. \_\_\_\_\_  
 Total No. of Questions \_\_\_\_\_

Time : 3 Hrs.

Items	w	v
11	1	2
12	2	3
13	3	4

- INSTRUCTION
1. SECTION I have to solve each.
  2. SECTION II have to solve each.
  3. SECTION III have to solve each.

13. Apply Prim's Algorithm and Kruskal algorithm to the graph to obtain minimum spanning tree. Do these algorithms generate same output-Justify.
14. Explain the concepts of P, NP and NP completeness.
15. What are NP hard problems? Write short notes on the procedures of the following approximation algorithms to solve TSP using suitable examples.
- a) Nearest Neighbor algorithm.
  - b) Twice-around-the-tree algorithm.

Answer

- 1) In
- 2)
- 3)
- 4)
- 5)

SECTION-C

16. Write an algorithm for merging two sorted arrays into one array. Explain with suitable examples.
17. Modify the Dijkstra's algorithm to solve All-Pairs-Shortest-Path problem.
18. Find the Big-Oh notations for the following functions :
- (i)  $f(n) = 78889$
  - (ii)  $f(n) = 6n^2 + 135$
  - (iii)  $f(n) = 7n^2 + 8n + 56$
  - (iv)  $f(n) = n^4 + 35n^2 + 84$

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_  
Total No. of Questions : 18

Total No. of Pages : 02

B.Tech. (CSE/IT) (Sem.-4)

**DISCRETE STRUCTURES**

Subject Code : BTCS-402

M.Code : 71106

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Answer briefly :

- 1) In degree
- 2) Ring
- 3) Directed Graph
- 4) Euler circuit
- 5) Ordered set
- 6) Chromatic number
- 7) Equivalence relation
- 8) Postfix notation
- 9) Surjection
- 10) Semi group.





### SECTION-B

- 11) Show that the intersection of the two left ideals of a ring is again a left ideal of a ring.
- 12) Solve the recurrence relation,  $a_n + 5a_{n-1} + 6a_{n-2} = 3n^2 - 2n + 1$ .
- 13) Explain the following with example Homomorphism and Isomorphism.
- 14) Consider  $G = \{1, 5, 7, 11\}$  under multiplication modulo 12 is  $G$  cyclic? Also, find all subgroups of  $G$ .
- 15) Prove that a graph  $G$  with  $e = v - 1$  that has no circuit is a tree.

### SECTION-C

- 16) Write detailed note on :  
Cut Points, Simple Graphs, Multigraphs.
- 17) Define minimum spanning tree. Explain Prim's algorithm to find minimum spanning tree.
- 18) Prove that the sum of all degree of all the vertices in a graph is equal to twice the number of edges in a graph.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

B.Tech. (CSE/IT) (Sem.-5)

**COMPUTER NETWORKS-II**

Subject Code : BTCS-501

M.Code : 70534

Date of Examination : 01-08-22

Total No. of Pages : 02

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- (a) Discuss the class field in IP address.
- (b) What is a hostid and netid?
- (c) Describe in detail about the Network Edge.
- (d) Explain in brief about Addressing in Internet.
- (e) Discuss in briefly about Logical addressing.
- (f) What is Classful addressing in IPv4? Explain.
- (g) What are the Cellular Networks?
- (h) Discuss about WiFi technology and 802.11.
- (i) Discuss about Security of Ad-hoc networks.
- (j) Classify routing protocols for Ad-hoc networks.



### SECTION-B

2. What are the Internet Protocols? Explain in brief.
3. Draw and explain about IP Packet format in IPv4.
4. Explain the infrastructure of the Wireless networks in detail.
5. Explain about the Routing in Ad-hoc networks.
6. Discuss about Wireless Routing Protocol.

### SECTION-C

7. Explain in detail about the frame format of 802.11 with the role of access points in wireless Communication.
8. Compare and contrast the IPv4 and IPv6 header fields. Do they have any fields in common? Explain.
9. What is the difference between proactive and reactive routing protocols? Explain in detail any two routing protocols used in Ad-hoc networks.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engg.) (Sem.-5)

**ENTERPRISE RESOURCE PLANNING**

Subject Code : BTES-501-18

M.Code : 78319

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. ERP
- b. SAP
- c. Quality
- d. Data Mining
- e. Data warehousing
- f. Human Resource
- g. SCM
- h. Database
- i. E-Commence
- j. CRM.



### SECTION-B

2. Explain the benefits of ERP and its related technologies.
3. Explain the role of Project management and monitoring in ERP Implementation.
4. How does ERP helps in material and quality management?
5. Write a note on SAP.
6. Explain the correlation between ERP and E-commerce in detail.

### SECTION-C

7. Explain in detail the ERP Implementation lifecycle.
8. How does ERP helps in Business modules at different levels?
9. Write a note on future directions of ERP.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem.-5)  
**FORMAL LANGUAGE & AUTOMATA THEORY**

Subject Code : BTIT-501-18

M.Code : 78256

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. What do you mean by DFA?
- b. Describe Derivation Tree.
- c. Define closure properties of CFLs.
- d. Define CSG.
- e. Define TMs as enumerators.
- f. Define Post correspondence Problem.
- g. Give an example of un-decidable problem.
- h. What is the purpose of studying Turing Machine?
- i. Construct a regular grammar for  $L = \{0^n 11/n > 1\}$ .
- j. Define Greibach Normal Form.



## SECTION-B

2. Explain deterministic finite automata in detail with example.
3. Explain the process of minimization of finite automata.
4. What do you mean by Context sensitive grammars, explain with proper example?
5. Explain non-deterministic Turing machine.
6. Explain about the Decidability and Un-decidability Problems.

## SECTION-C

7. Describe pumping lemma for Context free languages with the help of suitable example.
8.
  - a) Give an overview of recursively enumerable language.
  - b) Give the correspondence between P, NP and NP-complete problems.
9.
  - a) Construct a Turing Machine that will accept the Language consists of all palindromes of 0's and 1's?
  - b) Explain types of Turing Machine.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

**FORMAL LANGUAGE AND AUTOMATA THEORY**

Subject Code : BTCS502-18

M.Code : 78321

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

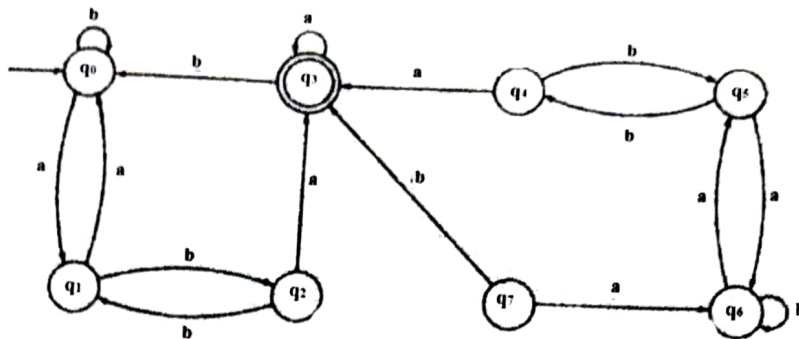
- a) If  $A = \{a, b\}$  and  $B = \{b, c\}$ , find  $(A \cup B)^*$ .
- b) State difference between deterministic and non-deterministic finite automata.
- c) Design a DFA that accepts set of all strings over  $\{a, b\}$  that contains the string 'aabb' in it.
- d) Convert the regular expression  $ba^*b$  to its equivalent Finite Automata.
- e) What is Context Free Language?
- f) What is Left Derivation Tree? Give example.
- g) State Ambiguous Grammar. Also, give example.
- h) State Arden's Theorem.
- i) What is Cellular automata and what it is used for?
- j) State Cook-Levin theorem.





### SECTION-B

2. Discuss Chomsky Classification of languages.
3. Construct the minimum state automaton equivalent to following finite automaton given :



4. Construct a NFA for a language that accepts all strings over {a,b} ending in aba. Use it to construct a DFA accepting same set of strings.
5. What is Pushdown Automata? Construct a PDA that accepts even palindromes of the form :

$$L = \{ww^R | w = (a+b)^*\}$$

6. Convert the given Moore Machine to its equivalent Mealy Machine

State	0	1	Output
→q <sub>0</sub>	q <sub>1</sub>	q <sub>2</sub>	1
q <sub>1</sub>	q <sub>3</sub>	q <sub>2</sub>	0
q <sub>2</sub>	q <sub>2</sub>	q <sub>1</sub>	1
q <sub>3</sub>	q <sub>0</sub>	q <sub>3</sub>	1

### SECTION-C

7. What is Turing machine? Design a Turing Machine which recognizes the language  

$$L = 01^*0$$
8. Describe pumping lemma for regular languages with the help of example.
9. Define Chomsky Normal Form. Convert the following Context Free Grammar to Chomsky Normal Form :

$$P : S \rightarrow ASA | aB, A \rightarrow B | S, B \rightarrow b | \epsilon$$

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



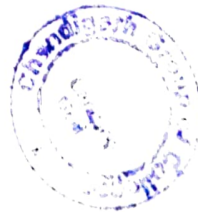


## SECTION-B

2. Compare and contrast file processing system and database management system.
3. Define Normalization. Explain 2 NF and 3NF with the help of a suitable example.
4. What is access control? Discuss DAC and MAC access control models.
5. What are key constraints? Explain different types of key constraints using examples.
6. Explain the concept of SQL injection. How we can protect from SQL injection attack?

## SECTION-C

7. What is Concurrency Control? Explain the time stamp-based protocol for concurrency control in DBMS.
8. Consider the following schemas :  
Sailors (sid, sname, rating, age)  
Reserves (sid, bid, day)  
Boats (bid, bname, color)  
Write the following queries :
  - a) Find the name of sailors who have reserved boat 103.
  - b) Find the names and ages of sailors with a rating above 7.
  - c) Find the names of sailors who have reserved a red boat.
  - d) Find the sname, bid, and day for each reservation.
  - e) Find the name of sailors who have reserved at least one boat.
9. Write a short note on :
  - a. Distributed databases
  - b. Two phase locking protocol



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (Sem.-5)

**RELATIONAL DATABASE MANAGEMENT SYSTEM-I**

Subject Code : BTCS-502

M.Code : 70535

Date of Examination : 02-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

- 1) What are DDL commands in SQL?
- 2) What is a partial dependency?
- 3) How does locking help in concurrency control?
- 4) What is a multi-level index?
- 5) Explain 'A' in 'ACID' properties?
- 6) What is the difference between B - Trees and B + Trees?
- 7) Define serializable schedule.
- 8) Differentiate between Grant and Revoke.
- 9) Explain 2PL.
- 10) What is a Dense Index?



**SECTION-B**

- 11) Consider a relation R(A, B, C, D, E) with the following functional dependencies:

AB → C,  
CD → E,  
DE → B

(3 + 2 = 5)

- a) What is a candidate key? Is AB a candidate key of this relation? If not, is ABD? Explain your answer.

- b) Compute  $(AB)^+$ .
- 12) Answer the following:
- a) What is a lossless join decomposition? (2)
  - b) What is a conflict serializable schedule? Explain with example. (3)
- 13) What is the need of concurrency control? Discuss about Dirty Read Problem. Explain with example. (5)
- 14) Compare binary locks to exclusive/shared locks. Why is the latter type of locks preferable? (5)
- 15) What are the possible threats to databases? (5)

### SECTION-C

- 16) What is dependency preserving decomposition?

Consider a relation R with attribute set  $\{A,B,C,D\}$  and functional dependency set  $F = \{A \rightarrow B, B \rightarrow C, C \rightarrow D\}$ . This relation is decomposed into three sub relations  $\{AB, BC, CD\}$ . Check if the decomposition is dependency preserving or not. Discuss.

- 17) Answer the following:

- a) List the types of privileges available inSQL.
- b) What is access control?
- c) What is database authorization?
- d) Explain Cascading Rollback.

- 18) Answer the following:

- a) Describe the concept of a cursor.
- b) What is the difference between Inner join and Outer join?



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (Sem.-5)  
**DESIGN & ANALYSIS OF ALGORITHMS**

Subject Code : BTCS-503

M.Code : 70536

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Answer the following briefly :

- 1) What do you mean by time complexity?
- 2) If  $f(n)=n!$  and  $g(n)=2^n$ , indicate whether  $f=O(g)$ , or  $f=\Omega(G)$ , or both ( $f=\theta(g)$ ).
- 3) State the time complexity of heap sort.
- 4) What do you mean by minimum spanning tree?
- 5) Explain the applications of Dijkstra's algorithm.
- 6) Describe asymptotic notation.
- 7) What is order statistics?
- 8) State the example of NP-complete problem.
- 9) What do you mean by randomization?
- 10) What is binary search?



## SECTION-B

- 11) Analyze average case time complexity of quick sort.
- 12) Explain depth first search algorithm with an example.
- 13) What do you mean by approximation algorithms? Explain.
- 14) Explain the classes of NP-hard and NP-complete.
- 15) Differentiate between Polynomial vs. Exponential running time.

## SECTION-C

- 16) Explain Radix sort algorithm. Sort the given list of numbers 215,203,710,415,812,115 using Radix sort algorithm. Also explain the time complexity of radix sort algorithm.
- 17) a. What is Fast Fourier Transform (FFT)? Explain in detail. Also, explain its applications.  
b. Explain Knuth-Morris-Pratt algorithm in detail with the help of an example.
- 18) Explain the following with the help of an example :
  - a. Dynamic programming
  - b. Divide and conquer technique
  - c. Greedy algorithm
  - d. Randomization



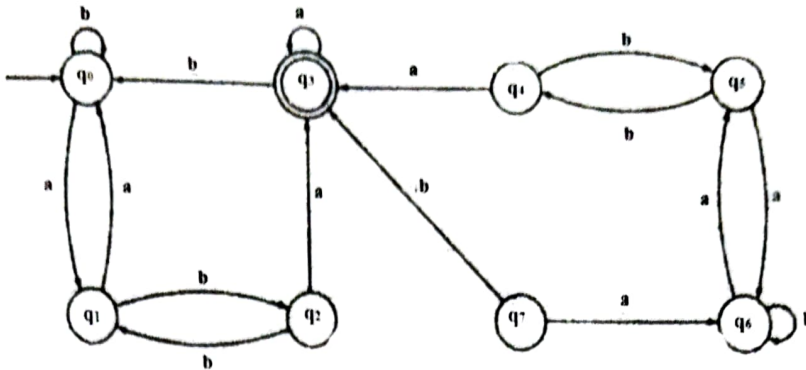
**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. Discuss Chomsky Classification of languages.
3. Construct the minimum state automaton equivalent to following finite automaton given :



4. Construct a NFA for a language that accepts all strings over  $\{a,b\}$  ending in aba. Use it to construct a DFA accepting same set of strings.
5. What is Pushdown Automata? Construct a PDA that accepts even palindromes of the form :

$$L = \{ww^R \mid w = (a+b)^*\}$$

6. Convert the given Moore Machine to its equivalent Mealy Machine

State	0	1	Output
→q <sub>0</sub>	q <sub>1</sub>	q <sub>2</sub>	1
q <sub>1</sub>	q <sub>3</sub>	q <sub>2</sub>	0
q <sub>2</sub>	q <sub>2</sub>	q <sub>1</sub>	1
q <sub>3</sub>	q <sub>0</sub>	q <sub>3</sub>	1

## SECTION-C

7. What is Turing machine? Design a Turing Machine which recognizes the language  
 $L = 01^*0$
8. Describe pumping lemma for regular languages with the help of example.
9. Define Chomsky Normal Form. Convert the following Context Free Grammar to Chomsky Normal Form :

$$P : S \rightarrow ASA \mid aB, A \rightarrow B \mid S, B \rightarrow b \mid \epsilon$$

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CSE) (Sem.-5)**  
**SOFTWARE ENGINEERING**

Subject Code : BTCS-503-18

M.Code : 78322

Date of Examination : 04-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1) Write briefly :

- a. What is meant by Software engineering paradigm?
- b. Which process model leads to software reuse and why?
- c. What is meant by software prototyping?
- d. What is all the information in data dictionary?
- e. What are the various testing activities?
- f. What is cyclomatic complexity?
- g. Define Verification & Validation.
- h. What is software architecture?
- i. Define software process. State the important features of a process.
- j. Define Spiral model.



### SECTION-B

- 2) Which is more important—the product or process? Justify your answer.
- 3) Justify “*Design is not coding and coding is not design*”.
- 4) Explain in detail the COCOMO model.
- 5) Draw and explain the DFD diagram for university information System.
- 6) What do you mean by software reliability?

### SECTION-C

- 7) Explain the feasibility studies. What are the outcomes? Does it have either implicit or explicit effects on software requirement collection?
- 8) What are the characteristics of a good design? Describe different types of coupling and cohesion. How design evaluation is performed?
- 9) What is black box testing? Is it necessary to perform this? Explain various test activities.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech.(CSE) (Sem.-5)**  
**COMPUTER GRAPHICS**

**Subject Code : BTCS-504**

**M.Code : 70537**

**Date of Examination : 04-08-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

**Answer briefly :**

- 1) How do you find whether the given point on the surface is inside or outside of the surface plane?
- 2) What are the matrices for rotating an object around an arbitrary axis?
- 3) Can one combine two transformations into one?
- 4) What is aspect ratio?
- 5) What is the difference between raster and vector graphics?
- 6) What is the working principle of CRT?
- 7) What is the difference between pointing and positioning devices?
- 8) How is a character formed in graphics?
- 9) What is the need for a graphics device driver?
- 10) How world coordinate system is converted to screen coordinate system?

### SECTION-B

- 11) Explain refresh cathode ray tube with the help of diagram and write down some advantages and disadvantages.
- 12) a) Describe the steps in DOA line drawing algorithm.  
b) Explain Bresenham's drawing algorithm and use it to find all points on a line drawn between (0,0) and (3,8) in a raster scan display.
- 13) a) What would be the advantages and disadvantages of permitting more than one segments to be open at a time?  
b) What do you understand by clipping? Explain point clipping and line clipping.
- 14) a) Elaborate the steps required to fill the polygon using flood fill technique.  
b) Modify the boundary fill algorithm for a 4-connected region to avoid excessive stacking by incorporating scan line method.
- 15) Draw the block diagram of colour graphics system indicating the number of bit planes per colour and look up table size for selecting 512 colour combinations from a palette of 4096 colours.

### SECTION-C

- 16) a) Why do we use Bezier methods? Write down all the properties of Bezier curve.  
b) What do you mean by geometric transformation? Explain translation, rotation and scaling with the help of an example.
- 17) a) Find out final transformation matrix when point  $p(x,y)$  is to be reflected about a line  $y=mx+c$ .  
b) Show how shear transformation may be expressed in term of rotation and scaling.
- 18) a) What do you mean by animation? Explain different tools used in animation.  
b) Write short notes on the following:
  - i) Flat panel display.
  - ii) Morphing.
  - iii) Plasma panel display.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CSE) (Sem.-5)**  
**COMPUTER PERIPHERALS & INTERFACES**

Subject Code : BTCS-505

M.Code : 70538

Date of Examination : 05-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Answer briefly :**

1. What is parallel communication?
2. Explain any one advanced 3D technology.
3. Write steps of troubleshooting of drivers.
4. Give the advantage of DMA channel.
5. What is an interrupt?
6. What is the need of accelerated graphics port bus?
7. Explain the working of parallel to SCSI converted.
8. What is the need of video RAM?
9. Explain the working principle of a CRT monitor.
10. Compare SCSI and IDE.

### SECTION-B

11. What is a resource conflict? Explain the methods to resolve the resource conflict.
12. What is a USB? How is data transferred from a keyword connected using USB?
13. Explain the working of LCD Panels.
14. Explain briefly the various I/O buses.
15. Explain the use of SCSI Interface with its pin outs.

### SECTION-C

16. What is a device driver? Explain UNIX/LINUX device drivers in details.
17. Explain the evolution of various ATA standards.
18. What is chipset? Discuss the concept of Integrated Video/ Motherboard chipset?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)

**COMPUTER NETWORKS**

Subject Code : BTCS-504-18

M.Code : 78323

Date of Examination : 05-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and student have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is the need of Protocols?
- b) What are the disadvantages of Optic fiber as a transmission media?
- c) What do you mean by block coding? Explain.
- d) Explain in brief about piggybacking.
- e) Why IPv6 is required?
- f) Explain the term BOOTP in brief.
- g) Differentiate between TCP and UDP Protocols.
- h) What do you mean by congestion control?
- i) What are the characteristics of cryptography?
- j) Differentiate between TELNET and FTP.



### SECTION-B

2. Write a detailed note on Virtual LAN.
3. Write a detailed note on Protocol using Go Back N.
4. Write a detailed note on RARP protocol.
5. Write a detailed note on Transmission Control Protocol (TCP).
6. Write a detailed note on EMAIL.

### SECTION-C

7. Write a detailed note on OSI reference Model. (10)
8. Write a detailed note on Distance Vector Routing protocol. (10)
9. Explain the following terms in detail :
  - a) TELNET (3)
  - b) DNS (Domain Name Space). (3)
  - c) SNMP. (4)

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem.-6)

**MACHINE LEARNING**

Subject Code : BTCS-618-18

M.Code : 79257

Date of Examination : 09-07-22

Max. Marks : 60

Time : 3 Hrs.

B. Tech C  
P.T.U. Question

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying FIVE marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Machine Learning
2. Well-Posed Learning Problems
3. Data integration
4. Data reduction
5. Rsquare
6. Linear Regression
7. K-NN
8. Clustering
9. Recombination
10. Mutation.

**SECTION-B**

11. What is the need of data Pre-processing? Explain any 2 methods.
12. Explain the various types of Machine Learning.

13. Explain how Naive-Bayes algorithm is useful for learning and classifying text.
14. What are the applications of Neural Network?
15. Explain :
  - a) Naive Algorithm
  - b) Apriori Algorithm.

#### SECTION-C

16. Explain the concept of classification in detail.
17. Write need and application of Association Rules Learning.
18. Describe the various types of clustering Methods.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

- 11) What is SQLite? Explain the steps required to create, open and close the database cursors.
- 12) Define Loader. Explain the different call back method of Loader Manager class.
- 13) Define Content Provider. Explain with an example sharing the data between application using Content Provider.
- 14) Explain best practices to keep the user data secure.
- 15) Define Input Control. Explain different types of Button and its states.

## SECTION-B

- 16) Explain the Android architecture with the help of a neat diagram.
- 17) Develop an application to store student details like roll no., name, branch, marks, percentage and retrieve student information using roll no. in SQLite databases.
- 18) What are the most important factors in developing mobile application development? Explain in detail.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE / CSE / EE / ECE)

(Sem.-6)

**COMPUTER NETWORKS**

Subject Code : BTIT401-18

M.Code : 79637

Date of Examination : 18-07-22

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. What is difference between ring and star topology?
- b. List some un-guided media for transmission of data.
- c. What is spread spectrum?
- d. Define flow control.
- e. Define piggybacking.
- f. Why do we need error control?
- g. What is HTTP?
- h. List some features of Bluetooth technology
- i. Why TCP is reliable protocol?
- j. Define virtual LAN.



## SECTION-B

2. Discuss the different types guided media used for transmission of data at physical layer.
3. Explain the Go-back- N ARQ flow control protocol with the help of a suitable example.
4. What is a logical addressing? How logical addressing is across the different networks?
5. Explain leaky bucket algorithm for congestion control.
6. What is the need of firewall? Discuss different types of firewalls used as Intrusion prevention system.

## SECTION-C

7. Why intermediate infrastructure is having only three layers in OSI model. Discuss the different types of hardware devices used at different layers of OSI Model.
8. What is QOS? Discuss few QOS parameters used at transport layer. How we can improve the QOS?
9. Write a short note on :
  - a. SNMP
  - b. CSMA/CD

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Computer Science & Engineering/  
Electrical Engineering/Electronics & Communication  
Engineering/Mechanical Engineering) (Sem.-7/8)  
PRODUCT DESIGN & DEVELOPMENT**

Subject Code : BTME-614-18

M.Code : 90482

Date of Examination : 20-07-22

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- (a) What do you mean by 'Product Design'?
- (b) What do you mean by 'Allowances'?
- (c) What do you mean by Product Strategies?
- (d) Discuss significance of forms in design.
- (e) What do you mean by 'tolerances' in design and assembly?
- (f) Describe 'House of quality'.
- (g) Differentiate between design by evolution and design by innovation.
- (h) Discuss characteristics of forms in design.
- (i) What is break-even point?
- (j) Describe 'Product Value'.





## SECTION-B

2. Explain in detail structure of Product Design? Write a detailed note on morphology of design.
3. Explain various design considerations. Write a detailed note on "*Ergonomics and Aesthetics in Product Design*".
4. Explain in detail break even analysis.
5. Explain in detail '*Quality Function Deployment*'.
6. Describe concurrent engineering in detail. Write benefits of concurrent engineering.

## SECTION-C

7. Write a detailed note on Rapid Prototyping Technologies. Explain its principle.
8. Explain producibility requirements for :
  - a) Design of Machine components.
  - b) Pressed Component Design.
  - c) Design for machining ease.
  - d) Forging Design.
  - e) Design of powder metallurgical parts.
9. Write a detailed note on relation of manufacturing operations to :
  - a) Design
  - b) Economic analysis
  - c) Profit
  - d) Competitiveness.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

- 11) Find the equation of a Bezier curve which is defined by four control points as  $(80,30,0)$ ,  $(100,100,0)$ ,  $(200,100,0)$  and  $(250,30,0)$ .
- 12) A square having end points A  $(1,1)$ , B  $(5,1)$ , C  $(5,5)$ , D  $(1,5)$  is rotated  $45^\circ$  in clockwise direction keeping the point B fixed. Find its final co-ordinate.
- 13) Explain in detail the various analytical properties associated with assembly design.
- 14) Explain in detail the representation of synthetic surfaces in CAD?
- 15) a) Describe how the data base is organized when building a solid model from the graphic primitives.  
b) What is geometric modelling? What are its advantages?

## SECTION-C

- 16) What are the ruled surfaces? Explain it with diagram.
- 17) Write a short note on the following :
  - a) Difference between translation and panning.
  - b) Euler-Poincare formula used in solid modelling.
- 18) a) Differentiate between wire frame modeling and surface frame modeling.  
b) Define NURBS curve and various properties of NURBS curve in details.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CSE) (Sem.-6)**  
**SIMULATION AND MODELING**

Subject Code : BTCS-601

M.Code : 71107

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**

**Answer briefly :**

- 1) Mention two advantages and two disadvantages of simulation.
- 2) Write the major operations of list processing.
- 3) List the statistical tools used for data analysis.
- 4) Differentiate activity and attribute with respect to system simulation.
- 5) What is an unbiased estimator? Give example.
- 6) What is sampling with equal and unequal variances?
- 7) Name any two techniques to generate Pseudo-Random numbers.
- 8) Compare process orientation and event orientation in simulation of computer systems.
- 9) What is meant by stochastic nature of output data?
- 10) State the equivalence property of queuing networks.



## SECTION-B

- 11) What is meant by event scheduling and time-advance mechanism in discrete event simulation? Give appropriate examples for both.
- 12) Describe the inverse transformation technique for Weibull and for Empirical Continuous Distribution.
- 13) What is preemptive and non-preemptive priority discipline queuing model? Give example.
- 14) Do you think the test of significance is important in the comparison and evaluation of simulation models? Give proper reasons.
- 15) Discuss the concept of both, confidence interval with specified precision and multiple linear regressions.

## SECTION-C

- 16) What is the use of network queues? Briefly discuss the steady state behavior of infinite (M/G/l) and finite (M/M/c/K/K) calling population models.
- 17) Explain the basic structure of queuing models by taking any suitable queuing model and highlight the role of exponential and non-exponential distributions in statistical modeling.
- 18) Describe the following with respect to input modeling :
  - a. Chi-Square and Chi-Square with equal probabilities.
  - b. Calibration and Validation.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-6)

**RDBMS-II**

Subject Code : BTCS-602

M.Code : 71108

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Write briefly :**

1. a) Differentiate between DDL and DML commands.  
b) What is a view? How it is related with data independence?  
c) Define Schema and Instance.  
d) What is functional dependency? When it is said to be minimal?  
e) What do you mean by atomicity and aggregation?  
f) What is phantom deadlock?  
g) What is checkpoint and when does it occur?  
h) What do you mean by data fragmentation in DDBMS?  
i) Compare OLTP and OLAP systems.  
j) What is buffer management?



## SECTION-B

2. Differentiate the recovery techniques deferred update and immediate update.
3. What is meant by multi-valued dependency? How it is related to normalization? .
4. Discuss the two phase locking protocols for concurrency control in databases with the help of an example.
5. Give a comparative study of different features of MySQL, Oracle and Microsoft SQL Server.
6. Briefly explain the data mining process. Also, discuss relationship between data warehousing and data mining.

## SECTION-C

7. What is Data Fragmentation? Explain its types with suitable examples.
8. What is Normalization? Discuss all the normal forms in detail with example.
9. Illustrate the statement syntax for following operations on given table.
  - a) Create above given table.
  - b) Change the marks of Rahul in English subject from 89 to 91.
  - c) Display the name of students who got more than 80 marks in any subject.
  - d) Calculate total marks of individual student.
  - e) Increase marks by adding 5 marks whose marks are less than 75.

Sr.No.	S name	English	Science	Maths	IT
100	Anil	75	85	73	70
101	Sunil	88	75	95	84
102	Rahul	89	77	82	91
103	Pihu	75	72	70	92
104	Monu	86	85	81	71

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) PIT(Sem.-6)

**COMPILER DESIGN**

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 02-07-22

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Write briefly :**

1. Lexeme
2. Error
3. Three address code
4. Impact of empty entry in parsing table.
5. Type checking
6. NFA
7. Regular expression
8. Syntax tree
9. Context free grammar
10. Phase of a compiler.





## SECTION-B

11. Write a note on input buffering.
12. How shift reduce parsing is performed on given below grammar, explain in detail.

$S \rightarrow S + S$

$S \rightarrow S * S$

$S \rightarrow id$

13. Differentiate between Parse tree and Syntax tree with the use of suitable example.
14. Explain the role of symbol table, symbol table management in compiler design.
15. Explain various issues of code generation in compiler design.

## SECTION-C

16. Write a note on basic blocks and its optimization techniques.
17. Explain in detail the role of various phases of compiler with suitable example.
18. Explain in detail error handling mid recovery techniques available in compiler.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**



## **SECTION-B**

2. Explain in detail the characteristics, vision and applications of cloud computing.
3. Write a note on virtualization techniques.
4. Explain in detail the various cloud service models and their examples.
5. What do you understand by Platform as a service? Explain its purpose.
6. Explain in detail various web services provided by AWS cloud provider.

## **SECTION-C**

7. Explain in detail the various steps involved in cloud migration.
8. Write a note on security risks and the measures involved in cloud computing.
9. Explain different types of Hypervisors, their limitations available in cloud computing.

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CSE) PIT (Sem.-6)**  
**ARTIFICIAL INTELLIGENCE**

Subject Code : BTCS-602-18

M.Code : 79250

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) Multi-agent environment
- b) Search graph
- c) Heuristic search
- d) Depth first search
- e) Probabilistic reasoning
- f) Bayesian networks
- g) Markov decision process
- h) Policy iteration in Markov decision process
- i) Q-learning algorithm in reinforcement learning
- j) Temporal difference learning.

## SECTION-B

2. Discuss the various issues and challenges in Artificial Intelligence.
3. Explain any one game search technique in Artificial Intelligence.
4. Describe the concept of conditional probability in detail.
5. How does utility functions work in Markov decision process?
6. Explain how the Bayesian networks are represented and constructed?

## SECTION-C

7. Discuss the searching algorithm with closed and open list. Give suitable example.
8. Differentiate between tree and graph structures.
9. With the help of suitable illustrations, describe the importance of Q-learning algorithm in reinforcement learning.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
CSE-6 Sem

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem.-6)  
**MOBILE APPLICATION DEVELOPMENT**

Subject Code : BTCS-620-18

M.Code : 79258

Date of Examination : 09-07-22

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

- 1) Define the role of GPS in Android devices.
- 2) Write the syntax for Intent-Filter tag.
- 3) Enlist the steps to publish the Android application.
- 4) What are the layers present in the android architecture?
- 5) What are the mobile agents?
- 6) Enlist steps to implement the AddMob in Application.
- 7) What is use of Gradle in Android?
- 8) Define Touch Gesture.
- 9) Enlist the two limitations AsyncTask.
- 10) Define Shared Preferences? Differentiate between Shared Preferences and Saved State

## SECTION-B

- 11) What is SQLite? Explain the steps required to create, open and close the database cursors.
- 12) Define Loader. Explain the different call back method of Loader Manager class.
- 13) Define Content Provider. Explain with an example sharing the data between application using Content Provider.
- 14) Explain best practices to keep the user data secure.
- 15) Define Input Control. Explain different types of Button and its states.

## SECTION-B

- 16) Explain the Android architecture with the help of a neat diagram.
- 17) Develop an application to store student details like roll no., name, branch, marks, percentage and retrieve student information using roll no. in SQLite databases.
- 18) What are the most important factors in developing mobile application development? Explain in detail.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





13. Explain how Naive-Bayes algorithm is useful for learning and classifying text.

14. What are the applications of Neural Network?

15. Explain :

a) Naive Algorithm

b) Apriori Algorithm.

### SECTION-C

16. Explain the concept of classification in detail.

17. Write need and application of Association Rules Learning.

18. Describe the various types of clustering Methods.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-6)

**RDBMS-II**

Subject Code : BTCS-602

M.Code : 71108

Date of Examination : 05-07-22

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Write briefly :**

1. a) Differentiate between DDL and DML commands.  
b) What is a view? How it is related with data independence?  
c) Define Schema and Instance.  
d) What is functional dependency? When it is said to be minimal?  
e) What do you mean by atomicity and aggregation?  
f) What is phantom deadlock?  
g) What is checkpoint and when does it occur?  
h) What do you mean by data fragmentation in DDBMS?  
i) Compare OLTP and OLAP systems.  
j) What is buffer management?

## SECTION-B

2. Differentiate the recovery techniques deferred update and immediate update.
3. What is meant by multi-valued dependency? How it is related to normalization?
4. Discuss the two phase locking protocols for concurrency control in **databases** with the help of an example.
5. Give a comparative study of different features of MySQL, Oracle and Microsoft SQL Server.
6. Briefly explain the data mining process. Also, discuss relationship between data warehousing and data mining.

## SECTION-C

7. What is Data Fragmentation? Explain its types with suitable examples.
8. What is Normalization? Discuss all the normal forms in detail with example.
9. Illustrate the statement syntax for following operations on given table.
  - a) Create above given table.
  - b) Change the marks of Rahul in English subject from 89 to 91.
  - c) Display the name of students who got more than 80 marks in any subject.
  - d) Calculate total marks of individual student.
  - e) Increase marks by adding 5 marks whose marks are less than 75.

Sr.No.	S name	English	Science	Maths	IT
100	Anil	75	85	73	70
101	Sunil	88	75	95	84
102	Rahul	89	77	82	91
103	Pihu	75	72	70	92
104	Monu	86	85	81	71

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) PIT(Sem.-6)

**COMPILER DESIGN**

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

1. Lexeme
2. Error
3. Three address code
4. Impact of empty entry in parsing table.
5. Type checking
6. NFA
7. Regular expression
8. Syntax tree
9. Context free grammar
10. Phase of a compiler.

## SECTION-B

11. Write a note on input buffering.
12. How shift reduce parsing is performed on given below grammar, explain in detail.

$$S \rightarrow S + S$$

$$S \rightarrow S * S$$

$$S \rightarrow \text{id}$$

13. Differentiate between Parse tree and Syntax tree with the use of suitable example.
14. Explain the role of symbol table, symbol table management in compiler design.
15. Explain various issues of code generation in compiler design.

## SECTION-C

16. Write a note on basic blocks and its optimization techniques.
17. Explain in detail the role of various phases of compiler with suitable example.
18. Explain in detail error handling mid recovery techniques available in compiler.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CSE) (Sem.-6)**  
**SIMULATION AND MODELING**

**Subject Code : BTCS-601**

**M.Code : 71107**

**Date of Examination : 02-07-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt **ANY FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt **ANY TWO** questions.

**SECTION-A**

**Answer briefly :**

- 1) Mention two advantages and two disadvantages of simulation.
- 2) Write the major operations of list processing.
- 3) List the statistical tools used for data analysis.
- 4) Differentiate activity and attribute with respect to system simulation.
- 5) What is an unbiased estimator? Give example.
- 6) What is sampling with equal and unequal variances?
- 7) Name any two techniques to generate Pseudo-Random numbers.
- 8) Compare process orientation and event orientation in simulation of computer systems.
- 9) What is meant by stochastic nature of output data?
- 10) State the equivalence property of queuing networks.

## SECTION-B

- 11) What is meant by event scheduling and time-advance mechanism in discrete event simulation? Give appropriate examples for both.
- 12) Describe the inverse transformation technique for Weibull and for Empirical Continuous Distribution.
- 13) What is preemptive and non-preemptive priority discipline queuing model? Give example.
- 14) Do you think the test of significance is important in the comparison and evaluation of simulation models? Give proper reasons.
- 15) Discuss the concept of both, confidence interval with specified precision and multiple linear regressions.

## SECTION-C

- 16) What is the use of network queues? Briefly discuss the steady state behavior of infinite (M/G/1) and finite (M/M/c/K/K) calling population models.
- 17) Explain the basic structure of queuing models by taking any suitable queuing model and highlight the role of exponential and non-exponential distributions in statistical modeling.
- 18) Describe the following with respect to input modeling :
  - a. Chi-Square and Chi-Square with equal probabilities.
  - b. Calibration and Validation.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CSE / IT) (Sem.-6)**  
**SOFTWARE ENGINEERING**

Subject Code : BTCS-603

M.Code : 71109

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Answer briefly :**

1. Differentiate between cohesion and coupling.
2. In which scenario structure chart will be considered a better choice than DFD?
3. What is the significance of software reuse?
4. How risk analysis helps in software development?
5. Why do we need to create SRS document?
6. Prerequisites to draw GANTT chart.
7. List the various software reliability metrics.
8. Define test case.
9. What is the need of technical feasibility study?
10. List various non-functional requirements for software.



## SECTION-B

11. Which methodology is used to analyze viability of software to be developed? Discuss its types.
12. How object-oriented software development is better than traditional development methods?
13. Differentiate between DFS and structure chart. Draw a DFD elaborating working of software for event ticket booking.
14. What are different test case design techniques? Discuss.
15. Why do we need formal process for software development? How it helps in standardization of software's across the world.

## SECTION-C

16. What are the various steps involved in spiral model? Explain and compare it with waterfall model.
17. Why testing is necessary for software's? What are the different methods to test software?
18. Write short note on following :
  - a) Cost estimation
  - b) Coding standards
  - c) Software requirement specification.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engg.) (Sem.-6)

**CLOUD COMPUTING**

Subject Code : BTCS-612-18

M.Code : 79254

Date of Examination : 03-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write short notes on :
  - a) Hypervisor
  - b) Scalability
  - c) API
  - d) IaaS
  - e) Private Cloud
  - f) Cloud Migration
  - g) Access Control
  - h) Security Breach
  - i) AWS
  - j) Multitenancy

## SECTION-B

2. Explain in detail the characteristics, vision and applications of cloud computing.
3. Write a note on virtualization techniques.
4. Explain in detail the various cloud service models and their examples.
5. What do you understand by Platform as a service? Explain its purpose.
6. Explain in detail various web services provided by AWS cloud provider.

## SECTION-C

7. Explain in detail the various steps involved in cloud migration.
8. Write a note on security risks and the measures involved in cloud computing.
9. Explain different types of Hypervisors, their limitations available in cloud computing.

**NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. "Zener diode can be used as a voltage regulator". Justify it.
3. Define tunneling phenomenon. Explain how tunnel diode operates under different operating conditions. In what way, it is different from conventional diodes? Give the necessary energy level diagrams.
4. Derive the expression for Diffusion capacitance of a diode.
5. Why is it preferred to locate the Q point at the centre of the active region for amplification purpose?
6. Explain the process of Chemical Vapour Deposition.

## SECTION-C

7. Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier without center tap transformer. Obtain the expression for peak inverse Voltages of both.
8. Explain the operation of Enhancement mode MOSFET in detail.
9. Compare CE, CB, and CC configurations of a transistor.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (Sem.-7,8)  
**THEORY OF COMPUTATION**

Subject Code : BTCS-702

M.Code : 71894

Date of Examination : 11-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**



**Answer briefly :**

1. What is the meaning of statement '*acceptability of string by FA*'?
2. L is a subset of closure of alphabet (T / F).
3. List some applications of Theory of computation.
4. Every Type 2 grammar is a Type 3 grammar (T/F). Justify your answer
5. Define Regular Expression.
6. State Arden's theorem.
7. What is the meaning of halting problem in TM?
8. Define yield of a parse tree.
9. What are useless symbols?
10. What is the difference between FA and PDA?

## SECTION-B

11. Discuss the procedure to convert NFA to DFA with the help of a suitable example.
12. What is parsing? How Left most and right most derivation helps to find out the ambiguity in a grammar?
13. What is a regular language? Explain the properties of regular languages.
14. Discuss the concept of Pumping Lemma for regular grammars. How Pumping Lemma is used to prove weather a given grammar is not a regular grammar?
15. Define regular expression. Find a regular expression corresponding to the language of strings of even lengths over the alphabet of  $\{a,b\}$ .

## SECTION-C

16. What is a context free grammar and explain closure properties of Context free grammar?
17. Discuss Push down Automation in detail. Design PDA for  $\{wcw^T \mid w=\{a,b\}^*\}$
18. Write a short note on :
  - a. LR(K) Grammars.
  - b. Recursively enumerable language.
  - c. CNF.
  - d. Regular Grammar.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages :02

Total No. of Questions :18

**B.Tech. (CSE) (Sem.-7,8)**  
**ARTIFICIAL INTELLIGENCE**

**Subject Code :BTCS-701**

**M.Code : 71893**

**Date of Examination : 13-07-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt **ANY FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt **ANY TWO** questions.

**SECTION-A**

**Write briefly :**

- 1) What are the features of NLP?
- 2) State the relationship between Intelligence and Knowledge.
- 3) Briefly explain syntactic processing.
- 4) What is rule based learning?
- 5) Features of utility functions in decision making.
- 6) Significance of planning in the blocks world.
- 7) Alpha-beta pruning.
- 8) What is an inference engine?
- 9) Distinguish between Fact and Predicate.
- 10) What is state space?





## SECTION-B

- 11) Describe in detail the differences between language understanding and language generation.
- 12) Explain state space approach in solving any AI problem. Discuss this for water jug problem.
- 13) What are the various heuristic techniques? Explain, how they are different from the solution guaranteed techniques.
- 14) Express the following sentences as conceptual dependency structure:
  - a) Bill is a programmer.
  - b) Sam gave Mary a box of candy.
- 15) What is an expert system? What are the main advantages in keeping the knowledge base separate from the control module in knowledge based systems.

## SECTION-C

- 16) Explain the back propagation algorithm for neural nets.
- 17) What is the mini Max search technique? What is a alpha beta cutoff?
- 18) What are the limitations of Predicate logic as a tool for Knowledge representation? Illustrate through examples.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering/Electrical & Electronics  
Engineering/Electrical Engineering/Electronics & Communication  
Engineering/Mechanical Engineering)/B.Tech. (ECE) (PIT) (Sem.-7/8)

**DATABASE MANAGEMENT SYSTEM**

Subject Code : BTCS-501-18

M.Code : 90493

Date of Examination : 15-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a. Explain data independence.
- b. Write the syntax for insert into table command. Give an example.
- c. Define candidate key. Give an sample.
- d. What is derived attribute?
- e. Discuss the importance of normalization.
- f. What is the role of authorization in database security?
- g. Explain cascading roll back.
- h. Discuss serializability.
- i. Define cardinality in ER Diagram.
- j. Consider a table employee with id, name, designation, salary attributes. Write update command to increase the salary of all employees by 1000 whose current salary is less than 20000.

## SECTION-B

2. Explain different keys used in database management system.
3. Explain in detail various levels of database security.
4. Explain the concept of view serializability.
5. Explain in detail the Logical databases.
6. Explain the file organization using indices.

## SECTION-C

7. Describe the overall architecture of a Database Management System. Discuss each component of DBMS architecture.
8. What is join operation? Discuss the various types of inner and outer joins with the help of an example each.
9. Explain in detail the storage strategies like Indices, B-Tree and Hashing.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Write a detailed note on Division Restoring techniques.
3. Explain in detail about software interrupts and exceptions.
4. Explain about arithmetic pipelining with an example.
5. Write a detailed note on Parallel processors.
6. Write a detailed note on Memory Interleaving.

## SECTION-C

7. Explain in detail about following :
  - a) Booth Multiplier
  - b) Floating point arithmetic.
8. Write a detailed note on privileged and non-privileged instructions.
9. Write a detailed note on following :
  - a) Replacement Algorithms
  - b) Mapping Functions.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Explain various black -box techniques used to design effective test cases.
3. Differentiate between the following :
  - a) Equivalence partitioning and Boundary value analysis methods
  - b) Verification and Validation
  - c) White-Box and Black-Box Testing.
4. What is object oriented testing? Explain the various objects oriented testing strategies and issues in detail.
5. Explain product quality metrics.
6. Why do we need integration testing? Explain various approaches in integration testing.

## SECTION-C

7. Write a short note on 'software quality assurance standards'.
8. Explain the following :
  - a. Alpha and beta testing
  - b. Fault based testing
  - c. Software reliability.
9. Write short notes on the following :
  - a) CMM
  - b) Formal Technical Reviews
  - c) BVA
  - d) ISO 9126.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science Engg./Information Technology) (Sem.-7)

**ROUTING AND SWITCHING**

Subject Code : BTEC-905A-18

M.Code : 90691

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- (a) Difference between host name and IP address.
- (b) What is ICMP used for?
- (c) Why should you use CLI?
- (d) Why Rapid Spanning Tree protocol is faster than Spanning Tree Protocol?
- (e) What is DHCP?
- (f) How does Telnet work?
- (g) What are the types of Wireless LANs?
- (h) What is Access Control List?
- (i) How VPN helps in securing data?
- (j) What is VLAN routing?





## SECTION-B

2. What are the services provided by application layer? Explain FTP and SMTP protocols.
3. What is the need of Network Address Translation? Explain its types.
4. What is CLI? What are the advantages and disadvantages of CLI?
5. Write a note on IPv6 routing technologies and application services.
6. What is Generic Routing Encapsulation? How does it work?

## SECTION-C

7. Write a note on :
  - (a) VRP Operating System Image Management.
  - (b) Establishing DSL/ADSL networks with PPPoE.
8. (a) How we can secure data with IPsec and VPN in networks?
  - (b) How enterprise network constructs?
9. Write a note on :
  - (a) File System Navigation and Management.
  - (b) Bridging Enterprise Networks with Serial WAN Technology.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science Engg.) (Sem.-7/8)

**DATA MINING AND DATA WAREHOUSING**

Subject Code : BTCS-702-18

M.Code : 90488

Date of Examination : 04-07-22

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. MOLAP versus HOLAP.
- b. Different stages of Data Warehousing.
- c. Advantages of Decision Tree Classifier.
- d. Different linkage methods used in the Hierarchical Clustering.
- e. User behavior analysis through Web Mining.
- f. Search Engine Optimization.
- g. Need of Cube in Data Warehousing.
- h. Web Page ranking.
- i. Categories of clustering methods.
- j. Data Mining query language.



## SECTION-B

2. What is the need to maintain hierarchy in web structure? Illustrate. What are the different rules for web mining?
3. Draw a neat diagram of data warehouse architecture. Explain its various components.
4. What are the reasons that make OLAP better than OLTP? Discuss two scenarios where OLAP can be used to extract information.
5. What is the application of DHP? Does it affect performance of algorithms? Justify your answer with example.
6. When will we need to perform cluster analysis of databases? How are association rules mined from large databases?

## SECTION-C

7. How Pre-processing of data improves data mining? Explain in detail about the various pre-processing activities involved in data mining.
8. What are the characteristics of decision tree induction algorithms? Discuss the role of information theory in data mining.
9. What are the most important factors for Page ranking on Internet? Explain in detail. What are the methods to improve page ranking? List some tools helpful to improve Page Rank.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (Computer Science & Engg.)(Sem.-7,8)  
NETWORK SECURITY AND CRYPTOGRAPHY**

Subject Code : BICS-701-18

M.Code : 90487

Date of Examination : 01-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is cryptography?
- b) What is modular arithmetic. Give an example to explain?
- c) What is the importance of prime numbers in cryptography?
- d) Differentiate between authorization and authentication.
- e) What does CIA stands for?
- f) Define threat and attack.
- g) Hash Function
- h) PFP
- i) IDS
- j) Block cipher

**SECTION-B**

2. Explain the Euclidean and Extended Euclidean algorithm.
3. Differentiate Active and Passive attack.
4. What is the purpose of S-boxes in DES?
5. Identify the possible threats for RSA algorithm and list their counter measures.
6. What are the types of attack on encrypted message. Explain.

**SECTION-C**

7. Explain the following :
  - a) MD5 message Digest Algorithm.
  - b) Digital Signature.
8. Explain the design and types of firewalls.
9. Perform encryption and decryption using RSA algorithm for the following :  
 $P=7$ ;  $q=11$ ;  $e=17$ ;  $M=8$ .



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Computer Science & Engg.)(Sem.-7,8)**  
**NETWORK SECURITY AND CRYPTOGRAPHY**

Subject Code : BTCS-701-18

M.Code : 90487

Date of Examination : 01-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is cryptography?
- b) What is modular arithmetic. Give an example to explain?
- c) What is the importance of prime numbers in cryptography?
- d) Differentiate between authorization and authentication.
- e) What does CIA stands for?
- f) Define threat and attack.
- g) Hash Function
- h) PFP
- i) IDS
- j) Block cipher



## SECTION-B

2. Explain the Euclidean and Extended Euclidean algorithm.
3. Differentiate Active and Passive attack.
4. What is the purpose of S-boxes in DES?
5. Identify the possible threats for RSA algorithm and list their counter measures.
6. What are the types of attack on encrypted message. Explain.

## SECTION-C

7. Explain the following :
  - a) MD5 message Digest Algorithm.
  - b) Digital Signature.
8. Explain the design and types of firewalls.
9. Perform encryption and decryption using RSA algorithm for the following :  
 $P=7$ ;  $q=11$ ;  $e=17$ ;  $M=8$ .



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Explain different keys used in database management system.
3. Explain in detail various levels of database security.
4. Explain the concept of view serializability.
5. Explain in detail the Logical databases.
6. Explain the file organization using indices.

## SECTION-C

7. Describe the overall architecture of a Database Management System. Discuss each component of DBMS architecture.
8. What is join operation? Discuss the various types of inner and outer joins with the help of an example each.
9. Explain in detail the storage strategies like Indices, B-Tree and Hashing.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No. \_\_\_\_\_

Total No. of Pages :02

Total No. of Questions :18

B.Tech. (CSE) (Sem.-7,8)  
**ARTIFICIAL INTELLIGENCE**

Subject Code :BTCS-701

M.Code : 71893

Date of Examination : 13-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**

**Write briefly :**

- 1) What are the features of NLP?
- 2) State the relationship between Intelligence and Knowledge.
- 3) Briefly explain syntactic processing.
- 4) What is rule based learning?
- 5) Features of utility functions in decision making.
- 6) Significance of planning in the blocks world.
- 7) Alpha-beta pruning.
- 8) What is an inference engine?
- 9) Distinguish between Fact and Predicate.
- 10) What is state space?



## SECTION-B

- 11) Describe in detail the differences between language understanding and language generation.
- 12) Explain state space approach in solving any AI problem. Discuss this for water jug problem.
- 13) What are the various heuristic techniques? Explain, how they are different from the solution guaranteed techniques.
- 14) Express the following sentences as conceptual dependency structure:
  - a) Bill is a programmer.
  - b) Sam gave Mary a box of candy.
- 15) What is an expert system? What are the main advantages in keeping the knowledge base separate from the control module in knowledge based systems.

## SECTION-C

- 16) Explain the back propagation algorithm for neural nets.
- 17) What is the mini Max search technique? What is a alpha beta cutoff?
- 18) What are the limitations of Predicate logic as a tool for Knowledge representation? Illustrate through examples.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech.(CSE) (Sem.-7,8)  
**THEORY OF COMPUTATION**

Subject Code : BTCS-702

M.Code : 71894

Date of Examination : 11-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**

**Answer briefly :**

1. What is the meaning of statement 'acceptability of string by FA'?
2.  $L$  is a subset of closure of alphabet (T / F).
3. List some applications of Theory of computation.
4. Every Type 2 grammar is a Type 3 grammar (T/F). Justify your answer
5. Define Regular Expression.
6. State Arden's theorem.
7. What is the meaning of halting problem in TM?
8. Define yield of a parse tree.
9. What are useless symbols?
10. What is the difference between FA and PDA?



## SECTION-B

11. Discuss the procedure to convert NDFA to DFA with the help of a suitable example.
12. What is parsing? How Left most and right most derivation helps to find out the ambiguity in a grammar?
13. What is a regular language? Explain the properties of regular languages.
14. Discuss the concept of Pumping Lemma for regular grammars. How Pumping Lemma is used to prove whether a given grammar is not a regular grammar?
15. Define regular expression. Find a regular expression corresponding to the language of strings of even lengths over the alphabet of  $\{a,b\}$ .

## SECTION-C

16. What is a context free grammar and explain closure properties of Context free grammar?
17. Discuss Push down Automation in detail. Design PDA for  $\{wcw^T \mid w=\{a,b\}^*\}$
18. Write a short note on :
  - a. LR(K) Grammars.
  - b. Recursively enumerable language.
  - c. CNF.
  - d. Regular Grammar.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science Engg.) (Sem.-7/8)

**DATA MINING AND DATA WAREHOUSING**

Subject Code : BTCS-702-18

M.Code : 90488

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Write briefly :
  - a. MOLAP versus HOLAP.
  - b. Different stages of Data Warehousing.
  - c. Advantages of Decision Tree Classifier.
  - d. Different linkage methods used in the Hierarchical Clustering.
  - e. User behavior analysis through Web Mining.
  - f. Search Engine Optimization.
  - g. Need of Cube in Data Warehousing.
  - h. Web Page ranking.
  - i. Categories of clustering methods.
  - j. Data Mining query language.

## SECTION-B

2. What is the need to maintain hierarchy in web structure? Illustrate. What are the different rules for web mining?
3. Draw a neat diagram of data warehouse architecture. Explain its various components.
4. What are the reasons that make OLAP better than OLTP? Discuss two scenarios where OLAP can be used to extract information.
5. What is the application of DHP? Does it affect performance of algorithms? Justify your answer with example.
6. When will we need to perform cluster analysis of databases? How are association rules mined from large databases?

## SECTION-C

7. How Pre-processing of data improves data mining? Explain in detail about the various pre-processing activities involved in data mining.
8. What are the characteristics of decision tree induction algorithms? Discuss the role of information theory in data mining.
9. What are the most important factors for Page ranking on Internet? Explain in detail. What are the methods to improve page ranking? List some tools helpful to improve Page Rank.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Computer Science & Engg.)(Sem.-7,8)**  
**NETWORK SECURITY AND CRYPTOGRAPHY**

Subject Code : BTCS-701-18

M.Code : 90487

Date of Examination : 01-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is cryptography?
- b) What is modular arithmetic. Give an example to explain?
- c) What is the importance of prime numbers in cryptography?
- d) Differentiate between authorization and authentication.
- e) What does CIA stands for?
- f) Define threat and attack.
- g) Hash Function
- h) PFP
- i) IDS
- j) Block cipher



## SECTION-B

2. Explain the Euclidean and Extended Euclidean algorithm.
3. Differentiate Active and Passive attack.
4. What is the purpose of S-boxes in DES?
5. Identify the possible threats for RSA algorithm and list their counter measures.
6. What are the types of attack on encrypted message. Explain.

## SECTION-C

7. Explain the following :
  - a) MD5 message Digest Algorithm.
  - b) Digital Signature.
8. Explain the design and types of firewalls.
9. Perform encryption and decryption using RSA algorithm for the following :  
 $P=7$ ;  $q= 11$ ;  $e=17$ ;  $M=8$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. What do you mean by Regression tests used in agile methodology? Illustrate this concept in detail.
3. Illustrate the concept of Agile life cycle and its impact on testing.
4. Elaborate the concept of Kanban framework along with the challenges faced in software development.
5. '*Waterfall model is the theoretical model for software development.*' Explain the term.
6. Explain the concept of twelve practices Principle of XP in agile testing along with a suitable example.

## SECTION-C

7. List down the differences between :
  - a) Alpha, Beta and Gamma Testing.
  - b) Unit Testing and Functional Testing.
8. List down the brief steps that are to be followed to design an Agile software.
9. What do you mean by Liskov substitution framework? Explain its workflow in detail along with an example?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
15-3 Sem

B.Tech CIP

P.T.U @ Bhopal

Roll No.

Total No. of Questions : 09

Total No.

B.Tech. (IT) (Sem.-3)  
**COMPUTER ARCHITECTURE**

Subject Code : BTES-302-18

M.Code : 76394

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) List various functional blocks of a computer.
- b) Explain in brief about Restoring Division.
- c) What do you mean by instruction execution cycle? Explain
- d) What do you mean by non-privileged instructions? Explain
- e) Explain in brief about Random Access Memory.
- f) Explain in brief about program controlled I/O transfers.
- g) What do you mean by pipelining? Explain
- h) Explain in brief about Memory Interleaving.
- i) What do you mean by Cache Hits? Explain.
- j) Explain in brief about Speedup of a pipeline processing.



### SECTION-B

2. Write a detailed note on Ripple carry adder.
3. Write a detailed note on I/O device Interface.
4. Explain in brief about cache coherence problem.
5. Explain in detail about mapping functions.
6. Explain in detail about Data Hazards.

### SECTION-C

7. Write a detailed note on the following :
  - a) Carry look-ahead adder
  - b) Floating Point arithmetic.
8. Explain in detail about the following :
  - a) Input-output subsystems
  - b) Role of interrupts in process state transitions.
9. Write a detailed note on replacement algorithms.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(IT) (Sem.-3)  
**DATA STRUCTURE & ALGORITHMS**

Subject Code : BTIT-301-18

M.Code : 76391

Date of Examination : 04-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. SECTION-B contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. SECTION-C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

1) Write briefly :

- a. What is the average and worst case time complexity of Quicksort?
- b. How can we determine the end of circular linked list?
- c. Write various applications of stacks.
- d. List out the performance measures of an algorithm.
- e. Define sparse matrix.
- f. What do you mean by depth of recursion? Give an example of recursive function.
- g. What is a B+ tree?
- h. Discuss the time complexity of binary search and compare it with linear search.
- i. Define threaded binary tree.
- j. Discuss two advantages of linked list over array data structure.



### SECTION-B

- 2) What is an AVL search tree? How do we define the height of it? Discuss about the balance factor associated with a node of an AVL tree.
- 3) Write down the algorithm for binary search. Also find its time complexity.
- 4) Illustrate working of Insertion Sort to sort list: 25,15,30,9,99,20,26.
- 5) Write an algorithm to count the number of nodes in a singly linked list.
- 6) Write an algorithm for converting infix expression to postfix expression using stacks. Show the working of the algorithm clearly indicating the contents of the stack for following expression:  $((P+Q)*S)^{(T-U)}$

### SECTION-C

- 7) What is single source shortest path? Discuss Dijkstra's single source shortest path algorithm with an example.
- 8) What is a heap? How does it differ from a binary tree?
  - a) Construct a heap tree (while explaining various steps) for the following elements :  
(44,30,50,22,60,55,77,55)
  - b) Delete the root node of the tree formed in (a).
- 9) Name various tree traversal algorithms. Make a binary search tree from the given data and traverse tree using all traversal algorithms: 23 7 92 6 12 14 40 44 20 21

Which traversal algorithm leads to sorted output data and why?



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (IT) (Sem.-3)**  
**OBJECT ORIENTED PROGRAMMING**

Subject Code : BTIT-302-18

M.Code : 76392

Date of Examination : 05-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a. What is ternary operator?
- b. Define inline function.
- c. Define Abstract class.
- d. How memory is allocated to object?
- e. Define pure virtual function
- f. What is volatile member function?
- g. What is pointer to object?
- h. Define I/O stream.
- i. Define late binding.
- j. How we can open a file?



## SECTION-B

2. Explain about the different types of methods to pass an argument to a function with an example.
3. What is a constructor? What are different types of constructors used in C++? Explain with an example.
4. Explain about the various types of access specifiers are used for Inheritance in C++.
5. Explain different operations on File in C++. Explain your answer with a suitable program.
6. Define Exception. How we can handle the different exceptions in C++?

## SECTION-C

7. What are different concepts of Object-Oriented Programming? Why OOPs languages are popular since many years?
8. Define Inheritance. Explain the different types of inheritance used in C++.
9. Write a short note on :
  - a. Operator Overloading
  - b. Object as argument.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



B. Tech (IT) Sem-4

~~Handwritten signature~~

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-4)  
**DEVELOPMENT OF SOCIETIES**  
Subject Code : HSMC-101-18  
M.Code : 77541  
Date of Examination : 09-07-22

B. Tech (IT)  
P.T.U questions

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Answer briefly :**

- a) Clan
- b) Social development
- c) Any two models of social structure
- d) Political development
- e) Capitalism
- f) Jajmani system
- g) Comparative study
- h) Proletariat
- i) Decentralization
- j) Monarchy.

## SECTION-B

2. Discuss the concepts behind the origin of family.
3. Discuss the relation between human being and society.
4. What is Buddhist economics?
5. What is socialism? Write a note on its origin.
6. Discuss the concept of economic development during pre-British period.

## SECTION-C

7. Write an essay on the ideas of political systems from History.
8. Which model of governing system suits Indian society the best? Explain.
9. Elaborate Gandhi's idea of economic development.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**



## SECTION - B

2. What is need of Threads? Discuss the types of Threads.
3. Find Waiting Time and Turnaround time for given process using FCFS and algorithms

Process	Arrival Time (ms)	Burst Time (ms)
P1	1	5
P2	2	5
P3	2	6
P4	3	2

4. Write overview of Process Synchronization. Discuss the mechanisms to ensure synchronized execution of processes.
5. Explain the concept of Dining Philosopher problem in Operating System.
6. How page replacement algorithms are used in virtual memory?

## SECTION-C

7. What are the features of LINUX operating System? Why LINUX is secure operating system?
8. a) Write different access methods.  
b) Explain different allocation methods used in File Management.
9. Discuss necessary and sufficient conditions for Deadlock. Write the deadlock detection and recovery strategies.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem.-4)

**COMPUTER NETWORKS**

Subject Code : BTIT-401-18

M.Code : 77538

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is topology and types of topology?
- b) Give a note on concept of spread spectrum.
- c) What is VLAN?
- d) What is the use of ALOHA protocol?
- e) What is meant ARP?
- f) Differentiate IPV4 with IPV6.
- g) Why Leaky Bucket is used?
- h) Discuss the functioning of cryptography.
- i) What is Domain Name Space?
- j) Write about SNMP.



## SECTION-B

2. Discuss the role of multiplexing in data communication.
3. Explain the central concept of Hamming Distance. How it is used in error detection?
4. What is Unicast route? Write about any one algorithm used in it.
5. How CSMA/CA protocol is used to avoid the collision in networks?
6. What is meant by congestion control? How it is controlled?

## SECTION-C

7. Discuss in brief the performance parameters used in transmission media.
8. Why is QoS important in Networking? Discuss some QoS improving techniques?.
9. Explain the role of Firewalls in Computer Networks. How it is used to secure the system?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-4)

**DESIGN & ANALYSIS OF ALGORITHMS**

Subject Code : BTIT-403-18

M.Code : 77540

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Answer briefly :**

- a) Define Big-oh notation.
- b) What is the time complexity of the algorithm for finding all-pairs-shortest-path problem?
- c) How is the time complexity measured? How the running time of an algorithm calculated?
- d) What is the minimal spanning tree? What are its advantages?
- e) What are NP class problems?
- f) What are the characteristics of the problems to be solvable via dynamic programming?
- g) Are the sub solutions overlapping in dynamic programming approach?
- h) What are the graph traversal techniques?
- i) What is the minimal spanning tree? What are its advantages?
- j) What are NP-hard problems?

## SECTION-B

2. Solve the recurrence using master method :

$$T(n) = 9 T(n/3) + n$$

3. Solve the following instance of the knapsack problem using branch and bound

Items	w	v
I1	9	15
I2	6	6
I3	7	5
I4	2	1

4. What are the ways for representation of graphs? Compare these ways.
5. What is the relationship between the classes P and NP? Explain
6. What are NP hard problems? Write short notes on the procedures of the following approximation algorithms to solve TSP using suitable examples.
- Nearest Neighbor algorithm
  - Twice-around-the-tree algorithm.

## SECTION-C

7. Explain the Floyd-Warshall's algorithm with the help of an example.
8. Prove that  $f(n) = a_m n^m + a_{m-1} n^{m-1} + \dots + a_1 n + a_0$  then  $f(n) = O(n^m)$
9. Compare the various programming paradigms such as divide-and-conquer, dynamic programming and greedy approach.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



May 2022

19-4 Sem

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-4)

**DESIGN & ANALYSIS OF ALGORITHMS**

Subject Code : BTIT-403-18

M.Code : 77540

Date of Examination : 07-07-22

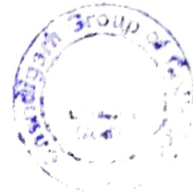
Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Answer briefly :**

- a) Define Big-oh notation.
- b) What is the time complexity of the algorithm for finding all-pairs-shortest-path problem?
- c) How is the time complexity measured? How the running time of an algorithm calculated?
- d) What is the minimal spanning tree? What are its advantages?
- e) What are NP class problems?
- f) What are the characteristics of the problems to be solvable via dynamic programming?
- g) Are the sub solutions overlapping in dynamic programming approach?
- h) What are the graph traversal techniques?
- i) What is the minimal spanning tree? What are its advantages?
- j) What are NP-hard problems?

## SECTION-B

2. Solve the recurrence using master method :

$$T(n) = 9 T(n/3) + n$$

3. Solve the following instance of the knapsack problem using branch and bound

Items	w	v
I1	9	15
I2	6	6
I3	7	5
I4	2	1

4. What are the ways for representation of graphs? Compare these ways.
5. What is the relationship between the classes P and NP? Explain
6. What are NP hard problems? Write short notes on the procedures of the following approximation algorithms to solve TSP using suitable examples.
- Nearest Neighbor algorithm
  - Twice-around-the-tree algorithm.

## SECTION-C

7. Explain the Floyd-Warshall's algorithm with the help of an example.
8. Prove that  $f(n) = a_m n^m + a_{m-1} n^{m-1} + \dots + a_1 n + a_0$  then  $f(n) = O(n^m)$
9. Compare the various programming paradigms such as divide-and-conquer, dynamic programming and greedy approach.

Roll No.  
Total No. of

Time : 3

INSTRU

- SE
- ea
- S
- h
- S

1.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Discuss the concepts behind the origin of family.
3. Discuss the relation between human being and society.
4. What is Buddhist economics?
5. What is socialism? Write a note on its origin.
6. Discuss the concept of economic development during pre-British period.

## SECTION-C

7. Write an essay on the ideas of political systems from History.
8. Which model of governing system suits Indian society the best? Explain.
9. Elaborate Gandhi's idea of economic development.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem.-4)

**COMPUTER NETWORKS**

Subject Code : BTIT-401-18

M.Code : 77538

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is topology and types of topology?
- b) Give a note on concept of spread spectrum.
- c) What is VLAN?
- d) What is the use of ALOHA protocol?
- e) What is meant ARP?
- f) Differentiate IPV4 with IPV6.
- g) Why Leaky Bucket is used?
- h) Discuss the functioning of cryptography.
- i) What is Domain Name Space?
- j) Write about SNMP.



## SECTION-B

2. Discuss the role of multiplexing in data communication.
3. Explain the central concept of Hamming Distance. How it is used in error detection?
4. What is Unicast route? Write about any one algorithm used in it.
5. How CSMA/CA protocol is used to avoid the collision in networks?
6. What is meant by congestion control? How it is controlled?

## SECTION-C

7. Discuss in brief the performance parameters used in transmission media.
8. Why is QoS important in Networking? Discuss some QoS improving techniques?.
9. Explain the role of Firewalls in Computer Networks. How it is used to secure the system?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem.-4)

**OPERATING SYSTEMS**

Subject Code : BTIT-402-18

M.Code : 77539

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is the functioning of System Call?
- b) How context switching is used in multiprogramming?
- c) What is Preemptive scheduling?
- d) What are different states of process?
- e) Write advantages of paging.
- f) Define critical section.
- g) What is External fragmentation?
- h) Write the use of Semaphores.
- i) Discuss Interrupt handlers.
- j) How C-SCAN algorithm works?



## SECTION - B

2. What is need of Threads? Discuss the types of Threads.
3. Find Waiting Time and Turnaround Time for given process using FCFS and S<sub>c</sub> algorithms

Process	Arrival Time (ms)	Burst Time (ms)
P1	1	5
P2	2	5
P3	2	6
P4	3	2

4. Write overview of Process Synchronization. Discuss the mechanisms to ensure synchronized execution of processes.
5. Explain the concept of Dining Philosopher problem in Operating System.
6. How page replacement algorithms are used in virtual memory?

## SECTION-C

7. What are the features of LINUX operating System? Why LINUX is secure operating system?
8. a) Write different access methods.  
b) Explain different allocation methods used in File Management.
9. Discuss necessary and sufficient conditions for Deadlock. Write the deadlock detection and recovery strategies.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

11. Which methodology is used to analyze viability of software to be developed? Discuss its types.
12. How object-oriented software development is better than traditional development methods?
13. Differentiate between DFS and structure chart. Draw a DFD elaborating working of software for event ticket booking.
14. What are different test case design techniques? Discuss.
15. Why do we need formal process for software development? How it helps in standardization of software's across the world.

## SECTION-C

16. What are the various steps involved in spiral model? Explain and compare it with water fall model.
17. Why testing is necessary for software's? What are the different methods to test software?
18. Write short note on following :
  - a) Cost estimation
  - b) Coding standards
  - c) Software requirement specification.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. What is a decision tree? How is Ginni index used as attribute selection measure in the decision tree algorithm? Explain.
3. Write a detailed note on the architecture of an artificial neural network. Explain the process of forward propagation.
4. Explain various steps of a machine learning process. Discuss the significance of data preprocessing in particular.
5. How is simple linear regression used to model the relationship between a dependent variable and independent variable? What is the role of gradient descent in this process?
6. Write a note on feature scaling. Differentiate between normalization and standardization.

## SECTION-C

7. Write a detailed note on Support Vector Machine. List the steps of the algorithm. How is kernelling used in SVM?
8. Discuss the phases of using the genetic algorithm as a heuristic search algorithm to solve optimization problems. Explain the general workflow of genetic algorithm with the help of a flowchart.
9. What are the various types of regression techniques used in machine learning? Discuss the applications of each. Differentiate between machine learning based regression and classification.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Discuss the various website design principles in detail.
3. Differentiate between HTML and DHTML.
4. Explain the various CSS properties for formatting text.
5. Write a block of code using while loop in PHP to print first ten natural numbers.
6. *"Websites updating live sports scores can be considered as an example of AJAX". Justify.*

## SECTION - C

7. Discuss the structure of HTML document in detail.
8. *"JavaScript properties can usually be changed, added, and deleted, but some are read only". Explain.*
9. Write a block of code to start a PHP Session and then to get PHP session variable values.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology)(Sem.-6)

**BIG DATA**

Subject Code : BTIT-601-18

M.Code : 79623

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) What is CAP theorem?
- b) What are three V's of Big Data?
- c) What is HDFS?
- d) What is CRUD in MongoDB?
- e) What is CQLSH and why it is used?
- f) What is difference between collection and document in MongoDB?
- g) Short Note on Pig Latin.
- h) What is data analytics?
- i) What is TTL index in MongoDB?
- j) What is piggy bank in Hadoop?

## SECTION-B

2. Define Big Data. What are the characteristics and challenges of Big Data?
3. Discuss architecture of Hadoop in detail.
4. Explain MongoDB and its features. How Import and Export data in Mongo DB?
5. Explain Apache Hive data types and file formats.
6. What are different techniques and types of data visualization?

## SECTION -C

7. What are NoSQL databases and its different types? Explain.
8. What are Hadoop ecosystem and its different components? Explain.
9. What are R variable? How vector is used in R? Explain.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Questions : 18

Total No. of Pages : 02

B.Tech.(CSE/IT) (Sem.-6)  
**HUMAN RESOURCE MANAGEMENT**

Subject Code : HU-251

M.Code : 71556

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

Write briefly :

- 1) Write the importance of Human Resource Management.
- 2) What is the need for Human Resource Planning?
- 3) Define Recruitment.
- 4) What is training effectiveness?
- 5) Define job specification.
- 6) What are Hygiene Factors?
- 7) Define Living Wage.
- 8) What is labour turnover?
- 9) Define industrial disputes.
- 10) What is the need for labour welfare?



## SECTION-B

- 11) Explain the position of personnel function in an organization.
- 12) Describe various kinds of psychological tests.
- 13) Discuss the main provisions of the Payments of Wages Act, 1936.
- 14) Discuss the factors required for good human relations policy in industry.
- 15) Discuss the safety provisions under the Factories Act, 1948.

## SECTION-C

- 16) Discuss the traditional methods of performance appraisal.
- 17) Discuss the changing face of Indian workforce and the challenges for human resource management.
- 18) Discuss the concept of quality of Work Life. How can organisations improve quality of work life among employees?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-6)  
**CRYPTOGRAPHY AND NETWORK SECURITY**

Subject Code : BTIT610-18

M.Code : 79629

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is Vulnerability?
- b) Write role of Key Management?
- c) What is Block Cipher?
- d) Why Diffie-Hellman algorithm is used?
- e) What is meant by Public Key cryptography?
- f) Write use of DES Algorithm.
- g) Define Digital signatures.
- h) What is Kerberos?
- i) Briefly explain PGP.
- j) Write about Honeypots.



## SECTION-B

2. Discuss an example of active attack on network system.
3. How Euler's Theorem is useful in Network Security applications?
4. What is the role of RSA algorithm in cryptography?
5. Write about the concept of MD5 Message digest Algorithm?
6. Discuss Confidentiality, Integrity And Availability in Network Security.

## SECTION-C

7. Define access controls in network security? How they can be useful in wireless security?
8. What is the concept of Hash Function? How it is used in Cryptography?
9. Explain, how Firewalls are used to enhance security in Computer Networks.

Roll No.  
Total No

Time

INST

1.

2.

3.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (IT) (Sem.-6)

**CLOUD COMPUTING**

Subject Code : BTIT-613-18

M.Code : 79632

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is utility computing?
- b) What is IT as service?
- c) What is Virtualization its types?
- d) What is the difference between elasticity and scalability?
- e) Explain Infrastructure as service.
- f) What is service hijacking?
- g) What is the role of API in cloud computing?
- h) What are the internal security breaches in cloud computing?
- i) What are Multitenancy and its advantages?
- j) What is the difference between cloud services and web services?



## SECTION-B

2. What are the main driving factors of cloud computing?
3. What are hypervisor and its types in cloud computing?
4. Compare the different cloud service models.
5. What is migration in cloud computing?
6. What are the security risks to the cloud computing?

## SECTION-C

7. Define Cloud. What are characteristics cloud computing and its application? Explain.
8. What are cloud service models? Explain software as service (SaaS) with example.
9. What are different cloud deployment models? Explain Hybrid deployment model.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. What are the different Agile design practices? Explain its different design principles.
3. Define Agile Scrum. What are its various roles in Software development?
4. What is a Kanban framework? Discuss its workflow.
5. Discuss the role of regression testing in Agile software development.
6. How code refactoring is beneficial for Agile testing? Explain with example.

## SECTION-C

7. Which are the major stages of Agile test life cycle? What is its impact on testing?
8. What is the need of Agile software development? Discuss its benefits in Software Engineering?
9. Discuss Extreme programming. Write about the Life cycle and tools of XP.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



May 2022 C15-55en

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-5)  
**PROGRAMMING IN JAVA**

Subject Code : BTIT-502

M.Code : 70595

Date of Examination : 02-08-22

Time : 3 Hrs.

Max. Marks : 60

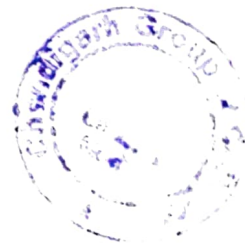
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) What is Encapsulation?
- b) What are the features of Java Language?
- c) Why Java is important to Internet?
- d) Give any 4 differences between C++ and Java.
- e) What is the use of final keyword?
- f) What is the need for static methods?
- g) What are the various operators available in Java?
- h) Give the difference between automatic type conversion and type casting.
- i) Why is Java strongly typed programming language?
- j) What is method overloading in Java?



## SECTION-B

2. What is Multithreading? What are the ways to create multiple threads in Java?
3. Explain history and evolution of java?
4. Demonstrate what are Jump statements? Give an example for each of them.
5. What is an Operate? Explain type of operators in Java with example programs.
6. Explain about try, catch statements with example in Java.

## SECTION-C

7. Explain Abstract classes with an example program. Also, describe the properties of abstract classes.
8. Write a Java program to implement method overloading and method overriding.
9. Give a detailed sketch of the differences between Single, Multilevel & Hierarchical Inheritance.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (IT) (Sem.-6)

**CLOUD COMPUTING**

Subject Code : BTIT-613-18

M.Code : 79632

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) What is utility computing?
- b) What is IT as service?
- c) What is Virtualization its types?
- d) What is the difference between elasticity and scalability?
- e) Explain Infrastructure as service.
- f) What is service hijacking?
- g) What is the role of API in cloud computing?
- h) What are the internal security breaches in cloud computing?
- i) What are Multitenancy and its advantages?
- j) What is the difference between cloud services and web services?



## SECTION-B

2. What are the main driving factors of cloud computing?
3. What are hypervisor and its types in cloud computing?
4. Compare the different cloud service models.
5. What is migration in cloud computing?
6. What are the security risks to the cloud computing?

## SECTION-C

7. Define Cloud. What are characteristics cloud computing and its application? Explain.
8. What are cloud service models? Explain software as service (SaaS) with example.
9. What are different cloud deployment models? Explain Hybrid deployment model.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
19 Sem-6

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem.-6)

**WEB TECHNOLOGIES**

Subject Code : BTIT-602-18

M.Code : 79624

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Cookies
- b) SSL
- c) Meta Tags in HTML
- d) DHTML
- e) Padding in style sheets
- f) Inline CSS
- g) *let* in JavaScript
- h) Loop in PHP
- i) Web Technologies
- j) Number datatype in JSON



## SECTION-B

2. Discuss the various website design principles in detail.
3. Differentiate between HTML and DHTML.
4. Explain the various CSS properties for formatting text.
5. Write a block of code using while loop in PHP to print first ten natural numbers.
6. *"Websites updating live sports scores can be considered as an example of AJAX"*. Justify.

## SECTION - C

7. Discuss the structure of HTML document in detail.
8. *"JavaScript properties can usually be changed, added, and deleted, but some are read only"*. Explain.
9. Write a block of code to start a PHP Session and then to get PHP session variable values.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Information Technology) (Sem.-6)

## MACHINE LEARNING

Subject Code : BTIT 608-18

M.Code : 79627

Date of Examination : 11-07-22

Time : 3 Hrs.

Max. Marks : 60

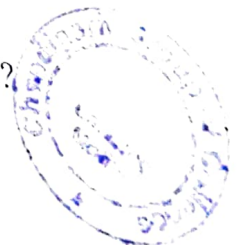
### INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

### SECTION-A

1. Answer the following questions :

- i. What is a well posed learning problem? Present the checkers game learning problem as a well posed problem.
- ii. What is positive reinforcement and negative reinforcement? Explain with example.
- iii. How does Random Forest algorithm work?
- iv. Discuss the need of data integration in a machine learning process.
- v. List the metrics used to evaluate the performance of a linear regression model.
- vi. Define precision and recall. How are these calculated?
- vii. What is the purpose of an activation function in a neural network?
- viii. State the cost function used in logistic regression.
- ix. What is an association rule? Explain with the help of example.
- x. Write down the steps of Naïve Bayes classifier.



## SECTION-B

2. What is a decision tree? How is Gini index used as attribute selection measure in decision tree algorithm? Explain.
3. Write a detailed note on the architecture of an artificial neural network. Explain the process of forward propagation.
4. Explain various steps of a machine learning process. Discuss the significance of data preprocessing in particular.
5. How is simple linear regression used to model the relationship between a dependent variable and independent variable? What is the role of gradient descent in this process?
6. Write a note on feature scaling. Differentiate between normalization and standardization.

Roll No. \_\_\_\_\_  
Total No. of Questions \_\_\_\_\_

Time : 3 Hrs

INSTRUCTIONS  
1. SECTION  
each.  
2. SECTION  
have  
3. SECTION  
have

## SECTION-C

7. Write a detailed note on Support Vector Machine. List the steps of the algorithm. How is kernel used in SVM?
8. Discuss the phases of using the genetic algorithm as a heuristic search algorithm to solve optimization problems. Explain the general workflow of genetic algorithm with the help of a flowchart.
9. What are the various types of regression techniques used in machine learning? Discuss the applications of each. Differentiate between machine learning based regression and classification.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology)(Sem.-6)

**BIG DATA**

Subject Code : BTIT-601-18

M.Code : 79623

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

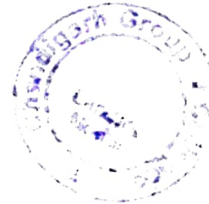
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is CAP theorem?
- b) What are three V's of Big Data?
- c) What is HDFS?
- d) What is CRUD in MongoDB?
- e) What is CQLSH and why it is used?
- f) What is difference between collection and document in MongoDB?
- g) Short Note on Pig Latin.
- h) What is data analytics?
- i) What is TTL index in MongoDB?
- j) What is piggy bank in Hadoop?



## SECTION-B

2. Define Big Data. What are the characteristics and challenges of Big Data?
3. Discuss architecture of Hadoop in detail.
4. Explain MongoDB and its features. How Import and Export data in Mongo DB?
5. Explain Apache Hive data types and file formats.
6. What are different techniques and types of data visualization?

## SECTION -C

7. What are NoSQL databases and its different types? Explain.
8. What are Hadoop ecosystem and its different components? Explain.
9. What are R variable? How vector is used in R? Explain.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

June - 2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/Information Technology) (Sem.-7)  
**SOFTWARE TESTING AND QUALITY ASSURANCE**

Subject Code : BTCS-905

M.Code : 71897

Date of Examination 18-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

B.Tech  
P.T. Questions

**SECTION-A**

**1. Write briefly :**

- a. What advanced process models have been proposed for software engineering work?
- b. Define Version Control.
- c. Write a short note on TQM.
- d. What is Baseline?
- e. Distinguish software faults and software failures.
- f. Differentiate between verification and validation.
- g. What is scaffolding in testing?
- h. Why do we need integration testing?
- i. Distinguish between alpha and beta testing.
- j. What is defect severity?



### SECTION-B

2. Define Big Data. What are the characteristics and challenges of Big Data?
3. Discuss architecture of Hadoop in detail.
4. Explain MongoDB and its features. How Import and Export data in Mongo DB?
5. Explain Apache Hive data types and file formats.
6. What are different techniques and types of data visualization?

### SECTION -C

7. What are NoSQL databases and its different types? Explain.
8. What are Hadoop ecosystem and its different components? Explain.
9. What are R variable? How vector is used in R? Explain.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

June - 2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/Information Technology) (Sem.-7)  
**SOFTWARE TESTING AND QUALITY ASSURANCE**

Subject Code : BTCS-905

M.Code : 71897

Date of Examination 18-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

B.Tech  
P.T.U. Q.U.

**SECTION-A**

**1. Write briefly :**

- a. What advanced process models have been proposed for software engineering work?
- b. Define Version Control.
- c. Write a short note on TQM.
- d. What is Baseline?
- e. Distinguish software faults and software failures.
- f. Differentiate between verification and validation.
- g. What is scaffolding in testing?
- h. Why do we need integration testing?
- i. Distinguish between alpha and beta testing.
- j. What is defect severity?



## SECTION-B

2. Explain various black -box techniques used to design effective test cases.
3. Differentiate between the following :
  - a) Equivalence partitioning and Boundary value analysis methods
  - b) Verification and Validation
  - c) White-Box and Black-Box Testing.
4. What is object oriented testing? Explain the various objects oriented testing strategies and issues in detail.
5. Explain product quality metrics.
6. Why do we need integration testing? Explain various approaches in integration testing.

## SECTION-C

7. Write a short note on 'software quality assurance standards'.
8. Explain the following :
  - a. Alpha and beta testing
  - b. Fault based testing
  - c. Software reliability.
9. Write short notes on the following :
  - a) CMM
  - b) Formal Technical Reviews
  - c) BVA
  - d) ISO 9126.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022

ECE-3 Sem  
ESE

Roll No.

Total N

B.Tech Sem-3  
P.T.O Question E.C.

Total No. of Questions : 09

B.Tech. (Artificial Intelligence & Machine Learning/Computer Science & Engineering/Information Technology)/(Computer Science & Engineering) (Artificial Intelligence & Machine Learning/Internet of Things and Cyber Security including Block Chain Technology)/B.Tech (Computer Engg./

CSE) (PIT) (Sem.-3)

**DIGITAL ELECTRONICS**  
Subject Code : BTES-301-18

M.Code : 76435

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

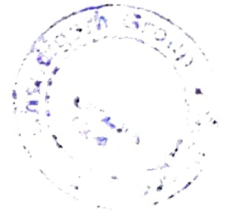
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Convert binary number 10010001 into octal and hexadecimal numbers.
- b) Explain Excess 3 codes.
- c) Give the applications of BCD codes.
- d) State principle of duality.
- e) Convert  $AB + AC$  into canonical form.
- f) Draw half subtractor circuit diagram.
- g) What do you mean by Ring counters?
- h) Draw state diagram of 3 bit down counter.
- i) Explain EPROM and EEPROM.
- j) Classify A/D conversion techniques.

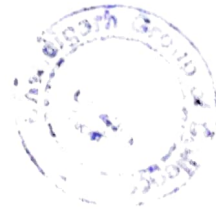


### SECTION-B

2. Realize  $F = AB' + A'BC + AB$  logic function using 2 inputs NAND and NOR gates.
3. Minimize the function  $F = \sum m (0,1,2,3,5,6,8,9) + d (4,11)$  using K-Map.
4. Design Full adder with truth table, circuit diagrams.
5. Design master slave flip flop.
6. Draw and explain Field Programmable Gate Array (FPGA).

### SECTION-C

7. Design 32:1 mux using 2:1 mux and 4:1 mux.
8. Explain R-2R Ladder type digital to analog converters.
9. Subtract 44 from 36 using 1's complement and 2's complement methods.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-3)  
ANALOG DEVICES & CIRCUITS

Subject Code : BTEC-301

M.Code : 57583

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) How an oscillator differ from an amplifier.
- b) Explain the role of Bleeder in Zener Voltage Regulator.
- c) Describe the use of two transistors in Wein Bridge oscillator.
- d) Define the term hole in relation of semiconductors.
- e) A BJT has base current 10 micro amperes, beta as 99, and leakage collector current of 1 micro ampere. Find the collector current.
- f) What do you mean by the term harmonic distortion?
- g) What are the Physical origins of resistances in hybrid - $\pi$  model of CE Transistor amplifier at high frequencies?
- h) Define Crossover distortion.
- i) What is the main distinction between JFET and MOSFET?
- j) Give the structure of light emitting diode.

### SECTION-B

2. With the help of necessary derivations, describe the effect of negative feedback on gain and the bandwidth in an amplifier.
3. A positive feedback network to be used in an oscillator circuit is found to give an output of 0.025 volt with an input of 0.5 volt. What must be the minimum gain of the amplifier to provide oscillations?
4. Elaborate the components of current in a npn transistor.
5. Explain the variation of hybrid-pi parameters with respect to current, voltage and temperature.
6. 'A Zener diode is a p-n junction yet it is different from an ordinary p-n junction'. Explain.

### SECTION-C

7. Describe the working of push pull class-B Amplifier with the help of neat schematic diagram. Also, enlist its comparative advantages & disadvantages.
8. Derive the expressions for gain, input impedance and output impedance for a CE amplifier.
9. Draw the volt-ampere characteristics of a tunnel diode. Explain the occurrence of the negative differential resistance in the characteristics of a tunnel diode.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering/Electronics & Communication Engineering/Information Technology)/(ECE) (PIT) (Sem.-3)

**ELECTRONIC DEVICES**

Subject Code : BTEC-301-18

M.Code : 76444

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) Explain the terms: diffusion process and depletion region.
- b) Discuss the behaviour of P-N junction diode under forward and reverse bias conditions.
- c) What is sheet resistance?
- d) What is pinch-off voltage?
- e) Differentiate tunnel diode and normal diode.
- f) What is ripple factor?
- g) Explain why CE configuration is most popular in amplifier circuits?
- h) Mention any two advantages of MOSFET over JFET.
- i) What are the advantages of ion-implantation as compared to conventional diffusion techniques?
- j) Differentiate DC and RF sputtering techniques.

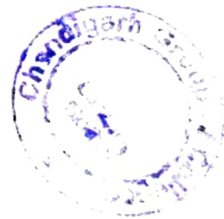


### SECTION-B

2. Draw and explain the energy band diagram of gallium arsenide and silicon semiconductors.
3. Explain the construction and working of solar cells.
4. What do you mean by operating point? How operating point affects the output of transistors?
5. Differentiate between FETs and BJTs.
6. What do you mean by annealing? Why it is required in IC fabrication process?

### SECTION-C

7. Describe the application of p-n junction as rectifier. Compute the value of dc-voltage and ripple factor for full wave rectifier.
8. What is difference between the construction of enhancement types MOSFET and depletion type MOSFET? Explain the operation and characteristics of N-channel MOSFET in enhancement mode.
9. What is etching in fabrication process? Explain its different types and state merits and demerits of each.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.)  
(Sem.-3)

**NETWORK ANALYSIS AND SYNTHESIS**

Subject Code : BTEC-303

M.Code : 57585

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

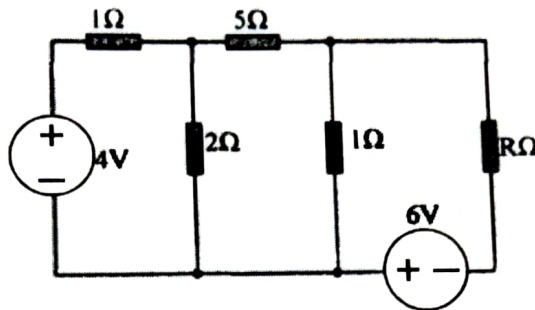
**1. Answer briefly :**

- a) What are advantages of m-derived filters over constant-k filters?
- b) State Kirchoff's current and voltage laws.
- c) How Laplace transform is useful in circuit analysis?
- d) Define poles and zeros in typical transfer function.
- e) Transform  $\pi$  network into its equivalent T network.
- f) Define impedance parameters for 2-port network.
- g) How are unit step, impulse and ramp signals related with each other?
- h) Differentiate band pass and band stop filters.
- i) How is cut-off frequency defined in filters?
- j) What are independent and dependent current and voltage sources?

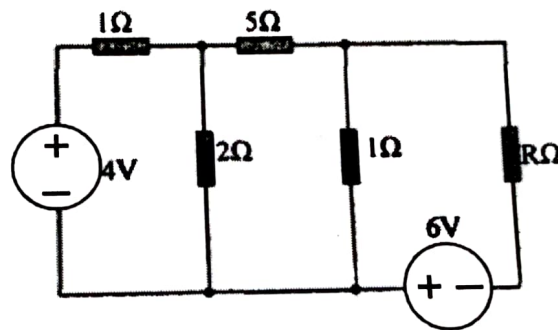


SECTION-B

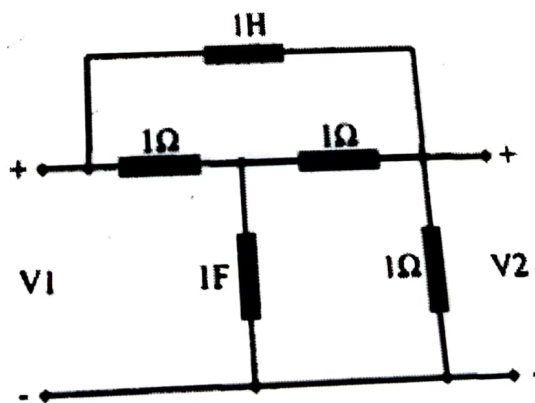
2. Determine the value of  $R$  in the circuit shown in Fig.1 such that maximum power transfer takes place. What is the amount of this power?



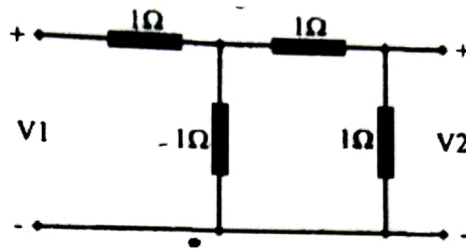
3. Draw Thevenin's equivalent circuit for the circuit shown in Fig.2. Determine current in resistance  $R = 2\ \Omega$  resistance.



4. Derive transfer function for the 2-port network shown in Fig.3.



5. Determine Z-parameters for the 2-port network shown in the Fig.4.



6. Determine Laplace Transform of shift unit step function  $u(t - \alpha)$ .

### SECTION-C

7. Design T and  $\Pi$  sections of  $m$ -derived high pass filter having nominal characteristic impedance of  $500\Omega$ , cut off frequency of  $4\text{KHz}$  and infinite attenuation at  $5\text{KHz}$ .
8. a) Using Cauer's first form synthesize a network for following driving point impedance :

$$Z(s) = \frac{3s^5 + 10s^3 + 5s}{s^4 + 4s^2 + 3}$$

- b) Find second Foster form of the following admittance function :

$$Y(s) = \frac{s(s^2 + 4)}{10(s^2 + 9)(s^2 + 25)}$$



9. Write short notes on :

- |                          |   |
|--------------------------|---|
| a) Superposition Theorem | b) Convolution Theorem                    |
| c) Composite Filters     | d) Impulse response vs. Transfer function |

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





### SECTION-B

2. Write Maxwell's equation in free space for the time varying fields both in differential form and integral form. Why these equations are not completely symmetrical?
3. State and Prove Poynting theorem.
4. Find the reflection co-efficient and transmission co-efficient of an electric-field wave travelling in air and incident normally on a boundary between air and dielectric having permeability of  $\mu_r = 1$  and  $\epsilon_r = 4$ .
5. Discuss surface currents on the waveguide walls taking suitable example.
6. Prove that in a travelling plane electromagnetic wave there is a definite ratio between the amplitudes of E & H. What is this ratio?

### SECTION-C

7. Discuss in detail, various S-parameters that can be for analysing transmission lines.
8. A distortion less transmission line has the following parameters :  
 $Z_0 = 50\Omega$ ,  $\alpha = 0.020$  dB/m,  $v_p = 0.6v_0$ . Determine the line parameters R, L, C, G and wavelength at 0.2 GHz.
9. Write a short note on Rectangular Waveguides.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on a page of Answer Sheet will lead to UMC against the Student.**

### SECTION-B

2. Discuss steps followed in the production of liqueurs.
3. Differentiate between pot still and patent still method of distillation.
4. Write a brief note on parts of bar along with their utility.
5. Discuss opening and closing duties followed in a bar operations.
6. Differentiate between brandy and cognac.

### SECTION-C

7. Write a detailed note on the different types of distilled beverage with suitable examples.
8. Write a short note on the following :
  - a) Major bar equipments
  - b) Bar service accessories.
9. Explain the following :
  - a) Galliano
  - b) Sambuca
  - c) Midori
  - d) Drambuie
  - e) Grand Marnier.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.) (Sem.-3)

**DIGITAL CIRCUITS AND LOGIC DESIGN**

Subject Code : BTEC-302

M.Code : 57584

Date of Examination : 02-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- (a) Write decimal number 36 into Excess 3 codes..
- (b) Add binary number 110101 with 111101.
- (c) Calculate 2's complement of 10101101.
- (d) What are the advantages of K-map?
- (e) Draw 2 input X-NOR gate.
- (f) Differentiate between combinational and sequential circuits.
- (g) Define shift register.
- (h) Explain excitation table.
- (i) Enlist various memories.
- (j) Which flip flop is preferred for asynchronous counters and why?



## SECTION-B

2. Convert decimal number 86 into binary, octal, hexadecimal and excess 3 codes.
3. Realize the X-OR and X-NOR logic gates using NOR gates.
4. Design 3 bit parity generator.
5. Design universal shift register.
6. Explain various characteristics of A/D and D/A converters.

## SECTION-C

7. Explain different types of memories. Also discuss PAL devices.
8. Draw and explain the TTL logic family.
9. Convert JK flip flop into SR, D and T flip flops.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on a page of Answer Sheet will lead to UMC against the Student.**



### SECTION-B

- Find the Laplace transform of  $f(t) = \sin \sqrt{t}, t \geq 0$ .
- Evaluate  $L^{-1}\left(\frac{s^2 - 49}{(s^2 + 49)^2}\right)$ .
- Find the Z-transform of  $\{x(n)\}$ , where  $x(n) = \begin{cases} 4^n, & n \geq 0 \\ 5^n, & n < 0 \end{cases}$ .
- A speaks the truth in 60% and B in 75% of the cases. In what percentage of cases are they likely to contradict each other in stating the same fact?
- Fit a straight line to the following data considering  $y$  as dependent variable:

<b>x</b>	1	2	3	4	5
<b>y</b>	5	7	9	10	11

### SECTION C

- Find the half range sine series for  $f(x) = e^{ax}$  in  $(0, \pi)$ .
- Fit a Poisson distribution to the following and calculate theoretical frequencies:

<b>Death:</b>	0	1	2	3	4
<b>Frequency:</b>	122	60	15	2	1

- Apply Convolution theorem to find inverse Laplace transform of  $\left(\frac{1}{(s+5)(s^2+25)}\right)$ .



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

K. Tech Sem 4

ECE

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech Se  
Questions EC

B.Tech. (Electronics & Communication Engg.)(Sem. 4)

## ELECTRONIC MEASUREMENT & INSTRUMENTATION

Subject Code : BTEC-404

M.Code : 57596

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

### INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

### SECTION-A

#### 1. Answer briefly:

- a. Name three detectors used in AC bridges.
- b. Write the working principle of Nixie Tube.
- c. Differentiate between Accuracy and Precision.
- d. What will be the output on screen of CRO if a sinusoidal voltage is applied to the vertical deflection plates but no voltage is applied to horizontal deflection plate?
- e. What is the relation between true and apparent value of resistance and Q for a seriesresonant circuit?
- f. What is the principle of harmonic distortion analyzer?
- g. What controls the frequency of the displayed signal on CRO? Explain.
- h. What are the various dynamic characteristics of instrumentation system?
- i. What do you understand by LVDT?
- j. Give the diagram and description of 7-segmental LED display.



## SECTION-B

2. With the help of block diagram and suitable waveforms, explain Ramp type digital voltmeters.
3. Explain the working of Strain Gauge as Force Sensor.
4. Explain the principle and various components used for magnetic recorders.
5. How can the capacitance be measured? Give its circuit and derive the relations.
6. Explain the principle and various components used for digital tape recorders.

## SECTION-C

7.
  - a) Give construction and working of PMMC instruments with torque equation.
  - b) A PMMC has a coil dimension of  $17\text{mm} \times 13\text{mm}$ . The flux density in the air gap is  $1.9 \times 10^{-3} \text{ Wb/m}^2$  and spring constant is  $0.17 \times 10^{-6} \text{ Nm/rad}$ . Determine the number of turns required to produce an angular deflection of  $90^\circ$  when a current of  $7\text{mA}$  flows through the coil.
8.
  - a) Explain how Wein bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters.
  - b) Explain the circuit and working of Kelvin Double bridge.
9.
  - a) Explain the block diagram of CRO in detail. Give the application of CRO for measurement of phase and frequency.
  - b) Explain the working of spectrum analyzer.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering)(PIT)(Sem.-4)

**SIGNALS AND SYSTEMS**

Subject Code :BTEC-403-18

M.Code :77568

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Give the difference between periodic and aperiodic signal.
- b) Define continuous time unit step and unit impulse.
- c) What is meant by signal? Contrast the differences between energy and power signal.
- d) Find the Fourier transform of unit impulse  $\delta(t)$ .
- e) Differentiate between joint and conditional probabilities.
- f) Define probability density function.
- g) Distinguish between a continuous random variable and a discrete random variable.
- h) Define Fourier Transform. Write short notes on dirichlets conditions.
- i) Define probability of random events?
- j) Define sampling theorem



## SECTION-B

2. When does aliasing occur? Explain the effects of aliasing.
3. Discuss properties of power spectral density function.
4. Find the input  $x(n)$  of the system, if the impulse response  $h(n)$  and the output  $y(n)$  are shown below.  
$$h(n) = \{1, 2, 3, 2\} \quad y(n) = \{1, 3, 7, 10\}$$
5. Find continuous time Fourier transform of the signal  $s(t) = t \cos At$
6. Explain the reconstruction of the signal from its samples.

## SECTION-C

7.
  - a) State and prove time shifting and time scaling properties of Fourier Transform.
  - b) Find the Laplace transform of the signal  $x(t) = e^{-at}u(t) + e^{-bt}u(-t)$
8. The input and output of a causal LTI system are related by the differential equation,

$$\frac{d^2 y(t)}{dt^2} + 6 \frac{dy(t)}{dt} + 8y(t) = 2x(t)$$

- i) Find the impulse response of the system.
  - ii) What is the response of this system if  $x(t) = te^{-2t}u(t)$
9. Write a note on:
  - a) Parseval's Theorem
  - b) Fourier Series.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 04

Total No. of Questions : 11

B.Tech. (CSE / ECE / AI & ML) (Sem.-4)

**UNIVERSAL HUMAN VALUES**

Subject Code : HSMC-122-18

M.Code : 77630

Date of Examination : 12-07-22

Time : 2 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A contains objective type questions.
2. SECTION-B contains short answer type questions.
3. SECTION-C contains descriptive answer type questions.
4. Attempt ALL questions.

**SECTION-A**

1. Fill in the blanks / True / False :

(10 × 1 = 10)

a) Physical facilities are necessary but ..... for humans.

भौतिक सुविधाओं मनुष्य के लिए आवश्यक है, लेकिन ..... हैं।

भौतिक सुविधाएं मनुष्य के लिए आवश्यक हैं, लेकिन ..... हैं।

b) Animal order in nature contains ..... and .....

प्रकृति में पशु आदेश में ..... और ..... होता है।

प्रकृति में पशु आदेश में ..... और ..... होता है।

c) Self-exploration is the process for ..... Education.

आत्म-अध्ययन ..... शिक्षा के लिए प्रक्रिया है।

आत्म-अध्ययन ..... शिक्षा के लिए प्रक्रिया है।

d) To be in a state of liking is .....

पसंद के हिसाब से एक अवस्था में होना ..... है।

पसंद के हिसाब से एक अवस्था में होना ..... है।

e) Right understanding + ..... = Mutual prosperity.

सही समझ + ..... = पारस्परिक समृद्धि

सही समझ + ..... = आपसी खुशहाली



- f) Human values are universal.  
मानवीय मूल्य सार्वभौमिक है।  
मानवी मूल सावरबैमिक हन।
- g) Prosperity and wealth are equivalent.  
समृद्धि और धनवनता बराबर है।  
खुशहाली अते अमीरी बराबर हन।
- h) Imaging is an activity of the body.  
इमेजिंग शरीर की एक गतिविधि है।  
चितरट सरीर दी ईक गतीविधी है।
- i) The innateness of material order is existence.  
सामग्री आदेश की प्रकृति अस्तित्व है।  
वसतु आदेश दी कुरत असतीतव है।
- j) Right understanding forms the basis for definitiveness of human conduct.  
सही समझ मानव आचरण की निश्चितता के लिए आधार बनाता है।  
ठीक समझ मनुष्य चाल चलन दी निश्चितता लयी आधार बटाउंदी है।

#### SECTION-B

(5 × 4 = 20)

2. What are the basic guidelines of value education?

मूल्य शिक्षा की बुनियादी दिशा-निर्देश क्या हैं?

मूल सिंधिआ दी बुनिआदी दिशा-निरदेश की हन?

3. Explain Natural Acceptance.

सहज स्वीकृति समझाओ।

कुरती मंसुरी समझाओ।

4. What do you mean by SVDD, SSDD and SSSS? How is the transformation possible from SSDD to SSSS?

आपका SVDD, SSDD और SSSS से क्या मतलब है? SSDD से SSSS के लिए परिवर्तन कैसे संभव है?

तुहाडा SVDD, SSDD अते SSSS तें की मतलब है? SSDD तें SSSS तें की उबदीली किस तरुं संभव है?



5. What do you mean by Animal Consciousness and Human Consciousness? How is the transformation possible from Animal Consciousness to Human Consciousness?

आपका पशु चेतना और मानव चेतना से क्या मतलब है? पशु चेतना से मानव चेतना के लिए परिवर्तन कैसे संभव है?

ਤੁਹਾਡਾ ਪਸ਼ੂ ਚੇਤਨਾ ਅਤੇ ਮਨੁੱਖੀ ਚੇਤਨਾ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ? ਪਸ਼ੂ ਚੇਤਨਾ ਤੋਂ ਮਨੁੱਖੀ ਚੇਤਨਾ ਤੱਕ ਦੀ ਤਬਦੀਲੀ ਕਿਸ ਤਰ੍ਹਾਂ ਸੰਭਵ ਹੈ?

6. Explain the process of self-exploration with the help of a suitable diagram.

एक उपयुक्त आरेख की मदद से आत्म-अन्वेषण की प्रक्रिया को समझाईये।

ਇੱਕ ਢੁਕਵੇਂ ਚਿੱਤਰ ਦੀ ਮਦਦ ਨਾਲ ਆਤਮ-ਅਧਿਐਨ ਦੀ ਪ੍ਰਕਿਰਿਆ ਨੂੰ ਸਮਝਾਓ।

### SECTION-C

(5 × 6 = 30)

7. What is happiness and prosperity? What are the wrong notions about attaining happiness and prosperity? What are the problems faced due to these wrong notions about happiness and prosperity?

सुख और समृद्धि क्या है? खुशी और समृद्धि को प्राप्त करने के बारे में गलत धारणा क्या है? सुख और समृद्धि के बारे में गलत धारणाओं के कारण पेश आ रही समस्याएं क्या हैं?

ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਕੀ ਹੈ? ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਨੂੰ ਪ੍ਰਾਪਤ ਕਰਨ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਨਾ ਕੀ ਹੈ? ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਨਾਵਾਂ ਦੇ ਕਾਰਨ ਕੀ ਸਮੱਸਿਆਵਾਂ ਪੇਸ਼ ਆ ਰਹੀਆਂ ਹਨ?

OR

What is the need of Value-Education?

मूल्य शिक्षा की क्या जरूरत है?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਕੀ ਜ਼ਰੂਰਤ ਹੈ?

8. Human being is co-existence of Self and body, explain. इंसान स्वयं और शरीर का सह-अस्तित्व कैसे है? समझाओ।  
ਇਨਸਾਨ ਮੈਂ ਅਤੇ ਸਰੀਰ ਦਾ ਸਹਿ-ਅਸਤੀਤਵ ਹੈ, ਸਮਝਾਓ।

OR

Explain Pre-conditioning, Sensation and Natural-Acceptance.

पूर्व-मान्यता, संवेदना और प्राकृतिक-स्वीकृति समझाओ।

ਪੂਰਵ-ਮਾਨਤਾ, ਸੰਵੇਦਨਾ ਅਤੇ ਸਹਿਜ-ਸਵਿਕਰਿਤੀ ਸਮਝਾਓ।

9. Explain self-organisation and health.

आत्म संगठन और स्वास्थ्य के बारे में बताएं।

ਆਤਮ ਸੰਗਠਨ ਅਤੇ ਸਿਹਤ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।

OR

What are the programmes to ensure Health?

स्वास्थ्य को सुनिश्चित करने के लिए क्या-क्या कार्यक्रम है?

ਸਿਹਤ ਨੂੰ ਠੀਕ ਰੱਖਣ ਲਈ ਕਿਹੜੇ-ਕਿਹੜੇ ਤਰੀਕੇ ਹਨ।

10. What are the salient unethical practices in the profession at present? Analyze the root cause and possible solution.

ਸੌਜੂਦਾ ਸਮਯ ਮੇਂ ਪੇਸ਼ੇ ਕੇ ਮੁੱਖ ਅਨੈਠਿਕ ਤਰੀਕੇ ਕਿਆ ਹੈਂ? ਮੂਲ ਕਾਰਣ ਔਰ ਸੰਭਵ ਸਮਾਧਾਨ ਕਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋਂ।

ਮੌਜੂਦਾ ਸਮਾਂ ਵਿੱਚ ਪੇਸ਼ੇ ਦੇ ਮੁੱਖ ਅਨੈਠਿਕ ਤਰੀਕੇ ਕੀ ਹਨ? ਮੂਲ ਕਾਰਨ ਅਤੇ ਸੰਭਵ ਸਮਾਧਾਨ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ।

OR

What are the implications of value based living at various levels?

ਮੂਲਯ ਆਧਾਰਿਤ ਜੀਵਨ ਯਾਪਨ ਕੇ ਵਿਖਿੰਨ ਸ਼ਤਰੀਂ ਪਰ ਅਚਲੇ ਪਰਿਣਾਮ ਕਿਆ ਹੈਂ?

ਕਦਰਾਂ ਕੀਮਤਾਂ ਆਧਾਰਿਤ ਜੀਵਨ ਜੀਉਣ ਦੇ ਵੱਖਰੇ-ਵੱਖਰੇ ਪੱਧਰਾਂ ਤੇ ਚੰਗੇ ਨਤੀਜੇ ਕੀ ਹਨ?

11. What do you understand by competence in professional ethics? Elaborate.

ਆਪ ਕ੍ਰਿਆਕਸਾਯਿਕ ਨੈਠਿਕਤਾ ਮੇਂ ਦਕਸ਼ਤਾ ਸੇ ਕਿਆ ਸਮਝਤੇ ਹੈਂ? ਸਮਝਾਓ।

ਤੁਸੀਂ ਪੇਸ਼ੇਵਰ ਨੈਠਿਕਤਾ ਵਿੱਚ ਯੋਗਤਾ ਵਲੋਂ ਕੀ ਸਮਝਦੇ ਹੋ? ਸਮਝਾਓ।

OR

Compare the four orders in Nature on the basis of their salient aspects.

ਮੁੱਖ ਪਹਲੂਆਂ ਕੇ ਆਧਾਰ ਪਰ ਪ੍ਰਕ੍ਰਿਤਿ ਮੇਂ ਚਾਰ ਆਦੇਸ਼ੀਂ ਕੀ ਤੁਲਨਾ ਕਰੋਂ।

ਮੁੱਖ ਪਹਿਲੂਆਂ ਦੇ ਆਧਾਰ ਉੱਤੇ ਕੁਦਰਤ ਵਿੱਚ ਚਾਰ ਆਦੇਸ਼ਾਂ ਦੀ ਤੁਲਨਾ ਕਰੋ।



**Note : Disclosure of Identity by writing Mobile No. or Making of Passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.-4)

**ANALOG CIRCUITS**

Subject Code : BTEC-401-18

M.Code : 77565

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a. Define static and dynamic resistance of a PN junction diode.
- b. What is the use of coupling capacitor and bypass capacitor in an amplifier?
- c. What is DC load line?
- d. What is current shunt feedback?
- e. Explain transconductance amplifier.
- f. What is current gain and voltage gain of amplifier?
- g. What is thermal runaway?
- h. Explain the gain of cascaded configuration.
- i. What do you mean by harmonic distortions in power amplifiers?
- j. What is the difference between Class-B and Class-AB operations?

### SECTION-B

2. Draw the circuit of various transistor configurations. List their important features. Why CE configuration is mainly used?
3. Can a negative feedback amplifier operate as an oscillator? If not, why?
4. Derive the expression for following parameters for a class B push-pull amplifier :
  - a. Q-point
  - b. DC input power
  - c. AC output power
  - d. Maximum Efficiency.
5. Explain the working of RC coupled amplifier with diagram.
6. Explain how will you determine the voltage gain of CE amplifier by plotting the DC load line on the output characteristics of the transistor.

### SECTION-C

7. Explain the working, frequency response and applications of transformer coupled transistor amplifier.
8. Drive the power and efficiency calculations of class B power amplifier.
9. Write short note on the following :
  - a) RC phase shift oscillator.
  - b) Emitter Follower.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering)/(ECE) (PIT)  
(Sem.-4)

**MICROPROCESSORS AND MICROCONTROLLERS**

Subject Code : BTEC-402-18

M.Code : 77566

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is the function of ALE signal?
- b) How many ways an 8051 microcontroller can be interrupted?
- c) What are special functions registers?
- d) List the interrupt sources of 89C51 with their vector address.
- e) What is the use of directives? List them.
- f) Differentiate between SJMP and LJMP instructions.
- g) Differentiate microprocessor and microcontroller.
- h) What are the functions of an accumulator?
- i) What is an operand? Explain with an example.
- j) What is baud rate? What is its significance and how can it be increased?



## SECTION-B

2. Explain the architecture of 8051 microcontroller with a neat block diagram.
3. Draw the interrupt vector table of 8085 microprocessor and explain its operation.
4. Show and explain the ADC interfacing with 8051 microcontroller.
5. Discuss about the organisation of Internal RAM and Special function registers of 8051 microcontroller in detail.
6. Draw the TMOD register format and explain the different operating modes of timer in 8051 microcontroller.

## SECTION-C

7. a) Draw and explain the timing diagram for IN and OUT instructions of 8085.  
b) Explain the program memory and data memory structure of 8051 microcontroller.
8. Draw the pin diagram of 8051 microcontroller and explain its port structure.
9. Show and explain the interface of LCD or 7 segment display using 8051 microcontroller.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics and Commiunication Engg.) (Sem.-4)

**DATA STRUCTURES AND ALGORITHMS**

Subject Code : BTCS-301-18

M.Code : 77567

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a. What is a Queue? Write applications of queue.
- b. Define link list. How it is represented in memory?
- c. What is a data structure? Give example.
- d. Compare single and doubly linked list.
- e. What do you mean by algorithmic complexity?
- f. Discuss the sequential representation of a tree.
- g. How you can delete a node from an existing binary tree.
- h. Distinguish between linear and binary search techniques.
- i. Compare array and linked list data structures.
- j. What is a priority queue? How it is created?

## SECTION- B

2. What do you mean by stack? Explain the various operations of stack.
3. Write an algorithm for linear search and discuss with suitable example.
4. Write an algorithm for Selection sort and discuss the same with the help of an example.
5. What is a binary tree? Explain binary tree traversals with the help of an example.
6. Define Graph. Explain BFS and DFS graph traversals with examples.

## SECTION-C

7.
  - a) Compare sequential and linked memory representation of binary tree.
  - b) What is the concept of Hashing? Explain the various techniques used for hashing. How collisions are handled while addressing?
8. Write an algorithm to insert a new node in a sorted one-way link list and illustrate with the help of an example.
9. What is a circular queue? Write algorithm how you can insert and delete an element from circular queue. Write its applications also.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
ECE - 4 Sem

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.-4)

**ANALOG CIRCUITS**

Subject Code : BTEC-401-18

M.Code : 77565

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. Define static and dynamic resistance of a PN junction diode.
- b. What is the use of coupling capacitor and bypass capacitor in an amplifier?
- c. What is DC load line?
- d. What is current shunt feedback?
- e. Explain transconductance amplifier.
- f. What is current gain and voltage gain of amplifier?
- g. What is thermal runaway?
- h. Explain the gain of cascaded configuration.
- i. What do you mean by harmonic distortions in power amplifiers?
- j. What is the difference between Class-B and Class-AB operations?



## SECTION-B

2. Draw the circuit of various transistor configurations. List their important features. Why CE configuration is mainly used?
3. Can a negative feedback amplifier operate as an oscillator? If not, why?
4. Derive the expression for following parameters for a class B push-pull amplifier :
  - a. Q-point
  - b. DC input power
  - c. AC output power
  - d. Maximum Efficiency.
5. Explain the working of RC coupled amplifier with diagram.
6. Explain how will you determine the voltage gain of CE amplifier by plotting the DC load line on the output characteristics of the transistor.

## SECTION-C

7. Explain the working, frequency response and applications of transformer coupled transistor amplifier.
8. Drive the power and efficiency calculations of class B power amplifier.
9. Write short note on the following :
  - a) RC phase shift oscillator.
  - b) Emitter Follower.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering)/(ECE) (PIT)  
(Sem.-4)

## MICROPROCESSORS AND MICROCONTROLLERS

Subject Code : BTEC-402-18

M.Code : 77566

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

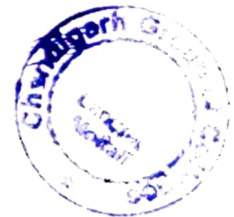
### INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

### SECTION-A

1. Write briefly :

- a) What is the function of ALE signal?
- b) How many ways an 8051 microcontroller can be interrupted?
- c) What are special functions registers?
- d) List the interrupt sources of 89C51 with their vector address.
- e) What is the use of directives? List them.
- f) Differentiate between SJMP and LJMP instructions.
- g) Differentiate microprocessor and microcontroller.
- h) What are the functions of an accumulator?
- i) What is an operand? Explain with an example.
- j) What is baud rate? What is its significance and how can it be increased?



## SECTION-B

2. Explain the architecture of 8051 microcontroller with a neat block diagram.
3. Draw the interrupt vector table of 8085 microprocessor and explain its operation.
4. Show and explain the ADC interfacing with 8051 microcontroller.
5. Discuss about the organisation of Internal RAM and Special function registers of 8051 microcontroller in detail.
6. Draw the TMOD register format and explain the different operating modes of timer in 8051 microcontroller.

Roll No.  
Total No

Time

INST

1.

2.

3.

## SECTION-C

7. a) Draw and explain the timing diagram for IN and OUT instructions of 8085.  
b) Explain the program memory and data memory structure of 8051 microcontroller.
8. Draw the pin diagram of 8051 microcontroller and explain its port structure.
9. Show and explain the interface of LCD or 7 segment display using 8051 microcontroller.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics and Communication Engg.) (Sem.-4)

**DATA STRUCTURES AND ALGORITHMS**

Subject Code : BTCS-301-18

M.Code : 77567

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**I. Write briefly :**

- a. What is a Queue? Write applications of queue.
- b. Define link list. How it is represented in memory?
- c. What is a data structure? Give example.
- d. Compare single and doubly linked list.
- e. What do you mean by algorithmic complexity?
- f. Discuss the sequential representation of a tree.
- g. How you can delete a node from an existing binary tree.
- h. Distinguish between linear and binary search techniques.
- i. Compare array and linked list data structures.
- j. What is a priority queue? How it is created?



## SECTION- B

2. What do you mean by stack? Explain the various operations of stack.
3. Write an algorithm for linear search and discuss with suitable example.
4. Write an algorithm for Selection sort and discuss the same with the help of an example.
5. What is a binary tree? Explain binary tree traversals with the help of an example.
6. Define Graph. Explain BFS and DFS graph traversals with examples.

## SECTION-C

7.
  - a) Compare sequential and linked memory representation of binary tree.
  - b) What is the concept of Hashing? Explain the various techniques used for hashing. How collisions are handled while addressing?
8. Write an algorithm to insert a new node in a sorted one-way link list and illustrate with the help of an example.
9. What is a circular queue? Write algorithm how you can insert and delete an element from circular queue. Write its applications also.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. With the help of block diagram and suitable waveforms, explain Ramp type digital voltmeters.
3. Explain the working of Strain Gauge as Force Sensor.
4. Explain the principle and various components used for magnetic recorders.
5. How can the capacitance be measured? Give its circuit and derive the relations.
6. Explain the principle and various components used for digital tape recorders.

## SECTION-C

7.
  - a) Give construction and working of PMMC instruments with torque equation.
  - b) A PMMC has a coil dimension of  $17\text{mm} \times 13\text{mm}$ . The flux density in the air gap is  $1.9 \times 10^{-3} \text{ Wb/m}^2$  and spring constant is  $0.17 \times 10^{-6} \text{ Nm/rad}$ . Determine the number of turns required to produce an angular deflection of  $90^\circ$  when a current of  $7\text{mA}$  flows through the coil.
8.
  - a) Explain how Wein bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters.
  - b) Explain the circuit and working of Kelvin Double bridge.
9.
  - a) Explain the block diagram of CRO in detail. Give the application of CRO for measurement of phase and frequency.
  - b) Explain the working of spectrum analyzer.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022

ECE - 5 Sem

Roll No.

Total No.

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-5)  
**ANALOG AND DIGITAL COMMUNICATION**

Subject Code : BTEC-501-18

M.Code : 78297

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define unit impulse signal.
- b) Explain types of noise.
- c) Explain aliasing.
- d) What are the advantages of SSB modulation?
- e) Differentiate between PCM and DPCM.
- f) Explain SNR.
- g) What do you mean by coherent communication?
- h) Define "Shift Keying" term in digital modulation.
- i) Enlist advantages of continuous phase modulation.
- j) Define baseband signal.



### SECTION-B

2. Draw and explain VSB modulation and demodulation.
3. Derive the expression for random process Gaussian noise.
4. Explain Adaptive and Sigma Delta Modulation.
5. Draw and explain frequency shift keying modulation technique.
6. Describe frequency domain representation of signals.

### SECTION-C

7. Explain Pulse amplitude modulation technique block diagram and its types with waveforms.
8. Give the representation of spectral characteristics of angle modulation signals.
9. With the help of diagrams, explain continuous phase modulation technique.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-5)

**MICROPROCESSORS & MICROCONTROLLERS**

Subject Code : BTEC-504

M.Code : 70480

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- (a) List the Special function Registers of 8051.
- (b) What do you understand by Embedded Systems?
- (c) Enlist some salient features of 8085.
- (d) Discuss the different ports of 8051.
- (e) List the jump instructions of 8051.
- (f) Discuss the need of SBUF register.
- (g) Differentiate maskable and non-maskable interrupt in 8085.
- (h) What is the significance of directives in 8051?
- (i) What is the use of stack and stack pointer?
- (j) Compare Microprocessor and Microcontroller.



### SECTION-B

2. Differentiate memory mapped I/O and peripheral mapped I/O in case of 8085 microprocessor.
3. Write a program for 8085 microprocessor to add ten data bytes and store the result at memory location 2501 and 2502.
4. Give different modes of serial communication. Discuss the various steps to receive data serially.
5. What do you mean by the addressing mode? Explain the various addressing modes of 8051 in detail with the help of examples.
6. Write a program for 8051 microcontroller to generate a square wave of 50 Hz on the pin P1.5 using timer 1. The crystal frequency is 11.0592 MHz.

### SECTION-C

7. Classify and explain different types of 8085 instructions with examples.
8. Explain the architecture of microcontroller 8051.
9. Show the connections for Interfacing of any ADC with 8051 and write a program to demonstrate its working.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. State and explain the Shanon's capacity theorem.
3. Describe Codec and Combo chip.
4. Explain the coherent and non-coherent FSK detectors.
5. Determine the signal to quantization noise ratio of a delta modulator with a bit rate of 64 kb/s and an input signal bandwidth of 4 KHz.
6. Explain the minimum bandwidth required for a 16-QAM system and bit rate.

## SECTION-C

7. Describe QAM transmitter and receivers.
8. Explain the working of adaptive delta modulation with suitable diagrams. Also, compare this with other modulation schemes.
9. Determine the efficiency for the QPSK modulator and 8-PSK modulator with  $f_b = 10$  Mbps.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ECE) (Sem.-5)**  
**LINEAR INTEGRATED CIRCUIT**

**Subject Code : BTEC-503-18**

**M.Code : 78299**

**Date of Examination : 03-08-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

1. **Write briefly :**

- a) Define the Supply Voltage Rejection Ratio (SVRR).
- b) Write down the characteristics of an ideal op-amp.
- c) Discuss the dual input unbalanced output differential amplifier.
- d) Define Common Mode Rejection Ratio (CMRR).
- e) Differentiate input offset current and input bias current.
- f) What is scaling amplifier?
- g) What is the importance of swamping resistor in differential amplifier?
- h) What is Schmitt trigger?
- i) Discuss the concept of adjustable voltage regulator.
- j) Draw the pin diagram of 555 timer IC.

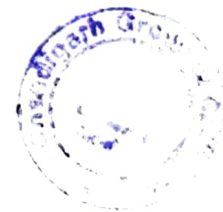


## SECTION-B

2. Draw the circuit diagram of differential amplifier. Write the advantages of double ended differential I/O amplifiers over single ended I/O amplifiers.
3. A non-inverting amplifier is to amplify 10mV signal to a level of 1 V using 741 Op-Amp. Design a suitable circuit and calculate its input and output impedances.
4. The input to an op-amp differentiator circuit is a sinusoidal voltage of peak value  $10\mu\text{V}$  and frequency of 2KHz. If the values of differentiating components are given as  $R = 40\text{ k}\Omega$  and  $C = 5\text{ }\mu\text{F}$ , determine the output voltage.
5. Draw and explain the circuit diagram of voltage- to -current converter. Also, explain any two applications of the converter.
6. What is the difference between digital and analog PLL?

## SECTION-C

7. Sketch the circuit of a single stage band-pass filter. Discuss the low-pass and high-pass operation of the circuit.
8. Draw the block diagram of a 555 timer and discuss it in astable configuration. Also, draw the output waveforms.
9. Write short notes on :
  - (a) Phase Shift Oscillator.
  - (b) Voltage Shunt Feedback Configuration of Op-Amp.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ECE) (Sem.-5)**  
**DIGITAL SIGNAL PROCESSING**

Subject Code : BTEC-502

M.Code : 70546

Date of Examination : 04-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**

1. Write briefly :

- a) List any four applications of digital signal processing.
- b) Determine whether the system is linear or non-linear  $y(n) = x(n^2)$ .
- c) Construct the block diagram of discrete time system whose input-output relation is described by the difference equation.  
$$y(n) = 0.25 y(n-1) + 0.5 x(n) + 0.75 x(n-1)$$
- d) Determine the Z transform of unit step sequence.
- e) What do you mean by 'twiddle factor' of DFT & show how it is cyclic?
- f) List the errors arise due to the quantization of filter coefficients.
- g) What are the basic elements used to construct the realization structures of discrete time system?
- h) Define frequency warping. Also tell, why it occurs?
- i) Why an impulse invariant transformation is not considered to be one to one?
- j) Give the various steps involved in the design of FIR filter.



### SECTION-B

2. Draw and explain the butterfly diagram of 8-point DIT radix 2 FFT.
3. Compute circular convolution  $x_1(n) \times x_2(n)$  for  $N = 5$   
If  $x_1(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$  and  $x_2(n) = \delta(n) - \delta(n-2) - \delta(n-4)$
4. Discuss the FIR filter desing by window method.
5. Compute the linear convolution of the given sequences :  
$$x_1(n) = [1, 3, 2, 2]$$
$$x_2(n) = [4, 2, 3, 2, 2]$$
6. Explain convolution and time shifting properties of Z-transform.

### SECTION-C

7. With the help of a block diagram, explain the architecture of a ADSP series processor.
8. a) Find the 4-point DFT of the sequence  $x(n) = \cos \frac{n\pi}{4}$   
b) Derive the relation between DFT and Z transform.
9. Explain the different types of structures for the realization of IIR filter.



**NOTE : Disclosure of Identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-5)

**PROJECT MANAGEMENT**

Subject Code : BTMS-YYY-18

M.Code : 78302

Date of Examination : 05-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1) Write briefly :

- a) Define Project Management.
- b) What is LOB?
- c) What is a pure project organization?
- d) What is GERT?
- e) What is Global project management?
- f) What are the full forms of PERT and CPM?
- g) What is matrix organisation?
- h) What are Gantt Charts?
- i) What are various performance indicators of a large construction project?
- j) What is NPV?



## SECTION-B

- 2) What are the various attributes of a project? Why we need to manage a project? Discuss.
- 3) What are various steps in soliciting project proposals? What are the important points to be considered at each stage? Explain.
- 4) What is WBS? Write a note on its usefulness in the Project Planning and Scheduling?
- 5) How the techniques of PERT and CPM are applied in project management? Discuss.
- 6) What are various types of project Evaluations and Audits? What are the roles duties of Evaluators/Auditors?

## SECTION-C

- 7) How do we classify the projects? What are the important requirements of each type of the project? What are the techniques that are best suited for managing each of these types of projects?
- 8) What is project control? What are the tools for controlling the time and what are the tools for Cost planning?
- 9) Write a note on :
  - (a) Work breakdown structure
  - (b) Resource allocation, crashing and resource sharing.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.) (Sem.-5)

**CONTROL SYSTEMS**

Subject Code : BTEC-504-18

M.Code : 78300

Date of Examination : 04-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1) Write briefly :

- a) What is the difference between DC and AC servomotors?
- b) What do you mean by pneumatic actuators?
- c) What is the difference between Proportional and Integral control?
- d) Draw the electrical circuits of Lead and lag compensator.
- e) What is polar plots?
- f) What is the difference between Controllability and observability?
- g) What is Non-linear control system?
- h) What are controllers?
- i) What is phase margin?
- j) Define state models for linear continuous time functions.



### SECTION-B

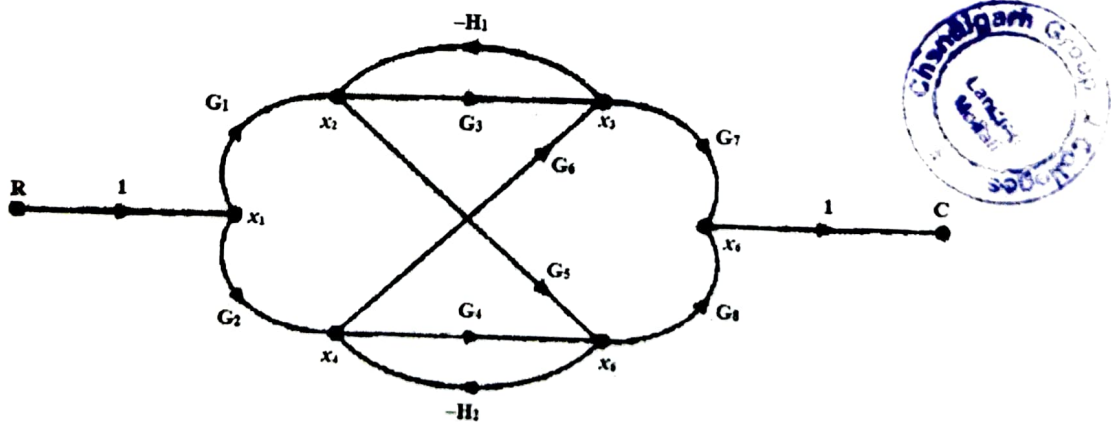
- 2) Using Routh Hurwitz stability criterion, determine the range of K for stability of the following characteristic equation.  

$$S^4 + 2S^3 + (4+K)S^2 + 9S + 25 = 0$$
- 3) Sketch the root-locus of the following system :  

$$G(S)H(S) = K/S(S+1)(S+2)$$
- 4) What are the rules for drawing polar plots?
- 5)
  - a) Explain BIBO stability.
  - b) What is the necessary condition for stability?
  - c) Define root locus?
  - d) What is centroid? How the centroid is calculated?
  - e) What is stable system?
- 6)
  - a) Compare open loop and closed loop control systems based on different aspects.
  - b) Distinguish between Block diagram Reduction Technique and Signal Flow Graph.

### SECTION-C

- 7) Draw the Nyquist plot for the system whose open loop transfer function is,  $G(s)H(s) = K/S(S+2)(S+10)$ . Determine the range of K for which closed loop system is stable.
- 8) Derive the expressions for resonant peak and resonant frequency and hence establish the correlation between time response and frequency response.
- 9) Using mason gain formula find the transfer function  $C/R$  for the signal flow graph shown in figure.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Briefly explain the various types of dialog boxes in JavaScript with an example.
3. How can we register, unregister & delete Session Variable in PHP? Explain with example.
4. What are Lists in HTML? Explain its types.
5. What is the use of domain name system? Explain the directory structure of the DNS.
6. How can CSS be integrated into an HTML page? Explain.

## SECTION-C

7. How can both Internal and External DTDs be used in an XML File? Show with an example.
8. Define Frameset, Frame Tag. Divide the web page into four equal parts, each individual part displays different web page.
9. Write a short note on the following :
  - a. Ajax server script
  - b. Internet Addressing.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. What are the differences between C++ and Java?
3. Explain the various types of datatypes we can use in JAVA.
4. Explain inheritance and its types.
5. What is the purpose of key word final?
6. Write a program to create an Applet that accepts parameter from HTML file.

## SECTION-C

7. Write steps of how we can access database in JAVA using JDBC?
8. Explain Java IDL with the help of "*Hello World*" example.
9. Explain life cycle of a Thread with the help of an example.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ECE) (Sem.-6)**  
**WIRELESS COMMUNICATION SYSTEM**

Subject Code : BTEC-602

M.Code : 71122

Date of Examination : 07-07-22

B. Tech Sem  
Questions - E

Time : 3 Hrs.

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1) Answer briefly :

- a) Define Doppler shift.
- b) Define cell splitting.
- c) Write full form of GSM.
- d) What are the advantages of RAKE receiver?
- e) What is signal to noise ratio?
- f) What is the need of multiple access techniques?
- g) What is IS-54 standard?
- h) Write about forward and reverse channel.
- i) Write full form of SIM.
- j) Briefly explain cordless telephone system.

## SECTION-B

2. Interpret the structure of wireless communication link in detail.
3. Explain co-channel interference and adjacent interference. Describe the techniques to avoid interference.
4. Explain in detail about channel assignment strategies.
5. What is the impact of fading in wireless communication?
6. Explain CDMA in detail.

## SECTION-C

7. Write a note on:
  - a) ZigBee
  - b) Bluetooth
  - c) LTE- Advance.
8. What is the need of diversity? Explain different types of diversity.
9. Write a note on GSM wireless networks and standards.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**





## SECTION-B

2. Define break even analysis. Draw a break even chart and explain its components.
3. Explain with the help of an example how the effective motivation theory helps in improving the Quality of work.
4. Explain with the help of the examples "Taylor's Scientific Management".
5. Discuss the effect of risk and uncertainty on lot size.
6. Differentiate between project, matrix, and informal organization.

## SECTION-C

7. Differentiate between characteristics of batch, continuous, and group-technology production systems.
8. Explain with the help of relevant examples "Maslow's Hierarchy of Human Needs"
9. Write a short note on the following :
  - a) Rate of return method of decision making.
  - b) Continuous review system of inventory control.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**



## SECTION-B

2. What is linear scattering? Briefly explain the Rayleigh scattering and Mie scattering with relation to intrinsic and extrinsic absorption mechanism.
3. When the mean optical power launched into an 10 Km length of fiber is  $180 \mu\text{W}$ , the mean power at the other end of the fibre is  $10 \mu\text{W}$ . Determine the overall signal attenuation in dB through the fiber assuming there are no connectors or splices and also the overall signal attenuation for 10 Km optical link using same fibre with splices at 1Km interval, each giving an attenuation of 1 dB.
4. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and cladding refractive index of 1.47. Determine: (i) the critical angle at core cladding interface, (ii) the numerical aperture for the fiber, and (iii) the acceptance angle in air for the fiber.  
Why is stimulated emission used in laser? Give the fundamental structure of optical confining?
5. Derive the expression for calculating the power budget.
6. Starting from Maxwell's equation, derive the expression for wave equation, derive the expression for wave propagating through optical fiber.

## SECTION-C

7. Discuss the sources of errors in optical receivers with mathematical expressions.
8. (a) Describe the add/drop techniques in WDM optical networks.  
(b) Compare the quantum efficiency of PIN & APD photo-detectors.
9. A 6 Km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive difference of 1%. Estimate:
  - i. The delay difference between the slowest and fastest modes at fiber output.
  - ii. The rms pulse broadening due to intermodal dispersion on the link.
  - iii. The maximum bit rate that may be obtained without substantial error on the link assuming only intermodal dispersion.
  - iv. The bandwidth-length product corresponding to (iii).

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

June - 2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE / CSE / EE / ECE / EEE / IT / SE ) / BTech. (CE) (PIT)  
(Sem.-6)

**WIRELESS COMMUNICATION**

Subject Code : BTEC-601-18

M.Code : 79373

Date of Examination : 20-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is LTE?
- b) Define cluster.
- c) Write full form of UMTS.
- d) What are the advantages of RAKE receiver?
- e) What is signal to noise ratio?
- f) What is frequency hopped multiple access?
- g) What is IS-136 standard?
- h) Write about forward and reverse channel.
- i) Write full form of VLR.
- j) Briefly explain ZigBee.



## SECTION-B

2. Explain the various parameters involved in multipath propagation.
3. Explain in detail how to improve coverage and channel capacity.
4. Explain fourth generation in detail.
5. Explain why large scale fading and small scale fading occur in wireless channel.
6. What are ALOHA protocols? Explain in detail.

## SECTION-C

7. Write a note on third generation wireless networks and standards.
8. Explain with diagram the different techniques available for signal combining.
9. Discuss the major differences between TDMA/FDMA and CDMA. Explain each in detail.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ECE) (Sem.-6)**  
**C# AND .NET PROGRAMMING**

Subject Code : BTEC-906D-18

M.Code : 79380

Date of Examination : 17-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) Dynamic data type in C#
- b) Exception
- c) CLR
- d) Operator Overloading
- e) Abstract Class
- f) MDI
- g) Synchronization
- h) ADO.NET
- i) Localization
- j) Data Stores



## SECTION-B

2. Discuss the various data types in C#
3. Define Indexers. Can they be overloaded? Justify.
4. Write a note on windows presentations foundation.
5. Differentiate between abstract and interface. Explain the concept of polymorphism.
6. Explain how testing and debugging is done in .Net.

## SECTION-C

7. Describe in detail the process of packaging and deployment in .Net.
8. Write a detailed note on memory management, pointers and regular expressions.
9. Define transactions. Explain P2P networking. How P2P applications are created in .Net.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-6)

**COMPUTER NETWORKS**

Subject Code : BTCS-504-18

M.Code : 79374

Date of Examination : 16-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. What is the need of presentation layer?
- b. List few applications layer protocols.
- c. What is Checksum?
- d. What is message switching? ,
- e. Why do we need RARP?
- f. Define BOOTP.
- g. What is meaning of reliability in TCP?
- h. What is MAC address?
- i. Define DDNS.
- j. What is IDS?



## SECTION-B

2. Why do we need multiplexing? Discuss Frequency Division multiplexing.
3. Explain the CSMA/CD protocol used at MAC layer. Does it reduce the number of collisions?
4. Discuss the functionality of network layer. How logical addressing is done at this layer?
5. Define Congestion. How Stream control Transmission protocol works?
6. Discuss the working of DNS protocol with the help of a suitable example.

## SECTION-C

7. Explain the different guided and unguided media used at physical layer for data transmission.
8. What is sliding window protocol? Discuss the advantages and disadvantages of using piggybacking.
9. Write a short note on :
  - a. TCP vs UDP
  - b. FTP.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



### SECTION-B

2. What is Nyquist criterion? Prove its sampling theorem mathematically. What is the need of antialiasing filter? How does it affect the distortion?
3. Explain the following terms :
  - a) Viterbi Coder
  - b) Lempel Ziv coding
4. Define Channel Capacity theorem and Shannon limit. Discuss Bandwidth-S/N trade off.
5. Discuss in detail convolution decoding procedure using the Trellis diagram.
6. Show how a 4bit stage shift register can generate a convolution code for input train 11001.

Roll No.  
Total No.

Time  
INST  
1.  
2.  
3.

### SECTION-C

7. What do you understand by linear block codes? Briefly comment on the BCH codes.
8. Design a block code with minimum distance of three and a message block size of 8 bits.
9. a) A source emits symbols  $X_i$ ,  $1 \leq i \leq 6$ , in the BCD format with probabilities  $P(X_i)$  as given in Table 1, at a rate  $R_s = 9.6$  kbaud (baud=symbol/second). State
  - (i) the information rate and
  - (ii) the data rate of the source.
- b) Apply Shannon-Fano coding to the source signal characterized in Table 1. Are there any disadvantages in the resulting code words?

Table 1		
$X_i$	$PX_i$	BCD word
A	0.30	000
B	0.10	001
C	0.02	010
D	0.15	011
E	0.40	100
F	0.03	101

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-6)

**OPERATING SYSTEMS**

Subject Code : BTCS-401

M.Code : 71120

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Answer briefly :

- a) Turnaround Time
- b) Seek Time
- c) Page Fault
- d) Physical Address
- e) Non-Preemptive
- f) Static Linking
- g) Software Trap
- h) External Fragmentation
- i) Shell
- j) Synchronization

## SECTION-B

2. What is segmentation? Explain segmentation with paging.
3. What is a deadlock? How it is avoided?
4. What is round robin scheduling? Explain it with the help of an example.
5. What is a threat? Differentiate between system and program threat.
6. What is process synchronization? Explain any two algorithms of it.

## SECTION-C

7. What is disk scheduling? Explain SCAN and C-SCAN algorithms.
8. Define Operating Systems. Explain its functions and types.
9. Differentiate between LRU and optimal replacement algorithms with the help of an example.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Civil Engineering / Electrical & Electronics Engineering /  
Electrical Engineering / Electronics & Communication Engineering)**

**(Sem.-6)**

**OPERATING SYSTEM**

**Subject Code : BTCS 402-18**

**M.Code : 79262**

**Date of Examination : 03-07-22 (M)**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

1. **Write briefly :**

- a) Differentiate between UNIX and WINDOWS Operating System.
- b) Write at least two advantages of Microkernel based structure of an Operating System.
- c) Differentiate between Pre-emptive and Non-preemptive scheduling algorithms.
- d) List at least two benefits of threads.
- e) What is critical section problem?
- f) List the necessary conditions for a deadlock to occur.
- g) Why page size is always power of 2?
- h) Explain the term compaction in brief.
- i) Define the term Disk Bandwidth.
- j) What do you mean by device drivers?



## SECTION-B

2. Write a detailed note on following Operating Systems
  - a) Time sharing operating systems
  - b) Real Time operating systems
3. Write a detailed note on the concept of multithreads.
4. Explain in detail about Dining Philosopher problem.
5. What is deadlock? Explain deadlock prevention in detail.
6. Write a detailed note on Principles of I/O Software.

## SECTION-C

7. Write a detailed note on Operating System Services.
8. Write a detailed note on the following
  - a) Disk formatting
  - b) Boot-block
  - c) Bad blocks
9. What is the need of Page replacement? Consider the following reference string  
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with three free frames which are empty initially. Which algorithm gives the minimum number of page faults?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ECE) (Sem.-6)**  
**MICROWAVE AND RADAR ENGINEERING**

Subject Code : BTEC-601

M.Code : 71121

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.



**SECTION-A**

**1. Answer briefly :**

- a) What are the different types of limitations of conventional tubes on high frequency?
- b) What is the function of slow wave structure?
- c) Define tunnelling effect.
- d) What is MASER?
- e) What is the use of matched termination?
- f) How SWR can be measured?
- g) What is Doppler effect?
- h) Differentiate between CW and FMCW.
- i) What is staggered PRFs?
- j) Name the different scanning techniques used in radar.

## SECTION-B

2. What is Gunn effect and two valley theory of electrons?
3. Explain the working of isolator in detail.
4. Explain working and construction of reflex klystron tube with the help of a diagram.
5. Draw the block diagram of radar and derive radar equation.
6. Explain range tracking system in detail.

## SECTION - C

7. Write note on:
  - a) Varactor diode
  - b) BWO
  - c) MTI radar
  - d) Doppler tracking systems
8. Define the following terms in case of magnetron (with diagram):
  - a) Favoured and unfavored electrons
  - b) Effect of electric and magnetic field
  - c) Cut off field
  - d)  $\pi$ -mode oscillations
9.
  - a) Explain angle tracking system in detail.
  - b) What are the different applications of radar?

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.**

May 2022  
ECE - 6 Sem

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-6)

**OPERATING SYSTEMS**

Subject Code : BTCS-401

M.Code : 71120

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) Turnaround Time
- b) Seek Time
- c) Page Fault
- d) Physical Address
- e) Non-Preemptive
- f) Static Linking
- g) Software Trap
- h) External Fragmentation
- i) Shell
- j) Synchronization



### SECTION-B

2. What is segmentation? Explain segmentation with paging.
3. What is a deadlock? How it is avoided?
4. What is round robin scheduling? Explain it with the help of an example.
5. What is a threat? Differentiate between system and program threat.
6. What is process synchronization? Explain any two algorithms of it.

### SECTION-C

7. What is disk scheduling? Explain SCAN and C-SCAN algorithms.
8. Define Operating Systems. Explain its functions and types.
9. Differentiate between LRU and optimal replacement algorithms with the help of an example.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ECE) (Sem.-6)**  
**MICROWAVE AND RADAR ENGINEERING**

Subject Code : BTEC-601

M.Code : 71121

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) What are the different types of limitations of conventional tubes on high frequency?
- b) What is the function of slow wave structure?
- c) Define tunnelling effect.
- d) What is MASER?
- e) What is the use of matched termination?
- f) How SWR can be measured?
- g) What is Doppler effect?
- h) Differentiate between CW and FMCW.
- i) What is staggered PRFs?
- j) Name the different scanning techniques used in radar.



## SECTION-B

2. What is Gunn effect and two valley theory of electrons?
3. Explain the working of isolator in detail.
4. Explain working and construction of reflex klystron tube with the help of a diagram.
5. Draw the block diagram of radar and derive radar equation.
6. Explain range tracking system in detail.

## SECTION - C

7. Write note on:
  - a) Varactor diode
  - b) BWO
  - c) MTI radar
  - d) Doppler tracking systems
8. Define the following terms in case of magnetron (with diagram):
  - a) Favoured and unfavored electrons
  - b) Effect of electric and magnetic field
  - c) Cut off field
  - d)  $\pi$ -mode oscillations
9.
  - a) Explain angle tracking system in detail.
  - b) What are the different applications of radar?

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-6)  
**MICROWAVE AND RADAR ENGINEERING**

Subject Code : BTEC-601

M.Code : 71121

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) What are the different types of limitations of conventional tubes on high frequency?
- b) What is the function of slow wave structure?
- c) Define tunnelling effect.
- d) What is MASER?
- e) What is the use of matched termination?
- f) How SWR can be measured?
- g) What is Doppler effect?
- h) Differentiate between CW and FMCW.
- i) What is staggered PRFs?
- j) Name the different scanning techniques used in radar.



## SECTION-B

2. What is Gunn effect and two valley theory of electrons?
3. Explain the working of isolator in detail.
4. Explain working and construction of reflex klystron tube with the help of a diagram.
5. Draw the block diagram of radar and derive radar equation.
6. Explain range tracking system in detail.

## SECTION - C

7. Write note on:
  - a) Varactor diode
  - b) BWO
  - c) MTI radar
  - d) Doppler tracking systems
8. Define the following terms in case of magnetron (with diagram):
  - a) Favoured and unfavored electrons
  - b) Effect of electric and magnetic field
  - c) Cut off field
  - d)  $\pi$ -mode oscillations
9.
  - a) Explain angle tracking system in detail.
  - b) What are the different applications of radar?

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.**





## SECTION-B

2. Interpret the structure of wireless communication link in detail.
3. Explain co-channel interference and adjacent interference. Describe the techniques to avoid interference.
4. Explain in detail about channel assignment strategies.
5. What is the impact of fading in wireless communication?
6. Explain CDMA in detail.

## SECTION-C

7. Write a note on:
  - a) ZigBee
  - b) Bluetooth
  - c) LTE- Advance.
8. What is the need of diversity? Explain different types of diversity.
9. Write a note on GSM wireless networks and standards.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech.(ECE) (Sem.-6)**  
**ENGINEERING ECONOMICS & INDUSTRIAL MANAGEMENT**

Subject Code : BTEC-603

M.Code : 71123

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) What are the duties of a store manager?
- b) Define the "Productivity Index" and give its importance.
- c) Give the qualifications of an estimator.
- d) What are "Safety Stock" and "Re-order Level" in inventory control?
- e) Define "Purchase Management".
- f) What do you understand by the economic life of a project?
- g) Give various objectives of economic analysis.
- h) Explain the importance of delegation of authority.
- i) Discuss Mayo's Hawthorne study.
- j) What is depreciation? Give its types.



## SECTION-B

2. Define break even analysis. Draw a break even chart and explain its components.
3. Explain with the help of an example how the effective motivation theory helps in improving the Quality of work.
4. Explain with the help of the examples "Taylor's Scientific Management".
5. Discuss the effect of risk and uncertainty on lot size.
6. Differentiate between project, matrix, and informal organization.

## SECTION-C

7. Differentiate between characteristics of batch, continuous, and group-technology production systems.
8. Explain with the help of relevant examples "Maslow's Hierarchy of Human Needs".
9. Write a short note on the following :
  - a) Rate of return method of decision making.
  - b) Continuous review system of inventory control.

Roll No.   
Total No. of

Time : 3 H

INSTRUCT  
1. SECT  
each  
2. SEC  
hav  
3. SEC  
hav

1.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ECE) (Sem.-6)**  
**INFORMATION THEORY AND CODING**

Subject Code : BTEC-907

M.Code : 71236

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) Define source entropy in case of discrete and continuous channels.
- b) What are cyclic codes? What are its various kinds?
- c) What is ARQ? State its types.
- d) What do you mean by generator matrices of the cyclic codes?
- e) State the need and meaning of error control coding.
- f) Write the steps for decoding of BCH codes.
- g) Write short note on decoding methods of convolutional codes.
- h) Write short note on Hamming distance and Code efficiency.
- i) What do you mean by matrix description of cyclic codes?
- j) Compare LZ and LZW coding.



## SECTION-B

2. What is Nyquist criterion? Prove its sampling theorem mathematically. What is the need of antialiasing filter? How does it affect the distortion?
3. Explain the following terms :
  - a) Viterbi Coder
  - b) Lempel Ziv coding
4. Define Channel Capacity theorem and Shannon limit. Discuss Bandwidth-S/N trade off.
5. Discuss in detail convolution decoding procedure using the Trellis diagram.
6. Show how a 4bit stage shift register can generate a convolution code for input train 11001.

## SECTION-C

7. What do you understand by linear block codes? Briefly comment on the BCH codes.
8. Design a block code with minimum distance of three and a message block size of 8 bits.
9. a) A source emits symbols  $X_i$ ,  $1 \leq i \leq 6$ , in the BCD format with probabilities  $P(X_i)$  as given in Table 1, at a rate  $R_s = 9.6$  kbaud (baud=symbol/second). State
  - (i) the information rate and
  - (ii) the data rate of the source.
- b) Apply Shannon-Fano coding to the source signal characterized in Table 1. Are there any disadvantages in the resulting code words?

$X_i$	$PX_i$	BCD word
A	0.30	000
B	0.10	001
C	0.02	010
D	0.15	011
E	0.40	100
F	0.03	101

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-6)  
**COMPUTER NETWORKS**  
Subject Code : BTCS-504-18  
M.Code : 79374  
Date of Examination : 16-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. What is the need of presentation layer?
- b. List few applications layer protocols.
- c. What is Checksum?
- d. What is message switching? ,
- e. Why do we need RARP?
- f. Define BOOTP.
- g. What is meaning of reliability in TCP?
- h. What is MAC address?
- i. Define DDNS.
- j. What is IDS?



## SECTION-B

2. Why do we need multiplexing? Discuss Frequency Division multiplexing.
3. Explain the CSMA/CD protocol used at MAC layer. Does it reduce the number of collisions?
4. Discuss the functionality of network layer. How logical addressing is done at this layer?
5. Define Congestion. How Stream control Transmission protocol works?
6. Discuss the working of DNS protocol with the help of a suitable example.

## SECTION-C

7. Explain the different guided and unguided media used at physical layer for data transmission.
8. What is sliding window protocol? Discuss the advantages and disadvantages of using piggybacking.
9. Write a short note on :
  - a. TCP vs UDP
  - b. FTP.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.-6)

**OPTICAL FIBERS & COMMUNICATION**

Subject Code : BTEC-602-18

M.Code : 79375

Date of Examination : 18-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) How BER is related to the quality of the signal?
- b) What do mean by wavelength converter? Explain FWM wavelength converter.
- c) Calculate the quantum efficiency at 1300 nm if the change in power of 2mW produces a current change of 6mA.
- d) Define the receiver sensitivity.
- e) List the advantages of optical communication.
- f) Suppose you use an LED whose energy gap equals 2.5 eV. What wavelength signal will it radiate?
- g) Differentiate between Splices and Connectors.
- h) Calculate chromatic dispersion in single mode fibre at the 1550 nm operating wavelength with  $\Delta\lambda=1$  and  $L=1$  km.
- i) Calculate the length of DCF having dispersion coefficient of -46 ps/km, if length of SMF is 40 km with dispersion coefficient of 18.75 ps/km.
- j) What is Chromatic dispersion?

## SECTION-B

2. What is linear scattering? Briefly explain the Rayleigh scattering and Mie scattering with relation to intrinsic and extrinsic absorption mechanism.
3. When the mean optical power launched into an 10 Km length of fiber is  $180 \mu\text{W}$ , the mean power at the other end of the fibre is  $10 \mu\text{W}$ . Determine the overall signal attenuation in dB through the fiber assuming there are no connectors or splices and also, the overall signal attenuation for 10 Km optical link using same fibre with splices at 1Km interval, each giving an attenuation of 1 dB.
4. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and cladding refractive index of 1.47. Determine: (i) the critical angle at core cladding interface, (ii) the numerical aperture for the fiber, and (iii) the acceptance angle in air for the fiber.  

Why is stimulated emission used in laser? Give the fundamental structure of optical confining?
5. Derive the expression for calculating the power budget.
6. Starting from Maxwell's equation, derive the expression for wave equation, derive the expression for wave propagating through optical fiber.

## SECTION-C

7. Discuss the sources of errors in optical receivers with mathematical expressions.
8. (a) Describe the add/drop techniques in WDM optical networks.  
(b) Compare the quantum efficiency of PIN & APD photo-detectors.
9. A 6 Km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive difference of 1%. Estimate:
  - i. The delay difference between the slowest and fastest modes at fiber output.
  - ii. The rms pulse broadening due to intermodal dispersion on the link.
  - iii. The maximum bit rate that may be obtained without substantial error on the link assuming only intermodal dispersion.
  - iv. The bandwidth-length product corresponding to (iii).

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE/CSE/EE/ECE/IT) (Sem.-6)

**SATELLITE COMMUNICATION**

Subject Code : BTEC-906B-18

M.Code : 79378

Date of Examination : 06-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define the terms apogee and perigee.
- b) Define Keplers laws and list the orbital elements of a satellite.
- c) Explain the different orbital effects in satellite communication system performance.
- d) A receiving system has antenna noise temperature 60K and receiver noise figure 9dB. Find the system noise temperature if the room temperature is 290K.
- e) What is an Eclipse? How it affects the satellite function?
- f) Give the formulae to compute the uplink carrier to noise ratio.
- g) Define G/T ratio and give its importance in satellite communication.
- h) Briefly explain the characteristics of VSAT systems.
- i) What is meant by sun sync orbit?
- j) What do you mean by channel throughput? What is its significance?



## SECTION-B

2. Draw the block diagram for satellite communication system. Explain the function of each block.
3. Draw the typical tracking, telemetry, command and monitoring system and explain its working for sub system of a spacecraft.
4. Describe in detail about the Doppler frequency shift phenomena and also derive the expression for Doppler shift.
5. Derive the expression for system noise temperature in a satellite receiver.
6. Describe in detail about VSAT Earth Station using appropriate diagram.

## SECTION-C

7. List the various frequency bands being used in satellite communication. Compare the advantages and disadvantages of different bands considering the effects of propagation media.
8.
  - a) A low earth orbit satellite is at an altitude of 250 km above the earth's surface. Assuming earth's diameter is approximately 12,756.28 km, calculate the period of when the orbit is circular. Also, find the angular velocity of the satellite along its orbit.
  - b) With neat diagrams, explain the procedure for measuring critical satellite parameters like C/N and G/T. Emphasize on the significance of these parameters.
9. Write short notes on the following :
  - a) Interference effects on Complete Link design.
  - b) VSAT Network Architecture.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Electronics & Communication Engg.) (Sem.-7)

**PYTHON PROGRAMMING**

Subject Code : BTEC-907D-18

M.Code : 90676

Date of Examination : 01-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Define Following terms :

- IDE
- `_init_`
- `_str_`
- Class
- Inheritance
- Data types
- Exception Handling.
- Mutable Sequences
- Indexing of String
- Type conversion

**SECTION-B**

- What is list? Explain the concept of slicing and indexing with proper examples.
- Discuss the `int()`, `float()`, `str()`, `chr()` and `complex()` type conversion functions with examples.
- Discuss the following methods associated with the file object
  - `read()`
  - `readline()`
  - `readlines()`
  - `tell()`
  - `seek()`
  - `write()`
- Write Python program to demonstrate Multiple Inheritance.
- Write a python program to calculate the factorial of given number using function.

**SECTION-C**

- Write a python program to read contents of first.txt file and count vowels in it.
- Explain Sieve of Eratosthenes method with the help of suitable example.
- Design a python program which will throw exception if the age entered by user is less than 18.
  - Explain concepts of object oriented programming.

NOTE : D

ntify by writing Mobile No. or Making of passing request on any Answer Sheet will lead to UMC against the Student.

1 | M-90676

2 | M-90676

(52)-46



B.Tech  
P.T.U. Question

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-7)

**SOFT COMPUTING**

Subject Code : BTEC-908D-18

M.Code : 90681

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a. What do you mean by the term perceptron?
- b. What do you mean by soft computing?
- c. What is the importance of fitness function?
- d. Differentiate between crisp and fuzzy set theory.
- e. Define Adaline and Madaline.
- f. How fuzzy sets are defined in Fuzzy Logic?
- g. State the Bayes' rule.
- h. Draw biological neuron.
- i. What do you mean by mutation?
- j. Mention the criteria for the evaluation of a search strategy.



## SECTION-B

2. Differentiate between single and multi-point crossover operations.
3. Explain the string coding of chromosomes.
4. Differentiate between Mamdani and Sugeno fuzzy inference system.
5. Write a note on Swarm Intelligence.
6. Explain different activation functions in NN.

## SECTION-C

7. Explain the single layer Neural Network architecture using Perceptron model with suitable activation function.
8. Sketch the 5 layer ANFIS architecture mentioning the task of each layer.
9. Design Hebb Net to implement logical AND function. Use bipolar inputs and targets.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages :02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-7)  
**EMBEDDED SYSTEMS**

Subject Code :BTEC-701

M.Code : 71910

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) What is the WFI instruction used for?
- b) Draw and explain format of ARM CPSR.
- c) Which two variants of the Store Multiple instruction are used most often, and why?
- d) What is meant by 7-TDMI w.r.t. ARM processor core?
- e) Differentiate between BL and BNE instructions used in ARM processors.
- f) Compare little and big-endian modes in ARM processor.
- g) Implement the statement  $x = (a+b) - c$  using ARM instructions.
- h) Explain the instructions of LDC and MRC with an example.
- i) Explain Jazelle mode of ARM.
- j) Give different applications of ARM processors.





## SECTION-B

2. Write an ARM7 based ALP to perform multiplication of two 32 bit numbers and store the result in memory locations. Assume suitable data.
3. How C/C++ is useful in embedded system programming. Also, mention the advantages of high level programming for embedded system.
4. Which are the different conditional flags of ARM processor?
5. Calculate the effective address of the following instructions if register R3=0x4000 and register R4=0x20
  - a) STRH R9, [R3,R4]
  - b) LDRB R8,[R3,R4,LSL #3]
  - c) LDR R7,[R3],R4
6. Write an embedded C program to rotate stepper motor in clockwise direction. Draw a neat interfacing diagram of stepper motor with ARM7 processor.

## SECTION-C

7. With a neat diagram, explain the different general purpose registers of ARM processors.
8. Write an ARM program to find the larger of two 32-bit variables VALUE1 and VALUE2. Place the result in the variable RESULT. Assume the values are unsigned.
9. Write a program to display "ENGINEERING" on LCD using LPC2148 ARM processor. Also, draw interfacing diagram.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022

ECE-718, Sem

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.) (Sem.-7)

**PYTHON PROGRAMMING**

Subject Code : BTEC-907D-18

M.Code : 90676

Date of Examination : 01-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Define Following terms :

- a) IDE
- b) `_init_`
- c) `_str_`
- d) Class
- e) Inheritance
- f) Data types
- g) Exception Handling.
- h) Mutable Sequences
- i) Indexing of String
- j) Type conversion



## SECTION-B

2. What is list? Explain the concept of slicing and indexing with proper examples.
3. Discuss the int(), float(), str(), chr() and complex() type conversion functions with examples.
4. Discuss the following methods associated with the file object
  - a) read()
  - b) readline()
  - c) readlines()
  - d) tell()
  - e) seek()
  - f) write()
5. Write Python program to demonstrate Multiple Inheritance.
6. Write a python program to calculate the factorial of given number using function.

## SECTION-C

7. Write a python program to read contents of first.txt file and count vowels in it.
8. Explain Sieve of Eratosthenes method with the help of suitable example.
9.
  - a) Design a python program which will throw exception if the age entered by user is less than 18.
  - b) Explain concepts of object oriented programming.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Pages :02

Total No. of Questions : 09

**B.Tech.(ECE) (Sem.-7)  
EMBEDDED SYSTEMS**

Subject Code :BTEC-701

M.Code : 71910

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt **ANY FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt **ANY TWO** questions.

**SECTION-A**

**1. Write briefly :**

- a) What is the WFI instruction used for?
- b) Draw and explain format of ARM CPSR.
- c) Which two variants of the Store Multiple instruction are used most often, and why?
- d) What is meant by 7-TDMI *w.r.t.* ARM processor core?
- e) Differentiate between BL and BNE instructions used in ARM processors.
- f) Compare little and big-endian modes in ARM processor.
- g) Implement the statement  $x = (a+b) - c$  using ARM instructions.
- h) Explain the instructions of LDC and MRC with an example.
- i) Explain Jazelle mode of ARM.
- j) Give different applications of ARM processors.



## SECTION-B

2. Write an ARM7 based ALP to perform multiplication of two 32 bit numbers and store result in memory locations. Assume suitable data.
3. How C/C++ is useful in embedded system programming. Also, mention the advantages of high level programming for embedded system.
4. Which are the different conditional flags of ARM processor?
5. Calculate the effective address of the following instructions if register R3=0x4000, register R4=0x20
  - a) STRH R9, [R3,R4]
  - b) LDRB R8,[R3,R4,LSL #3]
  - c) LDR R7,[R3],R4
6. Write an embedded C program to rotate stepper motor in clockwise direction. Draw a neat interfacing diagram of stepper motor with ARM7 processor.

## SECTION-C

7. With a neat diagram, explain the different general purpose registers of ARM processors.
8. Write an ARM program to find the larger of two 32-bit variables VALUE1 and VALUE2. Place the result in the variable RESULT. Assume the values are unsigned.
9. Write a program to display "ENGINEERING" on LCD using LPC2148 ARM processor. Also, draw interfacing diagram.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Differentiate between single and multi-point crossover operations.
3. Explain the string coding of chromosomes.
4. Differentiate between Mamdani and Sugeno fuzzy inference system.
5. Write a note on Swarm Intelligence.
6. Explain different activation functions in NN.

## SECTION-C

7. Explain the single layer Neural Network architecture using Perceptron model with suitable activation function.
8. Sketch the 5 layer ANFIS architecture mentioning the task of each layer.
9. Design Hebb Net to implement logical AND function. Use bipolar inputs and targets.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Computer Science & Engineering/Electrical  
Engineering/Electronics & Communication Engineering/Electronics &  
Electrical Engineering/Information Technology/Mechanical Engineering)  
(Sem.-7)**

**ELECTRONIC DEVICES**  
Subject Code : BTEC-301-18  
M.Code : 90606  
Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. Explain how Zener diode can be used as a voltage regulator.
- b. What is the principle of working of solar cell?
- c. Explain the working of a transistor as a switch.
- d. What do you mean by dc load line?
- e. Give the V-I characteristics of PN diode.
- f. Calculate  $I_c$  and  $I_E$  for a transistor that has  $\alpha_{dc} = 0.98$  and  $I_B = 100\mu A$ . Determine the value of  $\beta_{dc}$  for the transistor.
- g. Define Transconductance of MOSFET.
- h. What is pinch off voltage?
- i. State Barkhausen criteria for oscillators.
- j. What is diffusion capacitance?





## SECTION-B

2. "Zener diode can be used as a voltage regulator". Justify it.
3. Define tunneling phenomenon. Explain how tunnel diode operates under different operating conditions. In what way, it is different from conventional diodes? Give necessary energy level diagrams.
4. Derive the expression for Diffusion capacitance of a diode.
5. Why is it preferred to locate the Q point at the centre of the active region for amplification purpose?
6. Explain the process of Chemical Vapour Deposition.

## SECTION-C

7. Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier without center tap transformer. Obtain the expression for peak inverse Voltages of both.
8. Explain the operation of Enhancement mode MOSFET in detail.
9. Compare CE, CB, and CC configurations of a transistor.

Roll No.   
Total No. of

Time : 3 Hr

INSTRUCTIONS

1. SECTION each.
2. SECTION have
3. SECTION have

1. W

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE / ECE) (Sem.-7,8)

**COMPUTER ORGANIZATION & ARCHITECTURE**

Subject Code : BTES-401-18

M.Code : 90491

Date of Examination : 16-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) What are the advantages and disadvantages of carry look ahead adder?
- b) What is the advantage of non-restoring method of division over restoring method of division?
- c) Explain in brief about carry save multiplier.
- d) Differentiate between Hardwired and micro-programmed design.
- e) What are the uses of interrupts?
- f) What are the advantages of DMA controller data transfer over interrupt driven or program controlled data transfer?
- g) Define Data hazards.
- h) Define pipelining.
- i) Explain in brief about cache memory.
- j) What are two main cache write policies?



## SECTION-B

2. Write a detailed note on Division Restoring techniques.
3. Explain in detail about software interrupts and exceptions.
4. Explain about arithmetic pipelining with an example.
5. Write a detailed note on Parallel processors.
6. Write a detailed note on Memory Interleaving.

## SECTION-C

7. Explain in detail about following :
  - a) Booth Multiplier
  - b) Floating point arithmetic.
8. Write a detailed note on privileged and non-privileged instructions.
9. Write a detailed note on following :
  - a) Replacement Algorithms
  - b) Mapping Functions.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



2 Sem

### SECTION-B

2. Derive the relationship between Young's modulus and bulk modulus.
3. Write the assumptions to drive torsion equation and drive the torsion equation.
4. A 250 mm (depth)  $\times$  150 mm (width) rectangular beam is subjected to maximum bending moment of 740 kNm, determine :
  - (a) the maximum stress in the beam,
  - (b) radius of curvature for that portion of beam where the bending is maximum, and
  - (c) the value of longitudinal stress at a distance of 65 mm from the top surface of the beam. Take, Young's modulus for beam material as 200 GN/m<sup>2</sup>.
5. Derive Euler's formula for a column with both ends fixed.
6. A girder of uniform section and constant depth is freely, supported over a span of 3 metres. If the point load at the mid span is 30 kN and  $I_{xx} = 15.614 \times 10^{-6} \text{ m}^4$ , calculate :
  - (a) the central deflection,
  - (b) the slopes at the ends of the beam. Take,  $E = 200 \text{ GN/m}^2$ .



### SECTION-C

7. A short metallic column of 500 mm<sup>2</sup> cross-sectional area carries an axial compressive load of 100 kN. For a plane inclined at 60° with the direction of load, calculate: Normal stress, tangential stress, resultant stress, maximum shear stress and obliquity of the resultant stress.
8. A beam ABCD 10 m long is supported at B and C. The overhangs AB and CD are 2 m and 3 m, respectively. The overhang AB carries a uniformly distributed load of 1 kN/m and CD carries uniformly distributed load of 0.5 kN/m. In addition, there are point loads of 1 kN, 2 kN and 1 kN at distances of 1.5 m, 3 m and 8 m from A, respectively. Find the reactions, and draw shearing force and bending moment diagrams.
9. A beam AB of length  $l$  simply supported at the ends carries a point load  $W$  at a distance  $a$  from the left end. Using, Macaulay's method, find :
  - (a) the deflection under the load, and
  - (b) the maximum deflection.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-3)

**FLUID MECHANICS**

Subject Code : BTME-301-18

M.Code : 76417

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Explain the concept of continuum.
- b) State the stability criteria of floating bodies.
- c) Define and distinguish local and convective acceleration.
- d) Define circulation.
- e) State the assumptions for Euler's equation of motion.
- f) What is kinetic energy correction factor?
- g) What is difference between a model and a prototype?
- h) What are major and minor losses in pipes?
- i) Give practical examples of free vortex.
- j) What is difference between notches and weirs?



**SECTION-B**

2. A circular disc of radius  $R$  is kept at a small height above a fixed bed by means of a layer of oil of viscosity  $\mu$ . If the disc is rotated at an angular Velocity  $\omega$ , obtain an expression for viscous torque on the disc.
3. A rectangular plate  $0.6\text{ m}$  wide and  $1.2\text{ m}$  deep lies within a water body such that its plane is inclined at  $45^\circ$  to the horizontal and the top edge is  $0.70\text{ m}$  below the water surface. Determine the total pressure force on one side of the plate and the location of center of pressure.

4. Consider the velocity field given by :

$$u = a_1x + b_1y$$

$$v = a_2x + b_2y$$

Determine the conditions that should exist among the four coefficients  $a_1$ ,  $a_2$ ,  $b_1$  and  $b_2$  so that the velocity field represents a possible irrotational fluid flow.

5. A 15 cm diameter pipe is reduced to 7.5 cm diameter through gradual contraction. At this contraction, the difference between the piezometric heads at the main and the contracted section is 4 cm of mercury. By neglecting losses, calculate the discharge of water.
6. Two wide plates are kept at a distance of 2.0 cm apart. The space between the plates is filled with oil of viscosity 0.5 Pa.s and density  $\rho = 1200 \text{ kg/m}^3$ . If the top plate moves with a velocity 4.0 m/s and the pressure is constant everywhere in the fluid, estimate the
- shear stress on the top and bottom plates and
  - discharge per unit width of the plate. Assume the flow to be laminar.

### SECTION-C

7. An open cylindrical tank 1 m in diameter and 2 m high contains water upto 1.5 m depth. If the cylinder rotates about its vertical axis, what maximum angular velocity can be attained without spilling any water?
8. A vertical venturimeter 40 cm  $\times$  20 cm is provided in a vertical pipe to measure the flow of oil of relative density 0.8. The difference in elevations of the throat section and the entrance section is 0.5 m, the direction of flow of oil being vertically upwards. The oil mercury differential gauge shows deflection of mercury ( $\rho = 13600 \text{ kg/m}^3$ ). Determine the quantity of oil flowing in the pipe.
9. Show that the fractional torque  $T$  of a disc of diameter  $D$  rotating at a speed of  $N$  in a fluid of viscosity  $\mu$  and density  $\rho$  in a turbulent flow condition is related as

$$T = D^5 N^2 \rho \left[ \frac{\mu}{D^3 N \rho} \right]$$



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



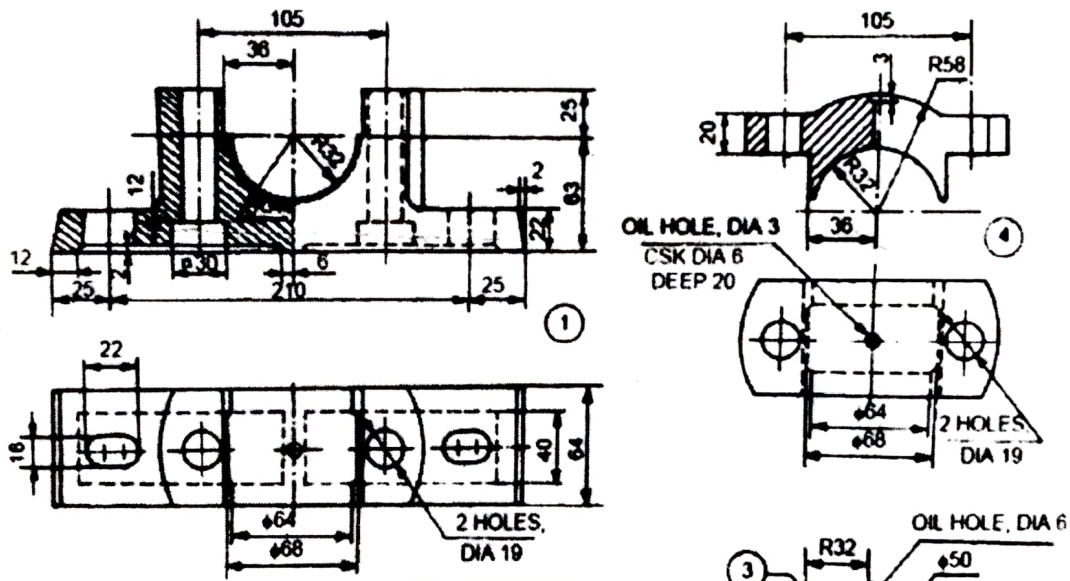


## SECTION-B

2. Draw free hand, the full sectional front view and side view of the Muff Coupling.
3. Draw freehand the sectional front view of Spigot and Socket joint used for underground pipelines of large diameters.
4. Draw freehand the full sectional front view and top view of Knuckle Joint.

## SECTION-C

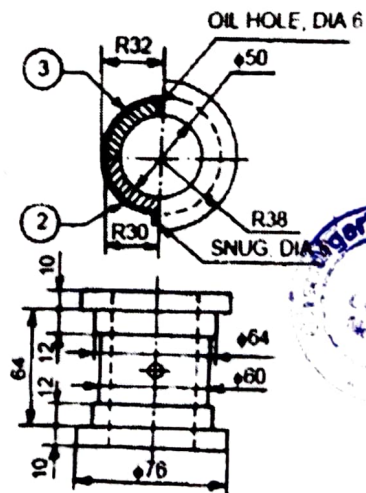
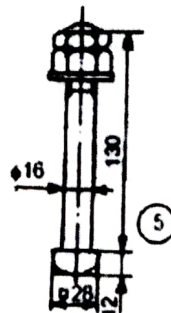
5. The part drawings of a Bearing are shown in Figure 1. Assemble the parts and draw full sectional front view and top view. Also show the Bill of Materials.



**Figure - 1**

Parts list

Sl No	Name	Matl	Qty
1	Base	CI	1
2	Bearing brass	Bronze	1
3	Bearing brass	Bronze	1
4	Cap	CI	1
5	Bolt with nuts	MS	2





Roll No.

Total No. of Questions : 08

Total No. of Pages : 02

M.Tech (ME) (Sem.-2,3)  
**SUPPLY CHAIN MANAGEMENT**

Subject Code : MTME-212

M.Code : 74988

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 100

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) What do you understand by "Supply chain management as integrated logistics", explain.  
b) What do you mean by obstacles in supply chains? How can these be removed?
2. a) Discuss the Push-pull concept in Supply chain management.  
b) While Hyundai India Ltd. has only one manufacturing plant in India, Asian Paints has 18 processing centers. Justify, why do firms in different industries work with different number of plants for serving the same market. List the pros and cons of having large number of facilities.
3. a) Explain the Supply chain strategies for successful implementation of SCM.  
b) Discuss the role of cycle inventory in Supply chain.
4. a) Why is it for a firm to periodically review its logistic network design? How do firm requirements for its logistics network change over time?  
b) Discuss the modes of transportation and their performance characteristics.
5. In selecting potential warehouse sites, it is important to consider issues such as geographical and infrastructure conditions, natural resources and labour supply, local industry and tax regulations. For the following industries, illustrate how the issues stated above will affect the choice of potential warehouse sites in:
  - a) Furniture Manufacturing
  - b) Prefabricated construction components and
  - c) Aircraft industry



6.
  - a) Explain the principles of logistics costing in SCM.
  - b) How can mapping be performed for supply chain processes? Explain.
7.
  - a) How will you set benchmarking priorities in supply chains? Discuss.
  - b) Explain the phenomenon of Bullwhip effect in supply chain and discuss the causes and remedies.
8. Write the short notes on the following :
  - a) Inventory costs
  - b) Product life cycle
  - c) Logistics and shareholder value
  - d) Supplier and distributor bench marking.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (ME) (Sem.-3)**  
**THEORY OF MACHINES-I**

**Subject Code : BTME-302**

**M.Code : 59112**

**Date of Examination : 02-08-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a. What is resistant body?
- b. Write the different types of joint in a chain.
- c. Write the condition when the driving and driven shafts connected by a Hooke's joint will have equal speeds.
- d. Define the velocity ratio of a belt drive.
- e. What are the different types of motion with which a follower can move?
- f. What is a limiting friction?
- g. Write the function of cone pulley.
- h. Write the difference between lower and higher pairs.
- i. Define Governor effort and power.
- j. Write the applications of engine indicator.



### SECTION-B

2. What is kinematic pair? Explain the different types of kinematic pairs with suitable examples.
3. What is the difference between absorption and transmission dynamometers?
4. A horizontal cross compound steam engine develops 300 kW at 90 r.p.m. The coefficient of fluctuation of energy as found from the turning moment diagram is to be 0.1 and the fluctuation of speed is to be kept within  $\pm 0.5\%$  of the mean speed. Find the weight of the flywheel required, if the radius of gyration is 2 metres.
5. Define the terms 'coefficient of fluctuation of energy' and 'coefficient of fluctuation of speed', in the case of flywheels.
6. What is the function of a governor? How does it differ from that of a flywheel?

### SECTION-C

7. Sketch a pantograph, explain its working and show that it can be used to reproduce to an enlarged scale a given figure.
8. Obtain an expression for the length of a belt in
  - a. An open belt drive; and
  - b. A cross belt drive.
9. A cam is to be designed for a knife edge follower with the following data :
  - a. Cam lift - 40 mm during  $90^\circ$  of cam rotation with simple harmonic motion.
  - b. Dwell for the next  $30^\circ$ .
  - c. During the next  $60^\circ$  of cam rotation, the follower returns to its original position with simple harmonic motion.
  - d. Dwell during the remaining  $180^\circ$ . Draw the profile of the cam when
    - i) The line of stroke of the follower passes through the axis of the cam shaft, and
    - ii) The line of stroke is offset 20 mm from the axis of the cam shaft.

The radius of the base circle of the cam is 40 mm. Determine the maximum velocity and acceleration of the follower during its ascent and descent, if the cam rotates at 240 r.p.m.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Draw and explain Half wave rectifier in detail.
3. Explain various optoelectronics devices.
4. Compare three configurations of BJT.
5. Draw and explain the block diagram of 741 Op-Amp.
6. Convert SR flip flop using JK flip flop.

## SECTION-C

7. Subtract 56 from 87 using 1's complement and 2's complement methods.
8. Explain the construction and working of pMOS in detail.
9. With the help of diagrams explain the working of Op-Amp as Voltage follower.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. What are pattern allowances? Explain various types of allowances commonly given to the wooden patterns in foundry practices.
3. Describe the working principle, applications and advantages of the submerged arc welding (SAW) process with the help of a neat sketch.
4. Discuss the relative advantages and disadvantages of AC and DC arc welding processes.
5. What are the various types of sands commonly used in the sand casting process? Explain in detail.
6. Explain the principle and procedure of magnetic particle inspection, with the help of a suitable example and a neat sketch.

## SECTION-C

7. What is a cupola furnace? Explain its construction and working with the help of a neat and a labelled diagram
8. a) Explain the following terms concerning the sand casting process :
  - i. Gate
  - ii. Riser
  - iii. Core.
- b) What are the various properties of the moulding sand? How the moulding sand is tested for these properties? Explain.
9. a) Describe the working principle, advantages and applications of the MIG welding process, with the help of a neat sketch.
- b) Explain the working principle of dye penetration testing, giving out its advantages and disadvantages.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Derive expression for extension of a bar due to self weight.
3. Derive expressions for equivalent torque and equivalent bending moment for a shaft subjected to bending and torsion.
4. A rectangular beam 250 mm deep is simply supported over a span of 4 m. If  $I$  is  $8 \times 10^6 \text{ mm}^4$  and bending stress should not exceed 120 MPa, then what will be the UDL the beam can carry?
5. A composite shaft consists of a 30 mm diameter steel shaft surrounded by a brass tube with an internal diameter of 30 mm. Both the shafts are fixed rigidly and share the applied torque equally. Find the thickness of the brass tube if  $C_s = 8 \times 10^4 \text{ N/mm}^2$  and that of brass,  $C_b = 4 \times 10^4 \text{ N/mm}^2$ .
6. Determine Euler's buckling load for a column of I section with flanges  $300 \text{ mm} \times 10 \text{ mm}$  and web  $40 \text{ mm} \times 8 \text{ mm}$ . The length of the column is 6 m. One end is fixed and other end is hinged.  $E = 200 \text{ kN/mm}^2$ .

## SECTION-C

7. A shear force (S.F.) diagram for a cantilever beam AB is given in figure 1. Considering A as fixed end of the cantilever beam, find the loading condition and draw the bending moment diagram for the same.

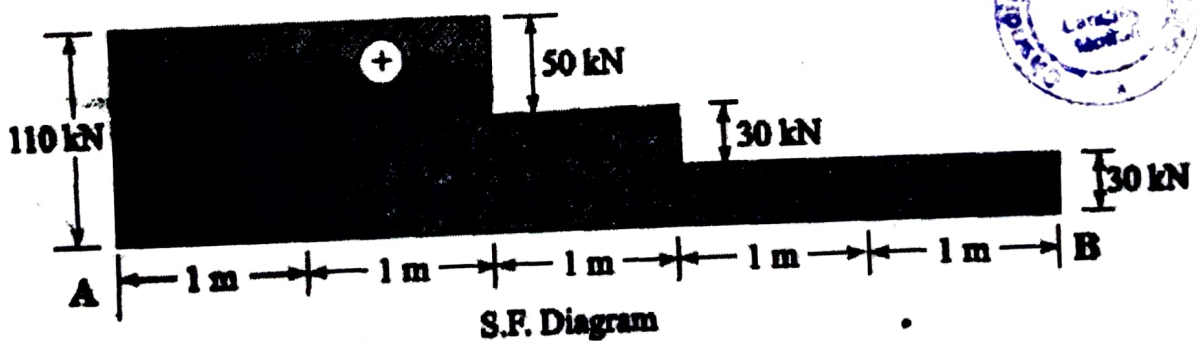
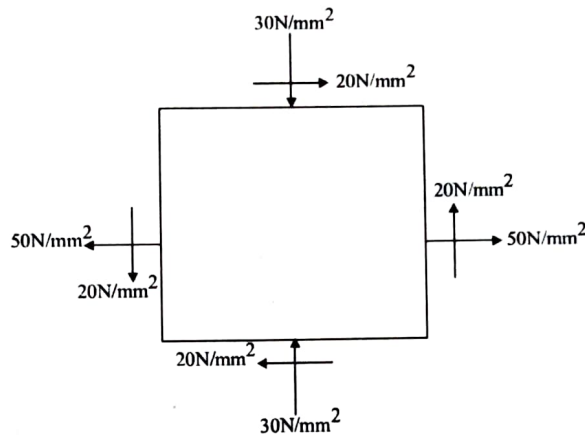


Figure 1

8. Use Mohr's circle method to find the principal stresses and maximum shear stress for the strained material as shown in Figure 2. ( $\sigma_x = 50 \text{ N/mm}^2$  (tensile),  $\sigma_y = 30 \text{ N/mm}^2$  (compressive) and  $\rho = 20 \text{ N/mm}^2$ )



9. A simply supported beam of 10 m span carries two concentrated loads of 100 kN and 60 kN at distances of 2 m and 5 m, respectively from the left support. Calculate :
- Slope at the left support and
  - Slope and deflection under the 100 kN load. Assume  $EI = 36 \times 10^4 \text{ kN-m}^2$ .



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. The Vander Waals equation is given by

$$\left(p + \frac{a}{v}\right)(v - b) = RT$$

Where  $a$  and  $b$  are constants and other terms have usual meanings. Determine the work done in a reversible isothermal process.

3. In a steady flow apparatus 135 kJ work is done by each kg of fluid. The specific volume of the fluid, pressure, and velocity at the inlet are  $0.37 \text{ m}^3/\text{kg}$ , 600 kPa and 16 m/s respectively. The inlet is 32 m above floor level. The discharge is at floor level. The discharge conditions are  $0.62 \text{ m}^3/\text{kg}$ , 100 kPa and 270 m/s. The total heat loss between inlet and outlet is 9 kJ/kg of the fluid. Does the specific internal energy increase or decrease and by how much?
4. Prove that the Kelvin-Planck and Clausius's statements of the second law of thermodynamics are equivalent of each other.
5. 1.5 kg of air at 1 bar, 300 K is contained in a rigid insulated tank. During the process, 18 kJ of work is done on the gas through a paddle-wheel mechanism. Determine the final temperature, final pressure of air in the tank and change in entropy. Assume specific heats of air to be constant.
6. Calculate specific enthalpy, specific volume and density of 1 kg of steam at a pressure of 1.9 MPa, having a dryness fraction of 0.85.

## SECTION-C

7. An air standard Diesel cycle has a compression ratio of 14. The pressure at the beginning of compression stroke is 1 bar and the temperature is 300 K. The maximum cycle temperature is 2500 K. Determine the cutoff ratio and thermal efficiency.
8. A steam power plant has boiler and condenser pressure of 60 bar and 0.1 bar respectively. Steam coming out of the boiler is dry saturated. The plant operates on the Rankine cycle. Calculate thermal efficiency.
9. Explain the working of a four stroke Diesel engine. Why four stroke engines are preferred over two stroke engines?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Mechanical Engineering) (Sem.-3)**  
**ENGINEERING MATERIALS AND METALLURGY**

**Subject Code : BTME-306**

**M.Code : 59116**

**Date of Examination : 06-08-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**



1. **Write briefly :**

- a. What is polymorphism?
- b. What is Pearlite?
- c. What do you understand by non-crystalline materials?
- d. Draw the crystal lattice of FCC.
- e. Why stainless steel is stainless?
- f. Define phase.
- g. What is the application of Gibbs Phase rules?
- h. What is meant by limited solubility in the solid state?
- i. What do you mean by hardenability?
- j. What are austenite stabilizers?



## SECTION-B

2. What is Eutectic reaction? How does it differ from the eutectoid reaction?
3. Differentiate between slip and twinning.
4. Differentiate between steady and non-steady state diffusion. Explain various factors that affect the diffusion process.
5. Differentiate between Annealing and normalizing processes.
6. Discuss the recrystallisation and preferred orientation. How does it affect the properties of materials?

## SECTION-C

7. Explain in detail the Time-temperature transformation curves (TTT Curves)
8. Draw a neat sketch of the Iron carbon equilibrium diagram and label the various phase fields. Explain the three invariant transformations taking place in it.
9. Write brief notes on the following :
  - a. Stainless Steel
  - b. Tempering.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Differentiate between steady-state and non-steady-state diffusion and briefly explain the factors affecting diffusion process.
3. What are solid solutions? Explain its different types in brief.
4. What is hardenability? Describe one method which is commonly used for the measurement of hardenability.
5. What is eutectic reaction? How it differs from eutectoid reaction.
6. What are the important alloying elements in HSS Tools? Discuss the effect of each alloying elements on the properties of these tools.

## SECTION-C

7.
  - a) Draw and explain the TTT diagram.
  - b) Write a short note on the Jominy test.
8.
  - a) Explain the basic principle and operation of oxyacetylene flame hardening with the help of neat sketch.
  - b) Discuss the difference between annealing and tempering. Give specific application of each process.
9. Write short notes on :
  - a) Surface hardening.
  - b) Theories of plastic deformation.
  - c) Phenomenon of slip.
  - d) Crystal imperfection.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

B.Tech (ME) 3  
Sem-4

Roll No.

Total No. of Questions : 09

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-4)

**MATERIALS ENGINEERING**

Subject Code : BTME-404-18

M.Code : 77549

Date of Examination : 09-07-22

B.Tech Se  
ME

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What are point defects? Name them.
- b) Define steady state diffusion process.
- c) Discuss the applications of lever rule.
- d) What is the importance of Iron-Carbon equilibrium diagram?
- e) Define critical cooling rate.
- f) Define the term harden-ability and severity of quench.
- g) Enlist different defects due to heat treatment.
- h) Define Thermal stress.
- i) Using suitable sketch, explain the difference between FCC and BCC unit cells.
- j) What are super alloys? Give an example.



## SECTION-B

2. What is the difference between an iron-carbon diagram and a T-T-T diagram? Discuss their applications.
3. Why hardening is always followed by tempering treatment? Explain the various stages of tempering.
4. Discuss nitriding as a method of surface-hardening of steel and compare it with induction hardening.
5. Explain with sketches the difference between edge dislocation and screw dislocation.
6. What is atomic packing factor of a crystal structure? Show that the atomic packing factor for F.C.C. structure is 0.74.

## SECTION-C

7. What are purposes of heat treatment? Classify heat treatment. Explain any one heat treatment process in detail.
8. Discuss the classification of alloying elements in steels. Explain the effects of adding Mo, Ni and Mn on the properties of steels.
9. How are carbon steels heat-treated to develop their properties? What are the limitations of such steels and how may they be overcome? Explain your statement with reference to T-T-T diagram.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.-4)

**APPLIED THERMODYNAMICS-II**

Subject Code : BTME404

M.Code : 59132

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) Draw Brayton cycle.
- b) Define volumetric efficiency of a reciprocating air compressor.
- c) What do you mean by surging and choking?
- d) Why centrifugal compressors are not suitable for aircraft applications?
- e) Enumerate the various uses of gas turbine.
- f) What are the advantages of multi stage compression?
- g) What is Turbojet?
- h) What is stalling?
- i) List the fuels and oxidiser used for rocket engines.
- j) Write the classification of jet propulsion devices.



## SECTION-B

2. State the merits and demerits of closed cycle gas turbine over open cycle gas turbine.
3. Explain with a neat sketch the working of a centrifugal compressor and obtain an expression for the work done.
4. Prove that with 50% reaction blading, axial flow compressors have symmetrical blading.
5. What are the various methods which are used to improve the efficiency and output of a gas turbine?
6. A turbojet engine flying at a speed of 800 Km/hr consumes air at the rate of 45kg/s. Calculate.
  - a) Jet exit velocity, the enthalpy change for the nozzle is 44.5 kcal/kg and the velocity coefficient is 0.95.
  - b) Fuel flow in kg/hr and thrust specific fuel consumption assuming the air fuel ratio is 80.

## SECTION-C

7. Draw P-V and T-S diagram for a single stage reciprocating air compressor without clearance. Derive the expression for the work done when compression is
  - a) isothermal
  - b) isentropic.
8. A gas turbine plant with a pressure ratio of 1:5 takes in air at 15°C. The maximum temperature is 600°C and develops 2200 KW. The turbine and compressor efficiencies are equal to 0.85. Taking  $C_p = 1 \text{ KJ/Kg K}$  and  $C_v = 0.714 \text{ KJ/Kg K}$ ; determine
  - a) Actual overall efficiency of the turbine and
  - b) Mass of air circulated by the turbine.
9. What is the principle of rocket propulsion and what are the different types of rocket engines?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ME) (Sem.-4)  
MANUFACTURING PROCESSES-II**

Subject Code : BTME-405  
M. code : 59133  
Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60



**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) Differentiate between the hot and cold forming.
- b) Enumerate the various rolling methods used in manufacturing industries.
- c) Differentiate between the edge bending and V bending operations.
- d) Explain the working principle of magnetic pulse forming process.
- e) Enumerate the various tool materials used in the production of cutting tools.
- f) What do you understand by progressive and combination dies?
- g) Enumerate the parts of twist drill.
- h) Enumerate the various types of milling operations.
- i) Differentiate between the cylindrical and surface grinding.
- j) What do you understand by simple indexing?

**SECTION-B**

2. Enumerate the various forging defects, giving neat sketches, and explain their causes and suggest the remedies for various forging defects

1 | M-59133

(S2)-992

3. Explain extrusion process. Differentiate between the forward and backward extrusion giving neat sketches, advantages and disadvantages.
4. Describe the working principle, applications and advantages of powder metallurgy process, giving neat sketch. Also, discuss the advantages, disadvantages and applications of powder metallurgy process.
5. Explain the working principle, applications, advantages and limitations of up milling and down milling operations, giving neat sketches.
6. Discuss the working principle, applications, advantages and limitations of horizontal shaper, giving a neat sketch.

**SECTION-C**

7. a) Explain the construction and working of open and close die forging operations, giving neat sketches.  
b) Explain the working principle of following sheet metal forming processes with the help of neat sketches :
  - i) piercing,
  - ii) blanking,
  - iii) squeezing,
  - iv) coining.
8. a) Describe the types of chips formed during machining operations, giving neat sketches and also, explain the conditions favouring formation of various types of chips.  
b) Write a short note on various types of lubricants used in machining operations giving their characteristic features, advantages, disadvantages and applications.
9. a) Discuss the nomenclature of tool geometry by describing various tool angles of single point cutting tool with the help of a neat sketch.  
b) The following data were recorded while turning a work piece on a lathe :

$V = 25\text{m/min}$ ;  $f = 0.3\text{ mm/rev}$ ;  $d = 2.0\text{ mm}$ ; tool life,  $T = 100\text{ min}$ . The following tool life equation is given for this operation  $V T^{0.1} f^{0.7} d^{0.5} = C$ . If  $V$ ,  $f$ ,  $d$  are all increased by 25% each & collectively. What will be their effect on tool life?

2 | M-59133

(S2)-992

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Mechanical Engg.) (Sem.-4)**

**STRENGTH OF MATERIALS-II**

Subject Code : BTME-401

M.Code : 59129

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- (a) Define strain energy.
- (b) Define toughness.
- (c) What is the importance of theories of failure?
- (d) State maximum strain energy theory.
- (e) Define stiffness of springs.
- (f) Define Circumferential and Hoop stress.
- (g) At which point, the maximum hoop stress in a thick pressure vessel under internal pressure occurs and why?
- (h) What is the importance of discs of uniform strength?
- (i) Why the cross section of a crane hook is generally trapezoidal, explain briefly.
- (j) Define shear centre.

## SECTION-B

2. State and explain Maxwell's theorem of reciprocal deflection.
3. A shaft is subjected to a maximum torque of 10 kNm and a maximum bending moment of 7.5 kNm, at a particular section. If the allowable equivalent stress in simple tension is  $160 \text{ MN/m}^2$ , find the diameter of the shaft according to strain energy theory.
4. A cylindrical vessel whose ends are closed by means of rigid flange plates is made of steel plate 3 mm thick. The internal length and diameter of the vessel are 50 cm and 25 cm respectively. Determine the longitudinal and circumferential stresses in the cylindrical shell due to an internal fluid pressure of  $3 \text{ MN/m}^2$ . Also, calculate increase in length, diameter and volume of the vessel. Take,  $E = 200 \text{ GN/m}^2$ , and Poisson's ratio = 0.3.
5. A chain link is made of steel rod of 18 mm diameter with straight portion 90 mm in length and ends 90 mm in radius. If the link is subjected to a load of 15 kN, calculate the deflection of the link along the load line. Take,  $E = 200 \text{ GN/m}^2$ .
6. An I-section, with rectangular ends, has the following dimensions: Flanges:  $15 \text{ cm} \times 2 \text{ cm}$ , Web:  $30 \text{ cm} \times 1 \text{ cm}$ . Find the maximum shearing stress developed in the beam for a shearing force of 10 kN.

## SECTION-C

7. A flat spiral spring is 5 mm wide, 0.25 mm thick and 3 metres long. Assuming maximum stress of  $1000 \text{ MN/m}^2$  to occur at the point of greatest bending moment, calculate :
  - (a) The torque,
  - (b) The work that can be stored in the spring, and
  - (c) The number of turns required to wind up the spring.  $E = 200 \text{ GN/m}^2$ .
8. A thick cylinder of 150 mm outside radius and 100 mm inside radius is subjected to an external pressure of  $30 \text{ MN/m}^2$  and internal pressure of  $60 \text{ MN/m}^2$ . Calculate the maximum shear stress in the material of the cylinder at the inner radius.
9. A disc of uniform thickness having inner and outer diameters 100 mm and 400 mm respectively is rotating at 5000 rpm about its axis. The density of the material of the disc is  $7800 \text{ kg/m}^3$  and Poisson's ratio is 0.3. Determine the stress variations along the radius of the disc.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-4)

**APPLIED THERMODYNAMICS**

Subject Code : BTME-401-18

M.Code : 77546

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What is meant by saturation temperature and saturation pressure?
- b) Give the classification of steam turbines.
- c) Distinguish between impulse and reaction turbines.
- d) What is steady flow energy equation as applied to steam nozzles? Explain its use in the calculation of a steam velocity at the exit of a nozzle.
- e) Explain the effect of friction on the performance of a steam nozzle.
- f) What is the main difference between boiler mountings and boiler accessories?
- g) What are differentiating features between a water tube and fire tube boiler?
- h) Compare supercharger with turbo charger.
- i) Define stoichiometric air-fuel ratio.
- j) Define draught, what is the use of draught in thermal power plants?



**SECTION - B**

2. Dry saturated steam enters a steam nozzle at a pressure of 15 bar and is discharged at a pressure of 2 bar. If the dry fraction of discharge steam is 0.96, what will be the final velocity of steam? Neglect initial velocity of steam. If 10 % of heat drop is lost in friction, find the percentage reduction in the final velocity.
3. "Auto ignition is responsible for knocking in S.I. engines or not?" Justify your answer by suitable diagram.

4. In a De Laval turbine steam issues from nozzle with a velocity of 1200 m/s the nozzle angle is  $20^\circ$ , the mean blade velocity is 400 m/s, and the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine per hour is 1000 kg. Take Blade velocity co-efficient as 0.8. Calculate
- Blade angles
  - Relative velocity of steam entering the blade
  - Tangential force on the blade
  - Power developed
  - Blade efficiency
5. What is the significance of critical pressure ratio for nozzle of a steam turbine? Obtain analytically its value in terms of the index of expansion.
6. Steam enters a nozzle passing a mass flow of 14 kg/s at a pressure of 30 bar and a temperature of  $300^\circ\text{C}$ . After expansion to an exit pressure of 5 bar, the exit velocity is 800 m/s. (a) Determine the nozzle efficiency and exit area (b) If the losses occur only in the divergent portion, determine the velocity of steam at the throat.

#### SECTION - C

7. During the trial of a four-stroke cylinder gas engine the following data were recorded. Determine the Indicated mean effective pressure and Indicated power
- Area of indicator diagram =  $565.8 \text{ mm}^2$
  - Length of indicator diagram = 74.8 mm
  - Spring index = 0.9 bar/mm
  - Cylinder diameter = 220 mm
  - Stroke length = 430 mm
  - Number of explosions/min = 100
8. In a reaction turbine, the fixed blades and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are  $35^\circ$  and of the discharging tips are  $35^\circ$  and the discharging tips  $20^\circ$ . Find the power developed per pair of blades for a steam consumption of 2.5 kg/s, when the blade speed is 50 m/s. If heat drop per pair is 10.04 kJ/kg, find the efficiency of the pair.
9. Why there is no chimney in case of locomotive boilers? Can we correlate maximum discharge rate of gases through the chimney for a given height of the chimney. Drive an expression.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. What do you understand by interference phenomena in gears? Also, explain various methods to eliminate the same.
3. An aeroplane makes a complete half circle of 50 meters radius towards left, when flying at 200 km/hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it.
4. Explain the analytical and graphical methods for balancing of several masses rotating in the same plane.
5. A pair of spur gears with involute teeth is to give a gear ratio of 4:1. The arc of approach is not to be less than the circular pitch and smaller wheel is the driver. The angle of pressure is  $14.5^\circ$ . Find:
  - a) the least number of teeth that can be used on each wheel and
  - b) the addendum of the wheel in terms of the circular pitch.
6. Write the classification of kinematic synthesis problem. Explain each of them in detail.

## SECTION-C

7. An internal wheel B with 80 teeth is keyed to the shaft F. A fixed internal wheel C with 82 teeth is concentric with B. A compound wheel D-E gears with the two internal wheels; D has 28 teeth and gears with C while E gears with B. The compound wheels revolve freely on a pin which projects from a disc keyed to a shaft A co-axial with F. If the wheels have the same pitch and the shaft A makes 800 r.p.m., what is the speed of the shaft F? Sketch the arrangement.
8. A pair of locomotive driving wheels with the axle, have a moment of inertia of  $180 \text{ kg-m}^2$ . The diameter of the wheel treads is 1.8 m and the distance between wheel centers is 1.5 m. When the locomotive is travelling on a level track at 95 km/h, defective ballasting causes one wheel to fall 6 mm and to rise again in a total time of 0.1s. If the displacement of the wheel takes place with simple harmonic motion, find:
  - a) The gyroscopic couple set up and
  - b) The reaction between the wheel and the rail due to this couple.
9. Explain the following:
  - a) Gyroscopic effect on four wheeled vehicles.
  - b) Least square technique.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 03

B.Tech. (Mechanical Engg.) (Sem.-4)

**FLUID MACHINES**

Subject Code : BTME-402-18

M.Code : 77547

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Write briefly :

- a) Write down the Bernoulli's equation.
- b) How do you understand by overall efficiency of a centrifugal pump?
- c) What do you understand by mass flow rate?
- d) What is propulsive efficiency? Give its expression.
- e) What is blade velocity coefficient?
- f) What is specific speed as referred to hydraulic turbine?
- g) What do you mean by speed ratio?
- h) What do you understand by plant efficiency? Give its relation.
- i) What is cavitation?
- j) What is NPSH?



## SECTION-B

8.

2. How are fluid (Hydrodynamic) machines classified? Explain briefly the difference between various types of hydrodynamic machines.
3. A jet of 4 cm in diameter having a velocity of 30 m/s strikes tangentially at one edge on a wheel which deflects the jet through an angle of  $120^\circ$ . Calculate the thrust on the vane when :
  - (a) The axis of symmetry of the vane is horizontal.
  - (b) The tangent at inlet tip is horizontal.
4. Derive an expression for force exerted by a fluid jet, work done by the fluid jet and vane efficiency when a jet impinges upon a moving vane with jet striking tangentially at one tip.
5. Establish the ratio of forces exerted by a water jet when it is made to strike:
  - (a) A stationary flat plate held normal to it,
  - (b) A flat plate moving in the direction of jet at one third the velocity of jet,
  - (c) A series of flat plates mounted on a wheel and moving at one third the velocity of jet.
6. Explain the characteristic features of the cup of a Pelton wheel. Draw a diagram for the same. What are the limitations in keeping the deflection angle of the cup as  $180^\circ$ ?

## SECTION-C

7. A ship driven by reaction jets and discharging astern is found to have resistance to motion of 3.5 km/hr. The velocity of jet relative to ship is 18 m/s. Find the number of jets if each has an area of  $100 \text{ cm}^2$ .  
Also, calculate the propulsive efficiency and the power required to work the pump for the following cases:
  - (a) Inlet orifices at right angles to ship motion
  - (b) Inlet orifices face the direction of ship motion.

- difference  
dge on a  
he vane  
vane  
one
8. The-axis of a Francis reaction turbine and its draft tube is vertical, the head in the spiral casing at inlet being 36 m and the speed of water 5 m/s. The flow through the turbine is  $2 \text{ m}^3/\text{s}$ , the hydraulic and overall efficiencies are 0.88 and 0.83, respectively. The top of the draft tube is 1 m below the centre line of the spiral casing while the tail race water level 3 m below the top of the draft tube. At inlet and outlet of draft tube, the velocities are 4 m and 1.5 m/s and there is no whirl at either position. Neglecting any leakage loss, work out
- (a) the total head across the turbine,
  - (b) the power output,
  - (c) the head lost in friction in the turbine and draft tube, and
  - (d) the power lost in mechanical friction.
9. A centrifugal pump impeller has diameter of 60 cm and width of 6 cm at the outlet. The pump runs at 1450 *rpm* and delivers  $0.8 \text{ m}^3/\text{s}$  against a head of 80 m. The leakage loss after the impeller is 4 percent of discharge, the external mechanical loss is 10 kW and the hydraulic efficiency is 80 percent. Determine the blade angle at outlet, the power required and the overall efficiency of the pump.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-4)

**STRENGTH OF MATERIALS-II**

Subject Code : BTME-403-18

M.Code : 77548

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Write briefly :

- a) Define strain energy.
- b) Discuss Castigliano's first theorem.
- c) Enlist various applications of spring working under tensile load, compressive load and bending load.
- d) State assumptions made in Lamé's theory.
- e) Enlist applications of flat spring.
- f) What do you understand by rotational disc of uniform strength?
- g) Derive expression for position of neutral axis for the section of bar having initial curvature and under the action of external bending moment.
- h) Show the graphical representation of maximum shear stress theory.
- i) Derive expression for longitudinal stress developed in the material of a thin cylindrical shell when subjected to internal fluid pressure.
- j) With a help of a plot, show the trend of variation of shear stress along the section of a T-shaped beam.

## SECTION-B

2. Derive expression for strain energy in three dimensional stress system.
3. Calculate the thickness of the metal necessary for a thick steel cylindrical shell of internal diameter 0.15 m to withstand an internal pressure of 50 MPa; the maximum permissible tensile stress is not to exceed 150 MPa.
4. A mild steel shaft of 120 mm diameter is to sustain a maximum torque of 20 kNm and maximum bending moment of 12 kNm at a point in the material. Determine the factor of safety according to maximum shear stress theory when the elastic limit in simple tension is 220 MPa.
5. A close-coiled helical spring made of 6 mm diameter steel wire and have 10 turns is subjected to an axial couple  $M$ . The mean coil diameter is 42 mm. If the maximum bending stress in spring wire is not to exceed  $240 \text{ MN/m}^2$ , find the magnitude of  $M$  and one end of Sprittg is turned relative to the other end.  $E = 200 \text{ GPa}$ .
6. Show graphically the variation of shear stress in rectangular beam cross-section. Also prove that the maximum value of shear stress is 1.5 times the mean shear stress for the rectangular section.

## SECTION-C

7. The gauge pressure in a boiler of 1.5 m diameter and 12.5 mm thickness is 2 MPa. Find the longitudinal and circumferential stresses in the boiler. Also find the longitudinal, circumferential and volumetric strains developed in the material. Take  $E = 200 \text{ GPa}$  and Poisson's ratio = 0.3.
8. Find the intensities of principal stresses in a flat steel disc of uniform thickness when rotating at 2400 rpm. The diameter of the disc is 1 m and has a central hole of diameter 0.2 m. Poisson's ratio = 0.3 and density of steel =  $7800 \text{ Kg/m}^3$ .
9. A steel bar 38 mm in diameter is bent into a curve of mean radius 32 mm. If a bending moment of 4.6 Nm tending to increase the curvature acts on the bar, find the intensities of maximum tensile and compression stresses. Also draw the variation of normal stress over the cross-section.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
ME-4 Sem

Roll No. \_\_\_\_\_

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (Mechanical Engg.) (Sem.-4)

**FLUID MACHINES**

Subject Code : BTME-402-18

M.Code : 77547

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Write briefly :

- a) Write down the Bernoulli's equation.
- b) How do you understand by overall efficiency of a centrifugal pump?
- c) What do you understand by mass flow rate?
- d) What is propulsive efficiency? Give its expression.
- e) What is blade velocity coefficient?
- f) What is specific speed as referred to hydraulic turbine?
- g) What do you mean by speed ratio?
- h) What do you understand by plant efficiency? Give its relation.
- i) What is cavitation?
- j) What is NPSH?

## SECTION-B

2. How are fluid (Hydrodynamic) machines classified? Explain briefly the difference between various types of hydrodynamic machines.
3. A jet of 4 cm in diameter having a velocity of 30 m/s strikes tangentially at one edge of a wheel which deflects the jet through an angle of  $120^\circ$ . Calculate the thrust on the wheel when:
  - (a) The axis of symmetry of the vane is horizontal.
  - (b) The tangent at inlet tip is horizontal.
4. Derive an expression for force exerted by a fluid jet, work done by the fluid jet and efficiency when a jet impinges upon a moving vane with jet striking tangentially at the tip.
5. Establish the ratio of forces exerted by a water jet when it is made to strike:
  - (a) A stationary flat plate held normal to it,
  - (b) A flat plate moving in the direction of jet at one third the velocity of jet,
  - (c) A series of flat plates mounted on a wheel and moving at one third the velocity of jet.
6. Explain the characteristic features of the cup of a Pelton wheel. Draw a diagram for the same. What are the limitations in keeping the deflection angle of the cup as  $180^\circ$ ?

## SECTION-C

7. A ship driven by reaction jets and discharging astern is found to have resistance to motion of 3.5 km/hr. The velocity of jet relative to ship is 18 m/s. Find the number of jets if each has an area of  $100 \text{ cm}^2$ .

Also, calculate the propulsive efficiency and the power required to work the pump for the following cases:

- (a) Inlet orifices at right angles to ship motion
- (b) Inlet orifices face the direction of ship motion.

## SECTION-B

2. How are fluid (Hydrodynamic) machines classified? Explain briefly the difference between various types of hydrodynamic machines.
3. A jet of 4 cm in diameter having a velocity of 30 m/s strikes tangentially at one edge on a wheel which deflects the jet through an angle of  $120^\circ$ . Calculate the thrust on the vane when :
  - (a) The axis of symmetry of the vane is horizontal.
  - (b) The tangent at inlet tip is horizontal.
4. Derive an expression for force exerted by a fluid jet, work done by the fluid jet and vane efficiency when a jet impinges upon a moving vane with jet striking tangentially at one tip.
5. Establish the ratio of forces exerted by a water jet when it is made to strike:
  - (a) A stationary flat plate held normal to it,
  - (b) A flat plate moving in the direction of jet at one third the velocity of jet,
  - (c) A series of flat plates mounted on a wheel and moving at one third the velocity of jet.
6. Explain the characteristic features of the cup of a Pelton wheel. Draw a diagram for the same. What are the limitations in keeping the deflection angle of the cup as  $180^\circ$ ?

## SECTION-C

7. A ship driven by reaction jets and discharging astern is found to have resistance to motion of 3.5 km/hr. The velocity of jet relative to ship is 18 m/s. Find the number of jets if each has an area of  $100 \text{ cm}^2$ .

Also, calculate the propulsive efficiency and the power required to work the pump for the following cases:

- (a) Inlet orifices at right angles to ship motion
- (b) Inlet orifices face the direction of ship motion.







## SECTION-B

2. What do you understand by interference phenomena in gears? Also, explain various methods to eliminate the same.
3. An aeroplane makes a complete half circle of 50 meters radius towards left, when flying at 200 km/hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it.
4. Explain the analytical and graphical methods for balancing of several masses rotating in the same plane.
5. A pair of spur gears with involute teeth is to give a gear ratio of 4:1. The arc of approach is not to be less than the circular pitch and smaller wheel is the driver. The angle of pressure is  $14.5^\circ$ . Find:
  - a) the least number of teeth that can be used on each wheel and
  - b) the addendum of the wheel in terms of the circular pitch.
6. Write the classification of kinematic synthesis problem. Explain each of them in detail.

## SECTION-C

7. An internal wheel B with 80 teeth is keyed to the shaft F. A fixed internal wheel C with 82 teeth is concentric with B. A compound wheel D-E gears with the two internal wheels. D has 28 teeth and gears with C while E gears with B. The compound wheels revolve freely on a pin which projects from a disc keyed to a shaft A co-axial with F. If the wheels have the same pitch and the shaft A makes 800 r.p.m., what is the speed of the shaft F? Sketch the arrangement.
8. A pair of locomotive driving wheels with the axle, have a moment of inertia of  $180 \text{ kg m}^2$ . The diameter of the wheel treads is 1.8 m and the distance between wheel centers is 1.5 m. When the locomotive is travelling on a level track at 95 km/h, defective ballasting causes one wheel to fall 6 mm and to rise again in a total time of 0.1s. If the displacement of the wheel takes place with simple harmonic motion, find:
  - a) The gyroscopic couple set up and
  - b) The reaction between the wheel and the rail due to this couple.
9. Explain the following:
  - a) Gyroscopic effect on four wheeled vehicles.
  - b) Least square technique.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_  
Total No. of Questions : 09

Total No. of Pages : 02

B.Tech.(ME) (Sem.-4)  
**THEORY OF MACHINES – II**

Subject Code : BTME-402

M.Code : 59130

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a. Write the need of balancing in machines.
- b. Differentiate between static and dynamic balancing.
- c. Define pressure angle.
- d. What is a circular pitch of spur gear?
- e. What do you mean by gyroscope?
- f. State D'Alembert's principle.
- g. State fundamental law of gearing.
- h. Describe the condition of balancing in multicylinder inline V-Engines.
- i. Write down the Freudenstein equation in reference to kinematic synthesis.
- j. What do you mean by hammer blow?



## SECTION-B

2. What do you understand by interference phenomena in gears? Also, explain various methods to eliminate the same.
3. An aeroplane makes a complete half circle of 50 meters radius towards left, when flying at 200 km/hr. The rotary engine and the propeller of the plane has a mass of 400 kg and radius of gyration of 0.3 m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple on the aircraft and state its effect on it.
4. Explain the analytical and graphical methods for balancing of several masses rotating in the same plane.
5. A pair of spur gears with involute teeth is to give a gear ratio of 4:1. The arc of approach is not to be less than the circular pitch and smaller wheel is the driver. The angle of pressure is  $14.5^\circ$ . Find:
  - a) the least number of teeth that can be used on each wheel and
  - b) the addendum of the wheel in terms of the circular pitch.
6. Write the classification of kinematic synthesis problem. Explain each of them in detail.

## SECTION-C

7. An internal wheel B with 80 teeth is keyed to the shaft F. A fixed internal wheel C with 82 teeth is concentric with B. A compound wheel D-E gears with the two internal wheels. D has 28 teeth and gears with C while E gears with B. The compound wheels revolve freely on a pin which projects from a disc keyed to a shaft A co-axial with F. If the wheels have the same pitch and the shaft A makes 800 r.p.m., what is the speed of shaft F? Sketch the arrangement.
8. A pair of locomotive driving wheels with the axle, have a moment of inertia of  $1800 \text{ kg m}^2$ . The diameter of the wheel treads is 1.8 m and the distance between wheel centers is 1.5 m. When the locomotive is travelling on a level track at 95 km/h, defective ballast causes one wheel to fall 6 mm and to rise again in a total time of 0.1 s. If the displacement of the wheel takes place with simple harmonic motion, find:
  - a) The gyroscopic couple set up and
  - b) The reaction between the wheel and the rail due to this couple.
9. Explain the following:
  - a) Gyroscopic effect on four wheeled vehicles.
  - b) Least square technique.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.

Roll No. \_\_\_\_\_

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-4)  
**FLUID MECHANICS**  
Subject Code : BTME-403  
M.Code : 59131  
Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) Define specific weight and state its units.
- b) Define surface tension and write the formula for hollow bubble.
- c) State the different types of fluid flow.
- d) Define Newtonian fluid and Mach number.
- e) Classify weirs according to the shape of crest.
- f) What do you mean by dimensional homogeneity and what are its applications?
- g) Classify notches according to shape of opening.
- h) Define stream line, path line and streak line.
- i) Define Weber number.
- j) Define impulse-momentum equation.



## SECTION-B

2. Derive an expression for the force exerted on a submerged inclined plane surface by a static liquid and locate the position of centre of pressure.
3. A stream function is given by  $5x - 6y$ . Calculate the velocity components and its magnitude and direction of the resultant velocity at any point.
4. The efficiency of a fan depends upon density, dynamic viscosity of fluid, angular velocity, diameter of the rotor and discharge. Using Buckingham's pi theorem obtain an expression for efficiency.
5. Derive Euler's Equation of motion.
6. Calculate the density, specific weight and weight of one litre of petrol of specific gravity 0.7.

## SECTION-C

7. A body has the cylindrical upper portion of 3 metre diameter and 1.8 metre deep. The lower portion is a curved one, which displaces a volume of  $0.6 \text{ m}^3$  of water. The centre of buoyancy of the curved portion is at a distance of 1.95 metre below the top of the cylinder. The centre of gravity of the whole body is 1.20 metre below the top of the cylinder. The total displacement of water is 3.9 tonnes. Find the meta-centric height of the body.
8. Derive Darcy equation for major hydraulic losses in pipes.
9. Derive equation and explain with a neat sketch
  - a) V-Notch.
  - b) Venturimeter.



## SECTION-B

- Derive expression for strain energy in three dimensional stress system.
- Calculate the thickness of the metal necessary for a thick steel cylindrical shell of internal diameter 0.15 m to withstand an internal pressure of 50 MPa; the maximum permissible tensile stress is not to exceed 150 MPa.
- A mild steel shaft of 120 mm diameter is to sustain a maximum torque of 20 kNm and a maximum bending moment of 12 kNm at a point in the material. Determine the factor of safety according to maximum shear stress theory when the elastic limit in simple tension is 220 MPa.
- A close-coiled helical spring made of 6 mm diameter steel wire and have 10 turns subjected to an axial couple M. The mean coil diameter is 42 mm. If the maximum bending stress in spring wire is not to exceed  $240 \text{ MN/m}^2$ , find the magnitude of M and one end of Sprittg is turned relative to the other end.  $E = 200 \text{ GPa}$ .
- Show graphically the variation of shear stress in rectangular beam cross-section. Also prove that the maximum value of shear stress is 1.5 times the mean shear stress for a rectangular section.

## SECTION-C

- The gauge pressure in a boiler of 1.5 m diameter and 12.5 mm thickness is 2 MPa. Find the longitudinal and circumferential stresses in the boiler. Also find the longitudinal, circumferential and volumetric strains developed in the material. Take  $E = 200 \text{ GPa}$  and Poisson's ratio = 0.3.
- Find the intensities of principal stresses in a flat steel disc of uniform thickness rotating at 2400 rpm. The diameter of the disc is 1 m and has a central hole of diameter 0.2 m. Poisson's ratio = 0.3 and density of steel =  $7800 \text{ Kg/m}^3$ .
- A steel bar 38 mm in diameter is bent into a curve of mean radius 32 mm. If a bending moment of 4.6 Nm tending to increase the curvature acts on the bar, find the intensities of maximum tensile and compression stresses. Also draw the variation of normal stress across the cross-section.

Roll No.   
Total No. of

Time : 3 Hrs

### INSTRUCTION

- SECTION-B questions have to be attempted.
- SECTION-C questions have to be attempted.
- SECTION-D questions have to be attempted.

1. Answer

a) Draw

b) De

c) Wh

d) Wh

e) En

f) W

g) W

h) W

i) Li

j) W

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.-4)  
**APPLIED THERMODYNAMICS-II**

Subject Code : BTME404

M.Code : 59132

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) Draw Brayton cycle.
- b) Define volumetric efficiency of a reciprocating air compressor.
- c) What do you mean by surging and choking?
- d) Why centrifugal compressors are not suitable for aircraft applications?
- e) Enumerate the various uses of gas turbine.
- f) What are the advantages of multi stage compression?
- g) What is Turbojet?
- h) What is stalling?
- i) List the fuels and oxidiser used for rocket engines.
- j) Write the classification of jet propulsion devices.





## SECTION-B

2. State the merits and demerits of closed cycle gas turbine over open cycle gas turbine.
3. Explain with a neat sketch the working of a centrifugal compressor and obtain expression for the work done.
4. Prove that with 50% reaction blading, axial flow compressors have symmetrical blades.
5. What are the various methods which are used to improve the efficiency and output of gas turbine?
6. A turbojet engine flying at a speed of 800 Km/hr consumes air at the rate of 45 kg/s. Calculate.
  - a) Jet exit velocity, the enthalpy change for the nozzle is 44.5 kcal/kg and the velocity coefficient is 0.95.
  - b) Fuel flow in kg/hr and thrust specific fuel consumption assuming the air fuel ratio is 80.

## SECTION-C

7. Draw P-V and T-S diagram for a single stage reciprocating air compressor without clearance. Derive the expression for the work done when compression is
  - a) isothermal
  - b) isentropic.
8. A gas turbine plant with a pressure ratio of 1:5 takes in air at 15°C. The maximum temperature is 600°C and develops 2200 KW. The turbine and compressor efficiencies are equal to 0.85. Taking  $C_p = 1 \text{ KJ/Kg K}$  and  $C_v = 0.714 \text{ KJ/Kg K}$ ; determine
  - a) Actual overall efficiency of the turbine and
  - b) Mass of air circulated by the turbine.
9. What is the principle of rocket propulsion and what are the different types of rocket engines?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC.



The connecting rod of a gasoline engine is 300 mm long between its centres. It has a mass of 15 kg and mass moment of inertia of  $7000 \text{ kg}\cdot\text{mm}^2$ . Its centre of gravity is at 200 mm from its small end centre. Determine the dynamical equivalent two-mass system of the connecting rod if one of the masses is located at the small end centre.

A pair of spur gears with involute teeth is to give a gear ratio of 4:1. The arc of approach is not to be less than the circular pitch and smaller wheel is the driver. The angle of pressure is  $14.5^\circ$ . Find : 1. the least number of teeth that can be used on each wheel, and 2. The addendum of the wheel in terms of the circular pitch.

Four masses  $m_1$ ,  $m_2$ ,  $m_3$  and  $m_4$  are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are  $45^\circ$ ,  $75^\circ$  and  $135^\circ$ . Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.

Explain why only a part of the unbalanced force due to reciprocating masses is balanced by revolving mass.

### SECTION-C

An inside cylinder locomotive has its cylinder centre lines 0.7 m apart and has a stroke of 0.6 m. The rotating masses per cylinder are equivalent to 150 kg at the crank pin, and the reciprocating masses per cylinder to 180 kg. The wheel centre lines are 1.5 m apart. The cranks are at right angles. The whole of the rotating and  $\frac{2}{3}$  of the reciprocating masses are to be balanced by masses placed at a radius of 0.6 m. Find the magnitude and direction of the balancing masses. Find the fluctuation in rail pressure under one wheel, variation of tractive effort and the magnitude of swaying couple at a crank speed of 300 r.p.m.

A four wheeled motor car of mass 2000 kg has a wheel base 2.5 m, track width 1.5 m and height of centre of gravity 500 mm above the ground level and lies at 1 metre from the front axle. Each wheel has an effective diameter of 0.8 m and a moment of inertia of  $0.8 \text{ kg}\cdot\text{m}^2$ . The drive shaft, engine flywheel and transmission are rotating at 4 times the speed of road wheel, in a clockwise direction when viewed from the front, and is equivalent to a mass of 75 kg having a radius of gyration of 100 mm. If the car is taking a right turn of 60 m radius at 60 km/h, find the load on each wheel.

9. In an epicyclic gear train, the internal wheels A and B and compound wheels C and D rotate independently about axis O. The wheels E and F rotate on pins fixed to the arm G. E gears with A and C and F gears with B and D. All the wheels have the same module and the number of teeth are:  $T_C = 28$ ;  $T_D = 26$ ;  $T_E = T_F = 18$ .

a. Sketch the arrangement; b. Find the number of teeth on A and B; c. If the arm G makes 100 r.p.m. clockwise and A is fixed, find the speed of B; and d. If the arm G makes 100 r.p.m. clockwise & wheel A makes 10 r.p.m. counter clockwise; find the speed of wheel B.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





3. Explain extrusion process. Differentiate between the forward and backward extrusion giving neat sketches, advantages and disadvantages.
4. Describe the working principle, applications and advantages of powder metallurgy process, giving neat sketch. Also, discuss the advantages, disadvantages and applications of powder metallurgy process.
5. Explain the working principle, applications, advantages and limitations of up milling and down milling operations, giving neat sketches.
6. Discuss the working principle, applications, advantages and limitations of horizontal shaper, giving a neat sketch.

### SECTION-C

7. a) Explain the construction and working of open and close die forging operations, giving neat sketches.
- b) Explain the working principle of following sheet metal forming processes with the help of neat sketches :
  - i) piercing,
  - ii) blanking,
  - iii) squeezing,
  - iv) coining,
8. a) Describe the types of chips formed during machining operations, giving neat sketches and also, explain the conditions favouring formation of various types of chips.
- b) Write a short note on various types of lubricants used in machining operations giving their characteristic features, advantages, disadvantages and applications.
9. a) Discuss the nomenclature of tool geometry by describing various tool angles of single point cutting tool with the help of a neat sketch.
- b) The following data were recorded while turning a work piece on a lathe :
 

$V = 25\text{m/min}; f = 0.3\text{ mm/rev.}; d = 2.0\text{ mm};$  tool life,  $T = 100\text{ min}$ . The following tool life equation is given for this operation  $VT^{0.12} f^{0.7} d^{0.3} = C$ . If  $V, f, d$  are all increased by 25% each & collectively. What will be their effect on tool life?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

2 | M 59133

**Roll No.**  
**Total No.**

**Time : 3**

**INSTRUC**

1. SECT  
each
2. SECT  
have
3. SECT  
have

1. Wr

a)

b)

c)

d)

e)

f)

g)

h)

i)

j)

1 | M-7754

(52)-992

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-4)

**MATERIALS ENGINEERING**

Subject Code : BTME-404-18

M.Code : 77549

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) What are point defects? Name them.
- b) Define steady state diffusion process.
- c) Discuss the applications of lever rule.
- d) What is the importance of Iron-Carbon equilibrium diagram?
- e) Define critical cooling rate.
- f) Define the term harden-ability and severity of quench.
- g) Enlist different defects due to heat treatment.
- h) Define Thermal stress.
- i) Using suitable sketch, explain the difference between FCC and BCC unit cells.
- j) What are super alloys? Give an example.



## SECTION-B

What is the difference between an iron-carbon diagram and a T-T-T diagram? Discuss their applications.

Why hardening is always followed by tempering treatment? Explain the various stages of tempering.

Discuss nitriding as a method of surface-hardening of steel and compare it with induction hardening.

Explain with sketches the difference between edge dislocation and screw dislocation.

What is atomic packing factor of a crystal structure? Show that the atomic packing factor for F.C.C. structure is 0.74.

## SECTION-C

What are purposes of heat treatment? Classify heat treatment. Explain any one heat treatment process in detail.

Discuss the classification of alloying elements in steels. Explain the effects of adding Mo, Ni and Mn on the properties of steels.

How are carbon steels heat-treated to develop their properties? What are the limitations of such steels and how may they be overcome? Explain your statement with reference to T-T-T diagram.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ME) (Sem.-4)**  
**FLUID MECHANICS**  
Subject Code : BTME-403  
M.Code : 59131  
Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Answer briefly :**

- a) Define specific weight and state its units.
- b) Define surface tension and write the formula for hollow bubble.
- c) State the different types of fluid flow.
- d) Define Newtonian fluid and Mach number.
- e) Classify weirs according to the shape of crest.
- f) What do you mean by dimensional homogeneity and what are its applications?
- g) Classify notches according to shape of opening.
- h) Define stream line, path line and streak line.
- i) Define Weber number.
- j) Define impulse-momentum equation.



## SECTION-B

2. Derive an expression for the force exerted on a submerged inclined plane surface by the static liquid and locate the position of centre of pressure.
3. A stream function is given by  $5x - 6y$ . Calculate the velocity components and also magnitude and direction of the resultant velocity at any point.
4. The efficiency of a fan depends upon density, dynamic viscosity of fluid, angular velocity, diameter of the rotor and discharge. Using Buckingham's pi theorem obtain an expression for efficiency.
5. Derive Euler's Equation of motion.
6. Calculate the density, specific weight and weight of one litre of petrol of specific gravity 0.7.

## SECTION-C

7. A body has the cylindrical upper portion of 3 metre diameter and 1.8 metre deep. The lower portion is a curved one, which displaces a volume of  $0.6 \text{ m}^3$  of water. The centre of buoyancy of the curved portion is at a distance of 1.95 metre below the top of the cylinder. The centre of gravity of the whole body is 1.20 metre below the top of the cylinder. The total displacement of water is 3.9 tonnes. Find the meta-centric height of the body.
8. Derive Darcy equation for major hydraulic losses in pipes.
9. Derive equation and explain with a neat sketch
  - a) V-Notch.
  - b) Venturimeter.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

May 2022  
ME Sem-5

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (ME) (Sem.-5)  
**AUTOMOBILE ENGINEERING**  
Subject Code : BTME-505  
M.Code : 70606  
Date of Examination : 06-08-22

B.Tech Sem-5  
P.T.U Questions

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a. Give the classification of various types of Automobiles.
- b. What is the function of a cut-out in the battery charging system?
- c. What is the function of an injector?
- d. Define camber.
- e. What are oil additives?
- f. Why there is no spark plug in a diesel engine?
- g. What is an MPFi engine?
- h. What is the function of pressure plates in the clutch?
- i. What is the function of a differential?
- j. What are the advantages of an Anti-lock braking system?



### SECTION-B

2. Explain the general layout of a front-wheel drive automobile.
3. Explain the working of single plate clutch with the help of a simple sketch.
4. What are the requirements of perfect steering system?
5. Explain different types of front and rear axles with neat diagrams.
6. Explain the principle of automatic transmission with a neat sketch

### SECTION-C

7. What are the different sources of automobile pollutants? Explain pollution control techniques used in practice.
8. Explain the common rail direct injection system with a neat sketch.
9. What are lubricants? Discuss different types of lubricants and their desirable properties.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ME) (Sem.-5)**  
**INDUSTRIAL AUTOMATION AND ROBOTICS**

Subject Code : BTME-504

M.Code : 70605

Date of Examination : 05-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a. What do you understand by automation?
- b. What is a gripper in a robot?
- c. What is function of Quick exhaust valve?
- d. What is telescopic cylinder?
- e. What is latching in PLC's?
- f. What is fluidic NOR gate?
- g. Draw the symbol of Twin pressure valve.
- h. What is Yaw?
- i. What is FRL?
- j. What is time displacement diagram for cylinder?

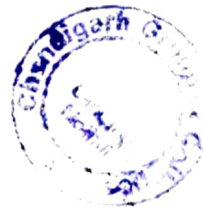


## SECTION-B

2. Explain the construction and working of reciprocating tube feeder with the help of neat sketch.
3. Explain architecture of a Programmable logic controller with the help of neat sketch.
4. Discuss and draw the circuit for speed control of double acting cylinder for backward direction.
5. Explain the functioning of pressure relief valve with the neat sketch.
6. What are the different types of sensors used in robots?

## SECTION-C

7. Classify robots based on their Control. List some application of robots.
8. What are the various types of valves used in pneumatics? Explain.
9. Write short note on :
  - a) Fluid power generator
  - b) Teach pendent



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-5)

**MECHANICAL MEASUREMENT AND METROLOGY**

Subject Code : BTME-503

M.Code : 70604

Date of Examination : 04-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a. Define the term "Measurand".
- b. Define hysteresis in measurement systems.
- c. What are piezo-electric transducers?
- d. Define the term calibration. Why is it required in measuring instruments?
- e. How the least count of a micrometer is calculated?
- f. What is Clinometers?
- g. What is the working principle of a thermocouple?
- h. What is working principle of a strain gauge?
- i. What is comparator? Name any two of them.
- j. What is pneumatic load cell?



## SECTION-B

2. Explain various functional elements of measurement system with suitable examples.
3. What are the different sources of errors in measurements? Describe.
4. Define the terms: Lag, Fidelity, Dynamic error, Dead time and Dead zone.
5. Explain any two types of mechanical comparators.
6. Explain the principle of measurement of linear velocity using electromagnetic transducers.

## SECTION-C

7. What is the working principle of hot wire anemometer? Explain constant current and constant temperature type hot wire anemometer. What are the problems associated during their use?
8. Explain the principle of torque measurement with strain gauge torsion meter. How is temperature compensation accounted for in these gauges?
9. Write short notes on:
  - a) Measurement of straightness and flatness.
  - b) Optical pyrometer.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. A vertical screw with single start square threads of 50 mm mean diameter and 12.5 mm pitch is raised against a load of 10 kN by means of a hand wheel, the boss of which is threaded to act as a nut. The axial load is taken up by a thrust collar which supports the wheel boss and has a mean diameter of 60 mm. The coefficient of friction is 0.15 for the screw and 0.18 for the collar. If the tangential force applied by each hand to the wheel is 100 N, find suitable diameter of the hand wheel.
3. Two pulleys, one 450 mm diameter and the other 200 mm diameter, on parallel shafts 1.95 m apart are connected by a crossed belt. Find the length of the belt required and the angle of contact between the belt and each pulley. What power can be transmitted by the belt when the larger pulley rotates at 200 rev/min. if the maximum permissible tension in the belt is 1 kN, and the coefficient of friction between the belt and pulley is 0.25?
4. Determine the thickness of a 120 mm wide uniform plate for safe continuous operation if the plate is to be subjected to a tensile load that has a maximum value of 250 kN and a minimum value of 100 kN. The properties of the plate material are as follows: Endurance limit stress = 225 MPa, and Yield point stress = 300 MPa. The factor of safety based on yield point may be taken as 1.5.
5. Design a spring for a balance to measure 0 to 1000 N over a scale of length 80 mm. The spring is to be enclosed in a casing of 25 mm diameter. The approximate number of turns is 30. The modulus of rigidity is  $85 \text{ kN/mm}^2$ . Also calculate the maximum shear stress induced.
6. The load on the journal bearing is 150 kN due to turbine shaft of 300 mm diameter running at 1800 r.p.m. Determine the following :
  - a. Length of the bearing if the allowable bearing pressure is  $1.6 \text{ N/mm}^2$ .
  - b. Amount of heat to be removed by the lubricant per minute if the bearing temperature is  $60^\circ\text{C}$  and viscosity of the oil at  $60^\circ\text{C}$  is  $0.02 \text{ kg/m-s}$  and the bearing clearance is 0.25 mm.

## SECTION-C

7. A solid circular shaft is subjected to a bending moment of 3000 N-m and a torque of 10000 N-m. The shaft is made of 45 C 8 steel having ultimate tensile stress of 700 MPa and a ultimate shear stress of 500 MPa. Assuming a factor of safety as 6, determine the diameter of the shaft.
8. A single plate clutch, effective on both sides, is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner diameters of frictional surface if the coefficient of friction is 0.255, ratio of diameters is 1.25 and the maximum pressure is not to exceed  $0.1 \text{ N/mm}^2$ . Also, determine the axial thrust to be provided by springs. Assume the theory of uniform wear.
9. Discuss the design procedure of spur gears.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-5)  
**MANUFACTURING PROCESSES**

Subject Code : BTME-503-18

M.Code : 78249

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1) Write briefly :

- a) Explain the terms: Brazing and Soldering.
- b) Name two forging defects and give their reasons and remedies.
- c) What do you understand by drawing?
- d) Differentiate between shaper and a planer.
- e) Define weld-ability.
- f) What is meant by rapid prototyping?
- g) What do you understand by directional solidification?
- h) Explain the function of runner and riser in casting process.
- i) Differentiate between consumable and non-consumable electrodes.
- j) Explain the functions of core prints and chaplets used in casting process.



## SECTION-B

- 2) Discuss various types of welding defects, their causes and remedies.
- 3) Explain the working of horizontal milling machine giving a neat sketch and describe components of horizontal milling machine.
- 4) What is the difference between jig and fixture? What are different types of fixtures? Enumerate the different applications for jigs and fixtures.
- 5) What is meant by liquid-state welding? Explain the basic principle of arc welding processes. Why is the quality of submerged arc welding very good? Why is the flux not needed in tungsten-arc welding?
- 6) What is the need of using coolants and lubricants in machining operations? Describe the functions and properties of various lubricants used in machining operations.

## SECTION-C

- 7)
  - a) What are the essential conditions that are to be kept in mind while designing risers? Compare the modulus method with that of Caine's method of fixing riser dimensions.
  - b) What are the types of cutting tool wear patterns observed in single point tools? How do they affect the metal cutting performance? How do you define the tool life? Explain the parameters that control the tool life of a single point cutting tool.
- 8)
  - a) Describe briefly about cluster rolling mill. What is the advantage of tandem rolling? What factors contribute to spreading in flat rolling? Explain some defects that can be present in rolled products.
  - b) Discuss in detail the principles and other important parameters need to be considered during forging the design.
- 9)
  - a) Explain the cutting forces encountered in machining operations. How these cutting forces can be measured?
  - b) Explain the working principle, applications, advantages and limitations of AC welding process giving a neat sketch.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-5)

**COMPUTER AIDED DESIGN AND MANUFACTURING**

Subject Code : BTME-502

M.Code : 70603

Date of Examination : 03-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) Discuss any two input devices used by CAD/CAM designers.
- b) Give the applications of Geometric Transformation.
- c) What is CSG?
- d) What is an interpolant curve?
- e) Explain the general procedure of FEM.
- f) Explain fixed and floating zero.
- g) What is combined DNC/CNC system?
- h) What is part family and how they are formed in GT?
- i) Define a part program.
- j) Give the benefits of FMS.



## SECTION-B

2. What is geometric modeling and discuss the applications of wire frame model?
3. Discuss the differences between synthetic and analytical curves.
4. Discuss any two types of Geometric Transformations using suitable 2-D examples.
5. Explain the features of NC machine tools and discuss the concept of tool length compensation in CNC machines.
6. What is CAPP and discuss various types of CAPP systems?

## SECTION-C

7.
  - a) Discuss the need and physical components of an FMS.
  - b) Discuss different types of layout considerations of FMS.
8.
  - a) What is adaptive control machining and discuss its types?
  - b) Discuss various sources of variability in adaptive control machining.
9. Discuss various part classification and coding systems used in GT.

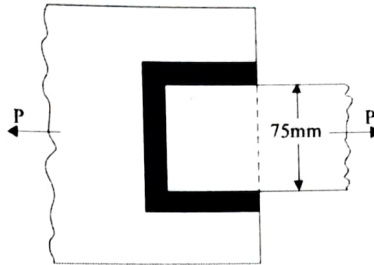


**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. A Plate 75 mm wide and 12.5 mm thick is joined with another plate by a single transverse weld and double parallel fillet welds as shown in Figure. The maximum tensile and shear stresses are 70 MPa and 56 MPa respectively. Find the length of each parallel fillet weld, if the joint is subjected to both static and fatigue loading.



3. Design a knuckle joint to transmit 150 KN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression.
4. A foot lever is 1 m from the center of shaft to the point of application of 800 N load. Find :
- Diameter of the shaft,
  - Dimensions of the key, and
  - Dimensions of rectangular arm of the foot lever at 60 mm from the center of shaft assuming width of the arm as 3 times thickness. The allowable tensile stress may be taken as 73 MPa and allowable shear stress as 70 MPa.
5. Design a clamp coupling to transmit 30 KW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are six. The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3.
6. A cast iron pipe of internal diameter 200 mm and thickness 50 mm carries water under a pressure of 5 N/mm<sup>2</sup>. Calculate the tangential and radial stresses at radius (r) = 100 mm; 110 mm; 120 mm; 130 mm; 140 mm; and 150 mm. Sketch the stress distribution curves.
7. Enumerate the various manufacturing methods of machine parts which a designer should know.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





coefficient may be taken as  $11 \text{ W/m}^2 \cdot \text{K}$ . Find the heat loss and fin efficiency, if the heat loss from fin tip is negligible.

4. Experimental results for heat transfer over a flat plate with an extremely rough surface were found to be correlated by an expression of the form

$$Nu_x = 0.04 Re^{0.9} Pr^{1/3}$$

where  $Nu_x$  is the local value of Nusselt number at a position  $x$  measured from the leading edge of the plate. Derive an expression for ratio of average heat transfer coefficient to local heat transfer coefficient  $h_x$ .

5. Discuss modes of condensation. Why is dropwise condensation preferred? What are the practical difficulties in retaining dropwise condensation on a surface?
6. A thermocouple is used to measure the temperature of gas flowing through a duct, records  $280^\circ\text{C}$ . If the emissivity of the junction is 0.4 and convection coefficient is  $150 \text{ W/m}^2 \cdot \text{K}$ . Find the true gas temperature. The duct wall temperature is  $140^\circ\text{C}$ . What should be the emissivity of the junction in order to reduce the error by 30%?

### SECTION-C

7. In a quenching process, a copper plate of 3 mm thick is heated upto  $350^\circ\text{C}$  and then suddenly, it is dropped into a water bath at  $25^\circ\text{C}$ . Calculate the time required for the plate to reach the temperature of  $50^\circ\text{C}$ . The heat transfer coefficient on the surface of the plate is  $28 \text{ W/m}^2 \cdot \text{K}$ . The plate dimensions may be taken as length 40 cm and width 30 cm. Also calculate the time required for infinite long plate to cool to  $50^\circ\text{C}$ . Other parameters remain same. Take the properties of copper as  $C = 380 \text{ J/kg} \cdot \text{K}$ ,  $\rho = 8800 \text{ kg/m}^3$ ,  $k = 385 \text{ W/m} \cdot \text{K}$ .
8. A heat exchanger is required to cool 55,000 kg/h of alcohol from  $66^\circ\text{C}$  to  $40^\circ\text{C}$  using 40,000 kg/h of water entering at  $5^\circ\text{C}$ . Calculate :
- Exit temperature of water
  - Heat transfer rate
  - Surface area required for
    - parallel flow type,
    - counter flow type of heat exchanger.

Take overall heat transfer coefficient,  $U = 580 \text{ W/m}^2 \cdot \text{K}$ ,  $C_p$  (alcohol) = 3760 J/kg. K,  $C_p$  (water) = 4180 J/kg. K.

9. Write short notes on the following :
- Heat transfer from piston crown
  - Wien's displacement law of radiation and its significance.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-5)

**MATHEMATICS-III**

Subject Code : BTAM-500

M.Code : 70601

Date of Examination : 01-08-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define Fourier series of a periodic function  $f(x)$ .
- b) When a function is said to be even? Give an example.
- c) Find Laplace transformation of  $f(t) = \frac{1}{t}(1 + \cos 6t)$ .
- d) Define Laplace transformation of Unit step function.
- e) Express  $2 - 3x + 4x^2$  in terms of Legendre polynomials.
- f) Find the partial differential equation by eliminating arbitrary function  $\phi$  from  $z = \phi(x + y)$ .
- g) Write Cauchy - Riemann equations in polar form.
- h) Show that  $u = x^3 - 3xy^2$  is a harmonic function.
- i) Evaluate  $\int_0^{5+3i} z^3 dz$ .
- j) Discuss the singularities of  $\frac{1}{z(1-z^2)}$ .



## SECTION-B

2. Obtain Fourier series expansion for  $f(x) = x^2$  from  $-\pi < x < \pi$
3. Form the partial differential equation by eliminating arbitrary constants  $a$  &  $b$  from  $\log(az - 1) = x + ay + b$
4. Expand  $f(z) = \sin z$  in a Taylor series about  $z = \pi/4$ .
5. Solve  $x(y'') + 2y' + \frac{xy}{2} = 0$  in terms of Bessel functions.
6. Solve the initial value problem  $y'' + 4y = 0$ ,  $y(0) = 1$ ,  $y'(0) = 3$  by Laplace transformation.

## SECTION-C

7. Find the Bilinear transformation which maps  $z = 1, -i, 2$  on to  $w = 0, 2, -i$  respectively.
8. Solve  $(D^2 - 2DD' - 15^2)z = 12xy$
9. Find the residue of  $\frac{z^3}{(z-2)(z-3)(z-1)^4}$  at  $z = 1, 2, 3$  and  $\infty$ . Also, show their sum is zero.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (M.E.) (Sem.-6)**  
**MECHANICAL MEASUREMENT AND METROLOGY**

Subject Code : BTME-602-18

M.Code : 79651

Date of Examination : 05-07-22

B. Tech

Time : 3 Hrs.

Max. Marks : 60

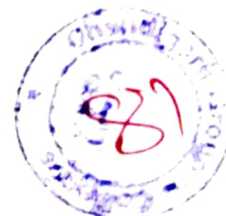
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Discuss the importance of linearity in measuring instruments.
- b) Explain the terms: (a) Drift (b) Threshold.
- c) Give a classification of errors in measurement.
- d) List the advantages of electrical transducers.
- e) How the least count of a vernier calliper is calculated?
- f) Define gauge factor of strain gauge.
- g) Explain the difference between roughness and waviness.
- h) List the common metals used in bimetallic strips.
- i) Define the terms 'Run out' and 'Concentricity'.
- j) Write the differences between precision and accuracy.



## SECTION-B

2. Discuss loading effect with respect to a measuring system.
3. What is sine bar? How it is used for angle measurement?
4. Explain the working principal of Resistive Potentiometer.
5. Discuss the major applications of pneumatic comparators.
6. Explain the working principle of piezo-electric transducer. What are its advantages and limitations?

Roll No  
Total N

Time

INST

1.

2.

3.

## SECTION-C

7. a) Explain the following methods of quantifying surface roughness : (i) Rz value, (ii) RMS value, and (iii) Ra value.  
b) With the help of a neat sketch, describe the construction and working of a pitch-measuring instrument.
8. a) What is temperature compensation in Strain Gauges? Why is it needed?  
b) Explain, with a neat sketch, determination of force using a load cell.
9. With the help of a neat sketch, explain the construction details of a tool maker's microscope. Briefly explain, surface illumination modes available in a tool maker's microscope. Discuss the important applications of a tool maker's microscope.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. 

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages :02

Total No. of Questions : 09

**B.Tech. (ME) (Sem.-6)**  
**HEAT TRANSFER**  
**Subject Code : BTME-602**  
**M.Code : 71186**  
**Date of Examination : 05-07-22**

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

1. **Write briefly :**

- a) Define heat transfer.
- b) How does heat transfer differs from thermodynamics?
- c) State Newton's law of cooling.
- d) List some good conductors of heat.
- e) What is the utility of extended surface?
- f) What is difference between Laminar flow and Turbulent flow?
- g) Define the Nusselt number.
- h) What is condensation and when does it occurs?
- i) Define absorptivity.
- j) State Kirchoff's law of radiation.



## SECTION-B

2. Discuss the different modes by which heat can be transferred. Give 5 suitable examples to illustrate your answer.
3. Explain why marble floor appears colder than cemented floor in winter though both are at the same temperature.
4. An iron ( $k = 65 \text{ W/mK}$ ) billet measuring  $20 \times 15 \times 80 \text{ cm}$  is exposed to a convective flow resulting in convection coefficient  $h = 11.5 \text{ W/m}^2\text{K}$ . Determine the Biot number and the suitability of a lumped analysis to represent the cooling rate if the billet is initially hotter than environment.
5. Define Reynolds number and mention its physical significance.
6. Define black, grey and real surface as applied to radiation heat transfer.

## SECTION-C

7. Write the Fourier rate equation for heat transfer by conduction. Give the units and physical significance of each term appearing in this equation. Why there is a negative sign in the Fourier's law of heat conduction?
8. Give a general equation for the rate of heat transfer by convection, and hence define the coefficient of heat transfer. List the various factors on which the value of coefficient depends.
9. Saturated steam at atmospheric pressure condenses on the outer surface of a vertical tube of length 1 m and outer diameter 75 mm. The tube wall is maintained at a uniform surface temperature of  $40^\circ\text{C}$  by the flow of cooling water inside the tube. Estimate the steam condensation rate and the heat transfer rate of the tube. What water flow rate will result in a  $5^\circ\text{C}$  temperature difference of water between outlet and inlet of pipe? Also, calculate the flow Reynolds number to check the assumption of laminar flow conditions.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-6)  
**INTRODUCTION TO INDUSTRIAL MANAGEMENT**

Subject Code : BTME-604-18

M.Code : 79653

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) Discuss the relevance of Total Quality Management in today's competitive world.
- b) What is the Input-output model in the production system?
- c) Explain the effect of product design on manufacturing cost.
- d) What do you understand by the term-Breakeven analysis?
- e) Name different buying techniques used in the organization.
- f) Enumerate the importance of predictive maintenance.
- g) Enlist the different types of waste in manufacturing organizations?
- h) What is the JIT cause and effect chain?
- i) Define benchmarking and elaborate its concept.
- j) Name the different methods of data collection from of customers.



## SECTION-B

2. In today's highly competitive and fast-changing environment, how industrial engineering helps to increase industrial productivity? Justify your answer with suitable examples.
3. Can there be a product design for disassembling? Where could this concept be useful? Justify your answer for such a design.
4. Would purchasing in the service industry differ from purchasing in the manufacturing industry? Discuss with suitable examples.
5. Does benchmarking help a firm to be proactive? Explain your answer. Give one example of each of the different types of benchmarking.
6. Can total customer satisfaction be achieved while a company is also aiming for key business results? Is there a conflict between these two goals? Discuss.

## SECTION-C

7. a) '*Poor maintenance of plant and machinery leads to various losses in the industry*'. What are these losses? Discuss briefly.  
b) Discuss in detail the objectives and responsibilities of the plant maintenance department.
8. a) What is the function of safety stock or buffer stock? What are all the different uncertainties against which you would like to protect the inventory?  
b) What is the role of set-up times in-JIT? How should they be reduced? Discuss in detail.
9. Write a short note on **any two** of the following :
  - a) Concept of Production and Production function
  - b) Salient features of Total Quality Management
  - c) ABC Analysis.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-6)

**STATISTICAL AND NUMERICAL METHODS IN ENGINEERING**

Subject Code : BTME-604

M.Code : 71188

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define mean, median, mode and standard deviation.
- b) What do you mean by mutually exclusive events in Probability Theory? Also give an example of mutually exclusive events.
- c) What do you mean by sampling distribution.
- d) Discuss the concept of Relative Error in numerical computing by considering an example.
- e) Write the formula of Newton-Raphson method. When does it fail to perform?
- f) Evaluate  $\Delta(x^2 + \sin x)$ , where  $\Delta$  denotes the forward difference operator.
- g) Discuss the concept of Interpolation by considering an example.
- h) Write the formula of Simpson's 1/3-rule of numerical integration.
- i) State eigen value problem.
- j) What are the disadvantages of Taylor series method for solving first order initial value problems of ordinary differential equations?

**SECTION-B**

2. Find the missing frequency for the following distribution whose mean is 50 :

$x$	10	30	50	70	90
$f$	17	?	32	24	19

3. Define Poisson distribution. Also fit a Poisson distribution to the following data

$x$	0	1	2	3	4
$f$	122	60	15	2	1

4. a) Find the positive root of  $x^3 = 2x + 5$  using method of false position.  
 b) Find the smallest positive root of  $x^2 - 5x + 1 = 0$  using bisection method.
5. A sample of 20 items has mean 42 units and standard deviation 5 units. hypothesis that it is a random sample from a normal population with mean 45 units.
6. Find the number of terms of the exponential series such that their sum gives the  $e^x$  correct to six decimal places at  $x = 1$ .

### SECTION-C

7. a) Find the cubic polynomial which takes the following values :

$x$	0	1	2	3
$f(x)$	1	2	1	10

Hence evaluate  $f(4)$  and  $f(5)$ .

- b) i) What do you mean by permanence property of interpolating polynomials?  
 ii) Give two uses of interpolating polynomials. Discuss with examples.
8. a) Using Simpson's 1/3-rule, evaluate  $\int_0^1 x e^x dx$  taking four intervals. Compare results with its actual value. Also write a note on error in Simpson's 1/3-rule.  
 b) Determine the largest eigen value in magnitude and its corresponding eigen vector of the following matrix by using power method
- $$\begin{bmatrix} 6 & 1 & 0 \\ 1 & 40 & 1 \\ 0 & 1 & 6 \end{bmatrix}$$
9. a) Given that  $y' = x^3 + y$ ;  $y(0) = 2$ , compute  $y(0.2)$ ,  $y(0.4)$  using Runge-Kutta method of fourth order.  
 b) Solve  $u_{xx} + u_{yy} = 0$  over the square mesh of side four units satisfying the boundary conditions
- $$u(0, y) = 0 \text{ for } 0 \leq y \leq 4, \quad y(4, y) = 12 + y \text{ for } 0 \leq y \leq 4$$
- $$u(x, 0) = 3x \text{ for } 0 \leq x \leq 4, \quad u(x, 4) = x^2 \text{ for } 0 \leq x \leq 4.$$

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.-6)

**FLUID MACHINERY**

Subject Code : BTME-603

M.Code : 71187

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Answer briefly :**

- a) Define the terms Euler's head, and degree of reaction.
- b) What are the Guide blades in a Turbine?
- c) Differentiate between Kaplan and Propeller turbine?
- d) What is the function of a draft tube in a hydraulic turbine?
- e) Define specific speed of a pump.
- f) Define slip in relation to pumps?
- g) What is the need for priming of a pump?
- h) Define utility of Surge tank.
- i) Define Net Positive Suction Head (NPSH) and write its expression.
- j) Why Jet pumps have been phased out?

## SECTION-B

2. State "Impulse momentum equation", also, give its applications. Why the case of jet striking single moving vane is not feasible?
3. Derive an expression for efficiency and maximum efficiency of Pelton turbine.
4. Show from the first principles that work saved in a single-acting reciprocation pump, by fitting an air vessel is 84.8 per cent.
5. Derive expressions for model relationships in case of centrifugal pump.
6. With the help of neat diagram, explain the working principle of fluid coupling. Also, describe the slip and the efficiency of the fluid coupling.

## SECTION-C

7. The impeller of a centrifugal pump has an outer diameter of 25 cm and an effective outlet area of  $170 \text{ cm}^2$ . The blades are backward curved and direction of relative velocity at outlet makes an angle of  $148^\circ$  with the direction of vane motion. The diameters of suction and delivery pipes are 15 cm and 10 cm, respectively. The pump delivers 1860 liter/min. at 1450 r.p.m. The gauges attached at suction and delivery pipes close to the pump inlet and outlet show heads of 4.6 m below and 18.0 m above atmospheric pressure, respectively. The head losses in the suction and delivery pipes are 2.0 m and 2.9 m, respectively. The motor driving the pump supplies 8.67 KW. Find the manometric efficiency assuming that water enters the pump without shock and whirl. Also, find the overall efficiency of the pump.
8. A single acting reciprocating pump has a plunger diameter of 75 mm and stroke length 150 mm. It takes supply of water from a sump 3 m below the pump through a pipe 5m long and 40 mm diameter. It delivers water to a tank 12 m above the pump through a pipe 30 mm diameter and 15m long. If the separation takes place at  $75 \text{ KN/m}^2$  below atmospheric pressure, find the maximum speed at which the pump may be operated without separation, plunger operates with S.H.M.
9. A Francis Turbine supplied through a 6m penstock has the following particulars :  
Output Power = 63500KW; Flow =  $117 \text{ m}^3/\text{s}$ ; Speed = 150 r.p.m. Hydraulic efficiency = 92%, mean dia. of turbine at entry = 4m; mean blade height at entry = 1m; entry diameter of draft tube = 4.2m; velocity in tail race = 2.4m/s. The static pressure head in penstock measured just before entry to runner is 57.4m. The point of measurement is 3m above level of tail race and flow leaves the runner without swirl. Determine : (a) overall efficiency, (b) direction of flow relative to runner at inlet, (c) pressure head at entry to draft tube.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engg.) (Sem.-6)

**AUTOMOBILE ENGINEERING**

Subject Code : BTME603-18

M.Code : 79652

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) Which vehicle is better monocoque or ladder on frame? Justify your answer.
- b) Where and why, we use multiplate clutch?
- c) What do you mean by multi-point fuel injection system for a petrol engine?
- d) Why the differential is needed in automobile?
- e) Why a rich mixture is required for idling?
- f) 'Is differential compulsory part of transmission system'. Explain in brief.
- g) What are the different sources of automobile pollution?
- h) Make a list of important quantities to be measured during the testing of an engine.
- i) How Exhaust Gas Recirculation (EGR) helps in reducing pollution?
- j) What is knocking phenomenon of I.C. engines.

## SECTION-B

2. Why we use multi-cylinder engines instead of the big single-cylinder with the same volume? Justify your answer by suitable engine parameter's discussion.
3. What are the main factors which affect the tendency to detonate? Describe them with suitable diagram.
4. What are the functions of exhaust system? Draw a neat sketch of exhaust system.
5. Explain the terms (a) Brake Power (b) Indicated Power (c) Specific Fuel consumption.
6. Discuss the weight transfer phenomenon indicating the force acting when brakes are applied to a moving vehicle.

## SECTION-C

7.
  - a) What do you understand from the 'breathing' of the fuel tank? How does it cause pollution?
  - b) What are the advantage and drawbacks of the catalytic converter method compared to blowing of air only into the exhaust manifold?
8. Explain the multi-point fuel injection system for a petrol engine.
9. Explain the following :
  - a) Camber
  - b) Caster
  - c) Toe-in and Toe-out
  - d) King-pin inclination.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ME) (Sem.-6)**  
**NON-TRADITIONAL MACHINING**

Subject Code : DE/ME-2.0

M.Code : 71252

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Answer briefly :**

- a) What is the need for Non Traditional Machining Processes?
- b) Enumerate the advantages of conventional machining process over the Non Traditional Machining Processes.
- c) What is computer-integrated manufacturing System?
- d) Explain the functions of intensifier and accumulator used in Water Jet Machining process.
- e) Explain the criteria for selection of media in Abrasive Flow Machining process.
- f) Enumerate the applications of water jet machining process.
- g) What are the gases commonly used in Laser?
- h) Discuss the effect of initial gap between tool and work piece on the process efficiency of electrochemical machining process.
- i) Explain the effect of the method of flushing of dielectric in EDM process.
- j) Explain the working principle of photo-chemical machining process.



## SECTION-B

2. Explain the classification of Non-Traditional Machining processes giving a neat sketch.
3. Describe the constructional details and material removal mechanism of ultrasonic machining process with the help of a neat sketch.
4. Explain principle of operation, elements and applications of electrochemical grinding process.
5. Explain the construction and working of water-shielded plasma arc machining process with the help of a neat sketch.
6. Explain the principle, working, applications and limitations of CO<sub>2</sub> Laser Beam Machining process giving a neat sketch.

## SECTION-C

7.
  - a) With the help of a neat sketch, explain the elements of Abrasive Flow Machining setup, giving the mechanism of material removal in Abrasive Flow Machining process.
  - b) Explain the elements of chemical machining process and discuss the mechanism of material removal giving a neat sketch.
8. Explain the mechanism of material removal in electro discharge machining process with the help of a neat sketch. Also, explain the process parameters involved in EDM process.
9.
  - a) Discuss the advantages of this hybrid process over the individual processes which have been combined. Give the applications of the hybrid machining processes.
  - b) Explain the construction and working of electron beam gun and diffusion pump used in electron beam machining process giving neat sketches.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CE/CSE/ECE/ME) (Sem.-6)**  
**NON-CONVENTIONAL ENERGY RESOURCES**

Subject Code : BTME-615-18

M.Code : 79660

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) What is bio mass? In what form bio mass can be used?
- b) What is the principle of wind energy conversion?
- c) What is difference between fuel cell and primary battery?
- d) What are the factors affecting the feasibility of a tidal power plant?
- e) What do you understand by energy chain?
- f) What do you understand by greenhouse effect?
- g) Explain :
  - i) extraterrestrial radiation.
  - ii) solar constant.
- h) How classification of solar energy storage can be done?
- i) What do you understand by solar still?
- j) What are advantages and disadvantages of waves as source of energy?

## SECTION-B

2. Explain the principle of working of a solar pond.
3. Explain the working of a molten carbonate fuel cell using appropriate diagram and write the various chemical reactions involved in this type of fuel cell.
4. Explain the working of single basin and double basin tidal systems.
5. Describe the construction and working of any one type of wave energy conversion machine.
6. Discuss various methods of production of hydrogen for use as an energy carrier.

## SECTION-C

7. How solar PV systems can be classified? With the help of block diagrams, explain the operations of stand-alone and grid interactive solar PV systems.
8. In a hilly geographical region in India, a huge quantity of biomass is available round the year, but this area is highly deficient in electricity supply. Suggest the ways in which the biomass energy can be converted into electrical energy and substantiate your answer with a suitable diagram.
9. Describe the working of a wind power system with a neat sketch, including its various components.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Mechanical Engg.) (Sem.-6)**  
**REFRIGERATION AND AIR CONDITIONING**

Subject Code : BTME601-18

M.Code : 79650

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly :**

- a) Explain how a refrigerant produces a cooling effect.
- b) What are the advantages of using a flash chamber in parallel with evaporator?
- c) Suggest some measures to improve the working of a vapor compression refrigeration system.
- d) What are various methods of leak detection in refrigeration system?
- e) What do you understand by the performance characteristics of refrigerant compressor?
- f) What is the basic principle of vapor absorption refrigeration system?
- g) What are human requirements of comforts?
- h) Atmospheric air temperature is 20°C and specific humidity is 9.5 gm/kg of dry air. Find the partial pressure of water vapour and specific humidity.
- i) Why wet compression is avoided?
- j) What is the importance of dielectric strength in selecting a proper refrigerant?

## SECTION - B

2. A vapor compression refrigeration machine with R – 12 as refrigerant has a capacity of 20 T of refrigeration operating between  $-28^{\circ}\text{C}$  and  $26^{\circ}\text{C}$ . The refrigerant is subcooled by  $4^{\circ}\text{C}$  before the throttle valve and superheated by  $5^{\circ}\text{C}$  before leaving the evaporator. Calculate the theoretical COP and power required.
3. “Compound compression with intercooling is effective method of operation”. Discuss.
4. Explain with a neat sketch, the working principle of thermostatic expansion valve. Discuss the factors that affect the capacity of the valve.
5. What are secondary refrigerants? Where these are used? Explain its importance in the context of big ice manufacturing plants.
6. Draw a neat diagram of the Lithium Bromide Water Absorption refrigeration system and explain its working.

## SECTION – C

7. Air flowing at the rate of  $90\text{m}^3/\text{min}$  at  $45^{\circ}\text{C}$  DBT and 60% RH is mixed with another stream flowing at the rate of  $20\text{m}^3/\text{min}$  at  $25^{\circ}\text{C}$  DBT and 40% RH. The mixture flows over a cooling coil whose ADP temperature is  $12^{\circ}\text{C}$  and bypass factor is 0.22. Find DBT and RH of air leaving the coil. If this air is supplied to an air conditioned room where DBT of  $25^{\circ}\text{C}$  and RH of 40% are maintained, estimate Room Sensible Heat Factor (SHR) and Cooling coil capacity in tons of refrigeration.
8. What are the thermodynamic advantages of sub-cooling the liquid refrigerant in the condenser? State different methods of sub-cooling and explain their relative merits and demerits.
9. Explain the following :
  - a) Two phased Carnot cycle and its limitations
  - b) Eco-friendly refrigerants



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2.
  - a. Explain the various steps for the design of flat belt.
  - b. Describe the conditions for gear tooth failure.
3.
  - a. Two springs of stiffness  $K_1$  and  $K_2$  are connected in series. What is the stiffness of connection?
  - b. What is the function of flywheel, discuss its design considerations.
4. Write the function of plate clutch with a neat sketch.
5. A railway wagon weighing 50 kN and moving with a speed of 8 km per hour has to be stopped by four buffer springs in which the maximum compression allowed is 220 mm. Find the number of turns in each spring of mean diameter 150 mm. The diameter of spring wire is 25 mm. Take  $G = 84 \text{ kN/mm}^2$ .
6. The ball bearings are to be selected for an application in which the radial load is 2000 N during 90 percent of the time and 8000 N during the remaining 10 percent. The shaft is to rotate at 150 r.p.m. Determine the minimum value of the basic dynamic load rating for 5000 hours of operation with not more than 10 percent failures.
7. Discuss the design of internal expanding breaks.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**





## SECTION-B

2. a. Explain the various steps for the design of flat belt.  
b. Describe the conditions for gear tooth failure.
3. a. Two springs of stiffness  $K_1$  and  $K_2$  are connected in series. What is the stiffness of the connection?  
b. What is the function of flywheel, discuss its design considerations.
4. Write the function of plate clutch with a neat sketch.
5. A railway wagon weighing 50 kN and moving with a speed of 8 km per hour has been stopped by four buffer springs in which the maximum compression allowed is 220 mm. Find the number of turns in each spring of mean diameter 150 mm. The diameter of the spring wire is 25 mm. Take  $G = 84 \text{ kN/mm}^2$ .
6. The ball bearings are to be selected for an application in which the radial load is 2000 N during 90 percent of the time and 8000 N during the remaining 10 percent. The shaft is to rotate at 150 r.p.m. Determine the minimum value of the basic dynamic load rating for 5000 hours of operation with not more than 10 percent failures.
7. Discuss the design of internal expanding brakes.

Roll No.   
Total No. of Questions

Time : 3 Hrs

### INSTRUCTIONS

1. SECTION A and B are compulsory and carry 10 marks each.
2. SECTION C and D are optional and carry 10 marks each.
3. SECTION E and F are optional and carry 10 marks each.

### 1. Write brief notes on the following:

- (a) Define the term 'stress'.
- (b) Define the term 'strain'.
- (c) What is the difference between tensile and compressive stress?
- (d) State the Hooke's law.
- (e) Define the term 'modulus of elasticity'.
- (f) Define the term 'Poisson's ratio'.
- (g) At what angle does the maximum shear stress occur?
- (h) What is the difference between ductile and brittle materials?
- (i) Why do brittle materials fail in shear?
- (j) Define the term 'factor of safety'.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

Roll No.   
Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (Mechanical Engg.) (Sem.-4)**  
**STRENGTH OF MATERIALS-II**  
Subject Code : BTME-401  
M.Code : 59129  
Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is **COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- (a) Define strain energy.
- (b) Define toughness.
- (c) What is the importance of theories of failure?
- (d) State maximum strain energy theory.
- (e) Define stiffness of springs.
- (f) Define Circumferential and Hoop stress.
- (g) At which point, the maximum hoop stress in a thick pressure vessel under internal pressure occurs and why?
- (h) What is the importance of discs of uniform strength?
- (i) Why the cross section of a crane hook is generally trapezoidal, explain briefly.
- (j) Define shear centre.



## SECTION-B

- State and explain Maxwell's theorem of reciprocal deflection.
- A shaft is subjected to a maximum torque of 10 kNm and a maximum bending moment of 7.5 kNm, at a particular section. If the allowable equivalent stress in simple tension is  $160 \text{ MN/m}^2$ , find the diameter of the shaft according to strain energy theory.
- A cylindrical vessel whose ends are closed by means of rigid flange plates is made of steel plate 3 mm thick. The internal length and diameter of the vessel are 50 cm and 25 cm respectively. Determine the longitudinal and circumferential stresses in the cylindrical shell due to an internal fluid pressure of  $3 \text{ MN/m}^2$ . Also, calculate the increase in length, diameter and volume of the vessel. Take,  $E = 200 \text{ GN/m}^2$ , and Poisson's ratio = 0.3.
- A chain link is made of steel rod of 18 mm diameter with straight portion 90 mm length and ends 90 mm in radius. If the link is subjected to a load of 15 kN, calculate the deflection of the link along the load line. Take,  $E = 200 \text{ GN/m}^2$ .
- An I-section, with rectangular ends, has the following dimensions: Flange:  $15 \text{ cm} \times 2 \text{ cm}$ , Web:  $30 \text{ cm} \times 1 \text{ cm}$ . Find the maximum shearing stress developed in the beam for a shearing force of 10 kN.

## SECTION-C

- A flat spiral spring is 5 mm wide, 0.25 mm thick and 3 metres long. Assuming a maximum stress of  $1000 \text{ MN/m}^2$  to occur at the point of greatest bending moment, calculate:
  - The torque,
  - The work that can be stored in the spring, and
  - The number of turns required to wind up the spring.  $E = 200 \text{ GN/m}^2$ .
- A thick cylinder of 150 mm outside radius and 100 mm inside radius is subjected to an external pressure of  $30 \text{ MN/m}^2$  and internal pressure of  $60 \text{ MN/m}^2$ . Calculate the maximum shear stress in the material of the cylinder at the inner radius.
- A disc of uniform thickness having inner and outer diameters 100 mm and 200 mm respectively is rotating at 5000 rpm about its axis. The density of the material of the disc is  $7800 \text{ kg/m}^3$  and Poisson's ratio is 0.3. Determine the stress variations along the radius of the disc.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student

Roll No.

Total No. of Questions

RE

Time : 3 Hrs.

### INSTRUCTIONS

- SECTION-A questions are to be attempted each.
- SECTION-B questions are to be attempted each.
- SECTION-C questions are to be attempted each.

### 1. Write briefly

- Explain the difference between a gas and a vapour.
- What are the characteristics of a gas?
- Suggest some applications of the gas laws.
- What are the characteristics of a liquid?
- What do you mean by surface tension?
- What is the difference between a gas and a vapour?
- What are the characteristics of a solid?
- Atmospheric pressure is 1.01325 bar. Find the partial pressure of oxygen in air.
- Why wet clothes dry faster in summer than in winter?
- What is the difference between a gas and a vapour?

1 | M 79650

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Mechanical Engg.) (Sem.-6)**  
**REFRIGERATION AND AIR CONDITIONING**

Subject Code : BTME601-18

M.Code : 79650

Date of Examination : 02-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) Explain how a refrigerant produces a cooling effect.
- b) What are the advantages of using a flash chamber in parallel with evaporator?
- c) Suggest some measures to improve the working of a vapor compression refrigeration system.
- d) What are various methods of leak detection in refrigeration system?
- e) What do you understand by the performance characteristics of refrigerant compressor?
- f) What is the basic principle of vapor absorption refrigeration system?
- g) What are human requirements of comforts?
- h) Atmospheric air temperature is 20°C and specific humidity is 9.5 gm/kg of dry air. Find the partial pressure of water vapour and specific humidity.
- i) Why wet compression is avoided?
- j) What is the importance of dielectric strength in selecting a proper refrigerant?



## SECTION - B

2. A vapor compression refrigeration machine with R – 12 as refrigerant has a capacity of 20 T of refrigeration operating between  $-28^{\circ}\text{C}$  and  $26^{\circ}\text{C}$ . The refrigerant is subcooled by  $4^{\circ}\text{C}$  before the throttle valve and superheated by  $5^{\circ}\text{C}$  before leaving the evaporator. Calculate the theoretical COP and power required.
3. “Compound compression with intercooling is effective method of operation”. Discuss.
4. Explain with a neat sketch, the working principle of thermostatic expansion valve. Discuss the factors that affect the capacity of the valve.
5. What are secondary refrigerants? Where these are used? Explain its importance in the context of big ice manufacturing plants.
6. Draw a neat diagram of the Lithium Bromide Water Absorption refrigeration system and explain its working.

## SECTION – C

7. Air flowing at the rate of  $90\text{m}^3/\text{min}$  at  $45^{\circ}\text{C}$  DBT and 60% RH is mixed with another stream flowing at the rate of  $20\text{m}^3/\text{min}$  at  $25^{\circ}\text{C}$  DBT and 40% RH. The mixture flows over a cooling coil whose ADP temperature is  $12^{\circ}\text{C}$  and bypass factor is 0.22. Find DBT and RH of air leaving the coil. If this air is supplied to an air conditioned room where DBT of  $25^{\circ}\text{C}$  and RH of 40% are maintained, estimate Room Sensible Heat Factor (SHR) and Cooling coil capacity in tons of refrigeration.
8. What are the thermodynamic advantages of sub-cooling the liquid refrigerant in the condenser? State different methods of sub-cooling and explain their relative merits and demerits.
9. Explain the following :
  - a) Two phased Carnot cycle and its limitations
  - b) Eco-friendly refrigerants



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



### SECTION-B

Time : 3 h

### INSTRUCTIONS

1. SECT each.
2. SECT have
3. SECT have

2. Discuss loading effect with respect to a measuring system.
3. What is sine bar? How it is used for angle measurement?
4. Explain the working principal of Resistive Potentiometer.
5. Discuss the major applications of pneumatic comparators.
6. Explain the working principle of piezo-electric transducer. What are its advantages and limitations?

### SECTION-C

7. a) Explain the following methods of quantifying surface roughness : (i) Rz value, (ii) RMS value, and (iii) Ra value.  
b) With the help of a neat sketch, describe the construction and working of a pneumatic measuring instrument.
8. a) What is temperature compensation in Strain Gauges? Why is it needed?  
b) Explain, with a neat sketch, determination of force using a load cell.
9. With the help of a neat sketch, explain the construction details of a tool maker's microscope. Briefly explain, surface illumination modes available in a tool maker's microscope. Discuss the important applications of a tool maker's microscope.

1. Write  
a) D  
b) H  
c) S  
d) L  
e) W  
f) W  
g) D  
h) W  
i) D  
j) S

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (ME) (Sem.-6)

**HEAT TRANSFER**

Subject Code : BTME-602

M.Code : 71186

Date of Examination : 05-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is **COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define heat transfer.
- b) How does heat transfer differs from thermodynamics?
- c) State Newton's law of cooling.
- d) List some good conductors of heat.
- e) What is the utility of extended surface?
- f) What is difference between Laminar flow and Turbulent flow?
- g) Define the Nusselt number.
- h) What is condensation and when does it occurs?
- i) Define absorptivity.
- j) State Kirchoff's law of radiation.





### SECTION-B

2. Discuss the different modes by which heat can be transferred. Give 5 suitable examples to illustrate your answer.
3. Explain why marble floor appears colder than cemented floor in winter though both are at the same temperature.
4. An iron ( $k = 65 \text{ W/mK}$ ) billet measuring  $20 \times 15 \times 80 \text{ cm}$  is exposed to a convective environment resulting in convection coefficient  $h = 11.5 \text{ W/m}^2\text{K}$ . Determine the Biot number and the suitability of a lumped analysis to represent the cooling rate if the billet is initially at  $100^\circ\text{C}$  and environment is at  $20^\circ\text{C}$ .
5. Define Reynolds number and mention its physical significance.
6. Define black, grey and real surface as applied to radiation heat transfer.

### SECTION-C

7. Write the Fourier rate equation for heat transfer by conduction. Give the units and physical significance of each term appearing in this equation. Why there is a negative sign in the Fourier's law of heat conduction?
8. Give a general equation for the rate of heat transfer by convection, and hence define the coefficient of heat transfer. List the various factors on which the value of coefficient depends.
9. Saturated steam at atmospheric pressure condenses on the outer surface of a vertical tube of length  $1 \text{ m}$  and outer diameter  $75 \text{ mm}$ . The tube wall is maintained at a uniform surface temperature of  $40^\circ\text{C}$  by the flow of cooling water inside the tube. Estimate the steam condensation rate and the heat transfer rate of the tube. What water flow rate will result in a  $5^\circ\text{C}$  temperature difference of water between outlet and inlet of pipe? Calculate the flow Reynolds number to check the assumption of laminar flow condition.

Roll No. \_\_\_\_\_  
Total No. \_\_\_\_\_

Time : 3 H

#### INSTRUCTIONS

1. SECTION-B and SECTION-C are compulsory.
2. SECTION-A have to be attempted in any order.
3. SECTION-C have to be attempted in any order.

1. Answer the following questions.

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)
- i)
- j)

**NOTE : Disclosure of identity by writing mobile number or making passing request on page of Answer sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech.(ME) (Sem.-6)  
**FLUID MACHINERY**  
Subject Code : BTME-603  
M.Code : 71187  
Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a) Define the terms Euler's head, and degree of reaction.
- b) What are the Guide blades in a Turbine?
- c) Differentiate between Kaplan and Propeller turbine?
- d) What is the function of a draft tube in a hydraulic turbine?
- e) Define specific speed of a pump.
- f) Define slip in relation to pumps?
- g) What is the need for priming of a pump?
- h) Define utility of Surge tank.
- i) Define Net Positive Suction Head (NPSH) and write its expression.
- j) Why Jet pumps have been phased out?



## SECTION-B

2. State "Impulse momentum equation", also, give its applications. Why the case of striking single moving vane is not feasible?
3. Derive an expression for efficiency and maximum efficiency of Pelton turbine.
4. Show from the first principles that work saved in a single-acting reciprocating pump fitting an air vessel is 84.8 per cent.
5. Derive expressions for model relationships in case of centrifugal pump.
6. With the help of neat diagram, explain the working principle of fluid coupling. Describe the slip and the efficiency of the fluid coupling.

## SECTION-C

7. The impeller of a centrifugal pump has an outer diameter of 25 cm and an effective area of  $170 \text{ cm}^2$ . The blades are backward curved and direction of relative velocity at outlet makes an angle of  $148^\circ$  with the direction of vane motion. The diameters of suction and delivery pipes are 15 cm and 10 cm, respectively. The pump delivers 1860 liter per second at 1450 r.p.m. The gauges attached at suction and delivery pipes close to the pump and outlet show heads of 4.6 m below and 18.0 m above atmospheric pressure respectively. The head losses in the suction and delivery pipes are 2.0 m and 2.5 m respectively. The motor driving the pump supplies 8.67 KW. Find the manometric efficiency assuming that water enters the pump without shock and whirl. Also, find overall efficiency of the pump.
8. A single acting reciprocating pump has a plunger diameter of 75 mm and stroke is 150 mm. It takes supply of water from a sump 3 m below the pump through a pipe 30 mm long and 40 mm diameter. It delivers water to a tank 12 m above the pump through a pipe 30 mm diameter and 15m long. If the separation takes place at  $75 \text{ KN/m}^2$  below atmospheric pressure, find the maximum speed at which the pump may be operated without separation, plunger operates with S.H.M.
9. A Francis Turbine supplied through a 6m penstock has the following particulars :  
Output Power = 63500KW; Flow =  $117 \text{ m}^3/\text{s}$ ; Speed = 150 r.p.m. Hydraulic efficiency = 92%, mean dia. of turbine at entry = 4m; mean blade height at entry = 0.5m; entry diameter of draft tube = 4.2m; velocity in tail race = 2.4m/s. The static pressure head in penstock measured just before entry to runner is 57.4m. The pressure measurement is 3m above level of tail race and flow leaves the runner without shock. Determine : (a) overall efficiency, (b) direction of flow relative to runner at entry, (c) pressure head at entry to draft tube.

**NOTE :** Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.

Roll No. \_\_\_\_\_  
Total No. of \_\_\_\_\_

Time : 3 Hr

### INSTRUCTION

1. SECTION-B questions are to be attempted each.
2. SECTION-C questions are to be attempted have to be attempted.
3. SECTION-D questions are to be attempted have to be attempted.

### 1. Write

a) W

b) V

c) V

d) V

e) V

f) V

g) V

h) V

i) V

j) V

Roll No. \_\_\_\_\_

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engg.) (Sem.-6)

**AUTOMOBILE ENGINEERING**

Subject Code : BTME603-18

M.Code : 79652

Date of Examination : 07-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) Which vehicle is better monocoque or ladder on frame? Justify your answer.
- b) Where and why, we use multiplate clutch?
- c) What do you mean by multi-point fuel injection system for a petrol engine?
- d) Why the differential is needed in automobile?
- e) Why a rich mixture is required for idling?
- f) 'Is differential compulsory part of transmission system'. Explain in brief.
- g) What are the different sources of automobile pollution?
- h) Make a list of important quantities to be measured during the testing of an engine.
- i) How Exhaust Gas Recirculation (EGR) helps in reducing pollution?
- j) What is knocking phenomenon of I.C. engines.



## SECTION-B

2. Why we use multi-cylinder engines instead of the big single-cylinder with the volume? Justify your answer by suitable engine parameter's discussion.
3. What are the main factors which affect the tendency to detonate? Describe them in suitable diagram.
4. What are the functions of exhaust system? Draw a neat sketch of exhaust system.
5. Explain the terms (a) Brake Power (b) Indicated Power (c) Specific Fuel consumption.
6. Discuss the weight transfer phenomenon indicating the force acting when brakes applied to a moving vehicle.

## SECTION-C

7. a) What do you understand from the 'breathing' of the fuel tank? How does it cause pollution?  
b) What are the advantage and drawbacks of the catalytic converter method compared to blowing of air only into the exhaust manifold?
8. Explain the multi-point fuel injection system for a petrol engine.
9. Explain the following :
  - a) Camber
  - b) Caster
  - c) Toe-in and Toe-out
  - d) King-pin inclination.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (ME) (Sem.-6)**  
**STATISTICAL AND NUMERICAL METHODS IN ENGINEERING**

Subject Code : BTME-604

M.Code : 71188

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define mean, median, mode and standard deviation.
- b) What do you mean by mutually exclusive events in Probability Theory? Also give an example of mutually exclusive events.
- c) What do you mean by sampling distribution.
- d) Discuss the concept of Relative Error in numerical computing by considering an example.
- e) Write the formula of Newton-Raphson method. When does it fail to perform?
- f) Evaluate  $\Delta(x^2 + \sin x)$ , where  $\Delta$  denotes the forward difference operator.
- g) Discuss the concept of Interpolation by considering an example.
- h) Write the formula of Simpson's 1/3-rule of numerical integration.
- i) State eigen value problem.
- j) What are the disadvantages of Taylor series method for solving first order initial value problems of ordinary differential equations?



**SECTION-B**

2. Find the missing frequency for the following distribution whose mean is 50 :

$x$	10	30	50	70	90
$f$	17	?	32	24	19

3. Define Poisson distribution. Also fit a Poisson distribution to the following data :

$x$	0	1	2	3	4
$f$	122	60	15	2	1

4. a) Find the positive root of  $x^3 = 2x + 5$  using method of false position.  
 b) Find the smallest positive root of  $x^2 - 5x + 1 = 0$  using bisection method.
5. A sample of 20 items has mean 42 units and standard deviation 5 units. Test hypothesis that it is a random sample from a normal population with mean 45 units.
6. Find the number of terms of the exponential series such that their sum gives the value  $e^x$  correct to six decimal places at  $x = 1$ .

### SECTION-C

7. a) Find the cubic polynomial which takes the following values :

$x$	0	1	2	3
$f(x)$	1	2	1	10

Hence evaluate  $f(4)$  and  $f(5)$ .

- b) i) What do you mean by permanence property of interpolating polynomials?  
 ii) Give two uses of interpolating polynomials. Discuss with examples.
8. a) Using Simpson's 1/3-rule, evaluate  $\int_0^1 x e^x dx$  taking four intervals. Compare results with its actual value. Also write a note on error in Simpson's 1/3-rule.  
 b) Determine the largest eigen value in magnitude and its corresponding eigen vector of the following matrix by using power method
- $$\begin{bmatrix} 6 & -1 & 0 \\ 1 & 40 & 1 \\ 0 & 1 & 6 \end{bmatrix}$$
9. a) Given that  $y' = x^3 + y$ ;  $y(0) = 2$ , compute  $y(0.2)$ ,  $y(0.4)$  using Runge-Kutta method of fourth order.  
 b) Solve  $u_{xx} + u_{yy} = 0$  over the square mesh of side four units satisfying the following boundary conditions
- $$u(0, y) = 0 \text{ for } 0 \leq y \leq 4, y(4, y) = 12 + y \text{ for } 0 \leq y \leq 4$$
- $$u(x, 0) = 3x \text{ for } 0 \leq x \leq 4, u(x, 4) = x^2 \text{ for } 0 \leq x \leq 4.$$

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No. \_\_\_\_\_

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engineering) (Sem.-6)  
**INTRODUCTION TO INDUSTRIAL MANAGEMENT**

Subject Code : BTME-604-18

M.Code : 79653

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

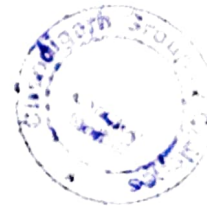
**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is **COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Discuss the relevance of Total Quality Management in today's competitive world.
- b) What is the Input-output model in the production system?
- c) Explain the effect of product design on manufacturing cost.
- d) What do you understand by the term-Breakeven analysis?
- e) Name different buying techniques used in the organization.
- f) Enumerate the importance of predictive maintenance.
- g) Enlist the different types of waste in manufacturing organizations?
- h) What is the JIT cause and effect chain?
- i) Define benchmarking and elaborate its concept.
- j) Name the different methods of data collection from of customers.





## SECTION-B

2. In today's highly competitive and fast-changing environment, how industrial engineering helps to increase industrial productivity? Justify your answer with suitable examples.
3. Can there be a product design for disassembling? Where could this concept be useful? Justify your answer for such a design.
4. Would purchasing in the service industry differ from purchasing in the manufacturing industry? Discuss with suitable examples.
5. Does benchmarking help a firm to be proactive? Explain your answer. Give one example of each of the different types of benchmarking.
6. Can total customer satisfaction be achieved while a company is also aiming for better business results? Is there a conflict between these two goals? Discuss.

## SECTION-C

7. a) *'Poor maintenance of plant and machinery leads to various losses in the industry'*. What are these losses? Discuss briefly.  
b) Discuss in detail the objectives and responsibilities of the plant maintenance department.
8. a) What is the function of safety stock or buffer stock? What are all the different uncertainties against which you would like to protect the inventory?  
b) What is the role of set-up times in-JIT? How should they be reduced? Discuss in detail.
9. Write a short note on **any two** of the following :
  - a) Concept of Production and Production function
  - b) Salient features of Total Quality Management
  - c) ABC Analysis.

**NOTE :** Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No.   
Total No. of Q

Time : 3 Hrs.

### INSTRUCTION

1. SECTION- each.
2. SECTION- have to at
3. SECTION- have to at

### 1. Answer

- a) What
- b) Enur  
Trad
- c) Wha
- d) Exp  
proc
- e) Exp
- f) Enu
- g) Wh
- h) Dis  
of c
- i) Exp
- j) Ex

1 | M 7125



## SECTION-B

2. Explain the classification of Non-Traditional Machining processes giving a neat sketch.
3. Describe the constructional details and material removal mechanism of ultrasonic machining process with the help of a neat sketch.
4. Explain principle of operation, elements and applications of electrochemical grinding process.
5. Explain the construction and working of water-shielded plasma arc machining process with the help of a neat sketch.
6. Explain the principle, working, applications and limitations of CO<sub>2</sub> Laser Beam Machining process giving a neat sketch.

## SECTION-C

7. a) With the help of a neat sketch, explain the elements of Abrasive Flow Machining setup, giving the mechanism of material removal in Abrasive Flow Machining process.  
b) Explain the elements of chemical machining process and discuss the mechanism of material removal giving a neat sketch.
8. Explain the mechanism of material removal in electro discharge machining process with the help of a neat sketch. Also, explain the process parameters involved in EDM process.
9. a) Discuss the advantages of this hybrid process over the individual processes which have been combined. Give the applications of the hybrid machining processes.  
b) Explain the construction and working of electron beam gun and diffusion pump used in electron beam machining process giving neat sketches.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (CE/CSE/ECE/ME) (Sem.-6)

# NON-CONVENTIONAL ENERGY RESOURCES

Subject Code : BTME-615-18

M.Code : 79660

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

## INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

1. Write briefly :

- a) What is bio mass? In what form bio mass can be used?
- b) What is the principle of wind energy conversion?
- c) What is difference between fuel cell and primary battery?
- d) What are the factors affecting the feasibility of a tidal power plant?
- e) What do you understand by energy chain?
- f) What do you understand by greenhouse effect?
- g) Explain :
  - i) extraterrestrial radiation
  - ii) solar constant.
- h) How classification of solar energy storage can be done?
  - i) What do you understand by solar still?
  - ii) What are advantages and disadvantages of waves as source of energy?



## SECTION-B

2. Explain the principle of working of a solar pond.
3. Explain the working of a molten carbonate fuel cell using appropriate diagram and write the various chemical reactions involved in this type of fuel cell.
4. Explain the working of single basin and double basin tidal systems.
5. Describe the construction and working of any one type of wave energy conversion machine.
6. Discuss various methods of production of hydrogen for use as an energy carrier.

## SECTION-C

7. How solar PV systems can be classified? With the help of block diagrams, explain the operations of stand-alone and grid interactive solar PV systems.
8. In a hilly geographical region in India, a huge quantity of biomass is available round the year, but this area is highly deficient in electricity supply. Suggest the ways in which the biomass energy can be converted into electrical energy and substantiate your answer with a suitable diagram.
9. Describe the working of a wind power system with a neat sketch, including its various components.





## SECTION-B

- 2) Define Human Resource Management along with scope and objectives of HRM.
- 3) Explain concept of Job description - Concepts and Methods.
- 4) What is the difference between training and development? Explain the future of Training & Development.
- 5) Explain the Process & Methods of collective bargaining.
- 6) Explain the concept of administration of welfare amenities.

## SECTION-C

- 7) Explain the elements & methods of Wage & Salary that contribute in performance appraisal of employee.
- 8) Explain the importance of psychological tests. What is the importance of placement and induction?
- 9) Explain the factors required for good human relation policy in industry.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.   
Total No. of Questions

**Time: 3 Hrs.**

### INSTRUCTION

1. SECTION-A each.
2. SECTION-B have to attempt.
3. SECTION-C have to attempt.

### 1. Answer the following questions

- a) What is the importance of Job description?
- b) Enumerate the traditional methods of Job description.
- c) What is the difference between Training and Development?
- d) Explain the importance of Training and Development.
- e) Explain the importance of Training and Development.
- f) Enumerate the traditional methods of Job description.
- g) What is the importance of Job description?
- h) Define Job description.
- i) Explain the importance of Job description.
- j) Explain the importance of Job description.

1 | 10 - 712

Roll No. \_\_\_\_\_

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech.(ME) (Sem.-6)**  
**NON-TRADITIONAL MACHINING**

Subject Code : DE/ME-2.0

M.Code : 71252

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly :

- a) What is the need for Non Traditional Machining Processes?
- b) Enumerate the advantages of conventional machining process over the Non Traditional Machining Processes.
- c) What is computer-integrated manufacturing System?
- d) Explain the functions of intensifier and accumulator used in Water Jet Machining process.
- e) Explain the criteria for selection of media in Abrasive Flow Machining process.
- f) Enumerate the applications of water jet machining process.
- g) What are the gases commonly used in Laser?
- h) Discuss the effect of initial gap between tool and work piece on the process efficiency of electrochemical machining process.
- i) Explain the effect of the method of flushing of dielectric in EDM process.
- j) Explain the working principle of photo-chemical machining process.





## SECTION-B

2. Explain the classification of Non-Traditional Machining processes giving a neat sketch.
3. Describe the constructional details and material removal mechanism of ultrasonic machining process with the help of a neat sketch.
4. Explain principle of operation, elements and applications of electrochemical grinding process.
5. Explain the construction and working of water-shielded plasma arc machining process with the help of a neat sketch.
6. Explain the principle, working, applications and limitations of CO<sub>2</sub> Laser Beam Machining process giving a neat sketch.

## SECTION-C

7. a) With the help of a neat sketch, explain the elements of Abrasive Flow Machining setup, giving the mechanism of material removal in Abrasive Flow Machining process.  
b) Explain the elements of chemical machining process and discuss the mechanism of material removal giving a neat sketch.
8. Explain the mechanism of material removal in electro discharge machining process with the help of a neat sketch. Also, explain the process parameters involved in EDM process.
9. a) Discuss the advantages of this hybrid process over the individual processes which have been combined. Give the applications of the hybrid machining processes.  
b) Explain the construction and working of electron beam gun and diffusion pump used in electron beam machining process giving neat sketches.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

21M 71252

(52) - 1089

Roll No.

Total No. of Questions : 09

**INDUSTRIAL ENGINEERING**

B.Tech.(ME)  
Subject Code  
M.Code

Date of Examination

Total No. of Pages : 02

**MANAGEMENT**

22

Time : 3 Hrs.

Max. Marks : 60



- INSTRUCTION TO CANDIDATES :**
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
  2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
  3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.--

**SECTION-A**

1. Answer briefly:
  - (a) Distinguish between production and productivity.
  - (b) List various principles of management.
  - (c) Identify the characteristics of an organization.
  - (d) Write down the various principles of control.
  - (e) Enlist various factors affecting plant location.
  - (f) List down the various reasons of low productivity.
  - (g) What is string diagram?
  - (h) Enlist various applications of value engineering.
  - (i) What do you mean by the term span of control?
  - (j) What is SIMO chart?

**SECTION-B**

2. Explain in detail the different functions of industrial engineering department in an industry.
3. What are the functions of management? Discuss Douglas Mc-Gregor's Theory X and Theory Y.
4. Discuss the concept of delegation of authority in context to designing of organization structure.
5. Briefly describe the basic elements of control process along with different principles of control.
6. Define the term method study. What are its objectives? Discuss step by step procedure for method study.
7. What is plant layout? Discuss product and process type plant layout with their merits, demerits and applications.
8. What is work measurement? What are its objectives? Enlist the different techniques of work measurement. Explain in detail any two work measurement techniques.
9. Write short notes on the following:
  - a) Types of values.
  - b) Maslow's hierarchy of human needs.

**SECTION-C**

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (ME) (Sem.-7)  
**HUMAN RESOURCE MANAGEMENT**  
Subject Code : HU-252/HU251/DE13/ME-25  
M.Code : 54067  
Date of Examination 13-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

**SECTION-A**



1) Answer briefly :

- a) Define HRM
- b) What is coaching?
- c) What is Job Description?
- d) What is contract labor?
- e) What is bargaining?
- f) Define motivation.
- g) What is employee grievance?
- h) What are Fringe Benefits?
- i) What is labor turnover?
- j) Define absenteeism.

(S2)-1161

### SECTION-B

- 2) Define Human Resource Management along with scope and objectives of HRM.
- 3) Explain concept of Job description - Concepts and Methods.
- 4) What is the difference between training and development? Explain the future of Training & Development.
- 5) Explain the Process & Methods of collective bargaining.
- 6) Explain the concept of administration of welfare amenities.

### SECTION-C

- 7) Explain the elements & methods of Wage & Salary that contribute in performance appraisal of employee.
- 8) Explain the importance of psychological tests. What is the importance of placement and induction?
- 9) Explain the factors required for good human relation policy in industry.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engg.) (Sem.-7)

**COMPOSITE MATERIALS**

Subject Code : BTME-612-18

M.Code : 90480

Date of Examination : 14-07-22

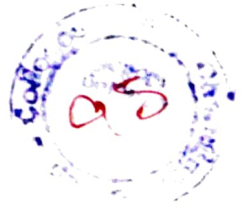
Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



1. Write briefly :

- a) Define "Composite Materials".
- b) Give application of glass fibers.
- c) Give the effect of high temperature exposure on the strength of ceramic fibers.
- d) What is wettability?
- e) Give the mechanical properties of polymer matrix composites.
- f) Enlist various types of metal matrix properties.
- g) What are different applications of carbon matrix composites?
- h) What do you understand by flux pinning?
- i) Give ablative properties of carbon matrix composites.
- j) What is magnetic resonance imaging?

## SECTION-B

2. Compare ceramic fibers and carbon fibers in terms of properties and applications.
3. Differentiate between thermoplastics and thermosets by giving suitable examples.
4. Discuss the high-pressure processing of carbon matrix composites.
5. Give an overview of different processes for the production of metal matrix composites.
6. Elaborate the processing of A15 superconductors.

## SECTION-C

7. Explain the vacuum bag molding technique for fabricating polymer matrix composites with a neat sketch.
8. Discuss cold pressing and sintering technique for the manufacturing of ceramic composites.
9. Explain the test used for the measurement of following properties of composites :
  - a) Interfacial strength
  - b) Flexural strength.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engg.) (Sem.-7)

**NON-DESTRUCTIVE TESTING**

Subject Code : DE/ME-2.4

M.Code : 72010

Date of Examination : 08-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write a short note on following :**

- a) Explain the various applications of NDT.
- b) What are the safety measures to be carried out during radiography testing?
- c) Explain about different types of screens used in radiography testing.
- d) Explain the various steps in penetrant testing.
- e) List the desirable properties required for a good penetrant used in LP1.
- f) What are the characteristics of ultrasonic waves?
- g) Explain fill factor and lift-off effect in eddy current testing.
- h) Explain the working principle of concrete test hammer.
- i) What are the three methods of testing hardness?
- j) Enumerate the NDT methods for the detection of defects in Ceramics.

## SECTION-B

2. With the help of suitable examples, differentiate between destructive and non-destructive testing techniques. List the advantages and disadvantages also.
3. What are the characteristics of radiography testing? Write short note on X-ray generation with neat sketch in Radiographic Testing.
4. Differentiate between direct and indirect methods of magnetization. Explain the advantages and disadvantages of both methods.
5. Explain about Eddy Current Testing (ECT) technique in detail giving a neat sketch. List the advantages and disadvantages of the process.
6. What is the theory of photoelasticity? Explain the procedure of Stress Analysis by the PhotoStress method.

## SECTION-C

7.
  - a) Explain visual inspection process. Also explain about the different types of optical aids used in the process.
  - b) State the principle of leak and pressure testing and explain it in detail.
8. With the help of neat figures, differentiate between through transmission technique and pulse echo testing techniques used in ultrasonic testing.
9.
  - a) Explain the NDT methods for detection of defects in Plastics.
  - b) Which method is best for insitu inspection of a Pipe line of a refinery? Why?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (ME) (Sem.-7/8)  
**MAINTENANCE AND RELIABILITY**

Subject Code : BTME 617-18

M.Code : 90485

Date of Examination : 16-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

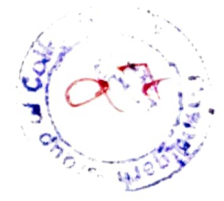
1. Write briefly :

- a) Discuss the advantages and disadvantages of breakdown maintenance.
- b) Explain briefly, Cost of equipment v/s cost of replacement.
- c) Define maintenance scheduling.
- d) Enumerate maintenance costs and its classification.
- e) How Maintenance Record keeping is different from Inventory record keeping?
- f) Briefly explain: Reliability and Availability.
- g) What are the benefits of Reliability estimation?
- h) What is maintainability and how the maintainability is improved?
- i) Differentiate between MTBF and MTTF?
- j) How spare parts management is important to ensure system reliability?

**SECTION-B**

2. What are different maintenance techniques? Discuss the objective of maintenance and its important functions.

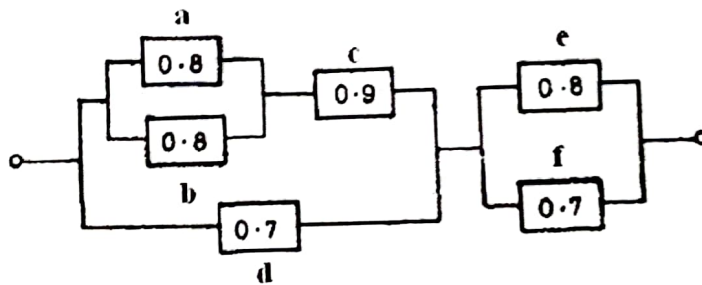
B. Tech 8  
Questions CM



3. What is meant by maintenance work planning? Make a flow chart for emergency work and explain.
4. What is Total Productive Maintenance? Explain prerequisite for implementing TPM in any organization.
5. What impact Reliability and Maintainability would have on availability? Explain.
6. What is Redundant? How element redundancy is better? Discuss.

### SECTION-C

7. What do you understand by diagnostic maintenance? How predictive Maintenance is different from preventive maintenance? Explain with examples.
8. Define the concept of Failure Tree Analysis (FTA). Explain the key elements and steps involved in FTA. State some applications/uses of FTA.
9. a) Find the system reliability. The components reliabilities are given as shown below:



- b) How reliability can be incorporated in the design of equipment/system? Explain?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09  
B.Tech. (Mechanical Engg.) (Sem. 7, 8)  
**MECHANICAL VIBRATIONS**  
Subject Code : BTME-701-18  
M.Code : 90474  
Date of Examination : 01-07-22

Time : 3 Hrs.

Max. Marks : 60



**INSTRUCTIONS TO CANDIDATES :**

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- If the motion of a particle is represented by  $x = A \sin(\omega t) + B \sin(2\omega t)$ ; determine its velocity at time,  $t = 0.125s$ , given:  $A = (\sqrt{2})/\pi$  m,  $B = 4/\pi$  m and  $\omega = 2\pi$  rad/s.
- The analog channel of a microcontroller can record data samples at a frequency of 200 kHz. Calculate, the number of samples (2k) that will be recorded per cycle of a 4 kHz periodic signal.
- Given  $x_1 = 5 \sin(10t)$  and  $x_2 = 5 \sin(10t + \pi/2)$ ; determine analytically the phase-angle  $\beta$  of the resultant, XR with the first SHM  $x_1$
- For a vehicle of mass 1000 kg, determine the critical damping coefficient,  $c_c$  of the suspension system, if it undergoes static deflection of 98mm under its dead weight.
- The natural frequency of a 1DOF system is 20 rad/s, which drops to 19.6 rad/s upon adding a viscous dashpot. Determine the damping ratio.
- Determine the damped natural frequency ( $\omega_d$ ) of a system having undamped natural frequency ( $\omega_n$ ) of 10 rad/s and damping ratio,  $\zeta = 0.6$ .
- Determine the peak amplitude frequency ( $\omega_p$ ) of a system having undamped natural frequency ( $\omega_n$ ) of 10 rad/s and damping ratio,  $\zeta = 0.6$ .

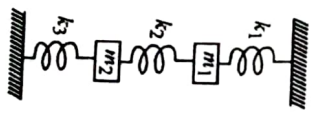
1 | M-90474

(52)-37

**SECTION -B**

- A system comprises of two masses  $m_1$  and  $m_2$ . Mass  $m_1$  is attached to a support towards its left with the help of a string having stiffness K. The mass  $m_2$  is attached to the mass  $m_1$  by means of another spring of stiffness 2K. Determine the four influence coefficients of the system.
- Determine the critical speed of a vertical shaft of stiffness  $k = 5000N/m$ , if it is carrying a disc of mass  $m = 0.5$  kg at its mid-point.

- Determine the magnitude ( $X_k$ ) of the resultant of the following two vectors, which represent two harmonic motions:  
 $x_1 = 3 \sin 20 t$  and  $x_2 = 4 \sin (20 t + \pi/2)$
- A mass,  $m = 10$  kg is supported on a suspension of stiffness,  $k = 1$  EN/m and damping coefficient,  $c = 40$  N/m/s. If the mass is given an initial displacement,  $X_0 = 25$ mm, determine the residual amplitude ( $X_2$ ) of free damped oscillations after two complete cycles.
- Determine actual displacement, Y of a machine operating at 2400 rpm, if a vibrometer having natural frequency,  $\omega_n = 4$ Hz placed on the machine shows a relative displacement,  $Z = 0.2$ mm. Assume damping ratio,  $\zeta = 0$  for vibrometer.
- For the 2DOF spring-mass system shown in figure constrained at both ends, the two springs at the lower and upper ends have a stiffness of  $k_1 = 2000$  N/m, while the spring in the middle has a stiffness of  $k_2 = 5000$ N/m. If  $m_1 = m_2 = 2$ kg, determine the natural frequencies of the system. Also draw the corresponding mode-shapes if the masses are farthest apart at time  $t = 0$ .



2 | M-90474

(52)-37

on any (52) 1411

Roll No  
Total N

Time : 3

INSTRUC

1. SECT each.
2. SECT have t
3. SECT have t

1. Write br

a) How

b) Defini

c) Defini

d) What

6. A cantilever steel shaft having diameter 2cm carries two masses. The first mass weighs 10kg and is at a distance of 20cm from the support, while the second mass weighs 5kg and is mounted at the free end, which is at a distance of 30cm from the support. Obtain an estimate of first natural frequency of the system, given  $E = 200 \text{ GPa}$  for steel.

### SECTION - C

7. Using analytical method, determine the Fourier harmonics for the periodic function, given by:  $f(t) = 20t$  for  $0 \leq t \leq 0.1$
8. The barrel of an artillery gun weighs 400kg. When it fires a shell weighing 0.5kg with a velocity of 1000 m/s, the barrel recoils by 20cm against a recoil spring. A viscous dashpot gets engaged at the end of the recoil stroke. Determine the damping coefficient of dashpot, if a damping factor of 1.2 is to be maintained. Neglecting preload of the recoil spring, determine the time taken by the barrel to return back to within 1 cm of the equilibrium position.
9. Derive the general solution for vibration of a stretched string for small amplitude of oscillation, so that the change in tension can be neglected. Assume a uniform distribution of mass ( $\rho$ ) per unit length of the string.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech.(ME) (Sem.-7,8)  
**REFRIGERATION AND AIR CONDITIONING**

Subject Code : BTME-802

M.Code : 71995

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**



**1. Write briefly/Fill in the blank :**

- a) How air conditioning different from refrigeration?
- b) Define Ton of refrigeration.
- c) Define the term contact factor as used for cooling coils.
- d) What do you understand by comfort air conditioning?
- e) Write the advantages of cooling towers used in Refrigeration Industry.
- f) What role is being played by wet bulb temperature in air-conditioning?
- g) Why a throttle valve is used in vapour compression refrigerator rather than an expansion cylinder to reduce pressure between the condenser and evaporator?
- h) Differentiate between split A.C system and window A.C system.
- i) 1.5 kW per ton of refrigeration is required to maintain the temperature of  $-40^{\circ}\text{C}$  in the refrigerator if the refrigeration cycle works on Carnot cycle. Find the COP and temperature of surroundings.
- j) The effective temperature depends on .....

## SECTION-B

2. The capacity of a refrigerator is 200 TR when working between  $-6^{\circ}\text{C}$  and  $25^{\circ}\text{C}$ . Determine the mass of ice produced per day from water at  $25^{\circ}\text{C}$ . Also, find the power required to drive the unit. Assume that the cycle operates on reversed Carnot cycle and latent heat of ice is  $335 \text{ kJ/kg}$ .
3. Describe the mechanism of a simple vapour compression refrigeration system.
4. List out the advantages of vapour refrigeration system over air refrigeration system.
5. a) What are the desirable properties of an ideal refrigerant?  
b) Name the different refrigerants generally used.
6. Atmospheric air at  $16^{\circ}\text{C}$  DBT and 25% RH passes through a furnace and then through a humidifier in such a way that the final DBT is  $30^{\circ}\text{C}$  and RH 50%. Determine :  
a) Heat and moisture added to air.  
b) Sensible heat factor of the process

## SECTION-C

7. An air craft is flying at a speed of 1000 km/h. The ambient temperature and pressure are  $-15^{\circ}\text{C}$  and 0.35 bar respectively. The compressor, turbine, and ram efficiencies are 0.8, 0.85 and 0.85 respectively. The pressure ratio of compressor is 5.0. The heat exchanger effectiveness is 0.8 and the pressure drop in the heat exchanger is 0.1 bar. The cabin pressure is 1.06 bar and the air leaves the cabin at  $25^{\circ}\text{C}$ . Assuming simple aircraft air conditioning cycle, find the temperature and pressure at various state points, COP, mass flow rate, ram work, compressor work and turbine work.
8. Which factors influence human comfort? Explain these factors.
9. Which equipments are used in refrigeration system? Briefly explain their classification and working.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Differentiate between rigid and flexible automation with suitable example.
3. Write the procedure for the selection of various components of an automated system.
4. Explain the construction and principle of operation of sensors.
5. Discuss the indexing mechanism with suitable example.
6. Explain the automated material handling system with suitable example.

## SECTION-C

7. What are the different components of manufacturing system? Explain each.
8. Write the use of microprocessor and discuss their configuration and working.
9. Write **short notes** on the following :
  - a) Automation strategies.
  - b) Computer simulation of automated flow lines.
  - c) Carousel storage systems.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request page of Answer Sheet will lead to UMC against the Student.**



Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engg.) (Sem.-7,8)  
**FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS**

Subject Code : BTME-703-18

M.Code : 90476

Date of Examination : 06-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. Define Management.
- b. Enumerate some qualities or features of management process.
- c. Define Plant Layout.
- d. Define six sigma.
- e. What is marketing and what is its Purpose?
- f. What is the need for conducting work analysis?
- g. What is the difference between time study and work sampling?
- h. Explain Predetermined Motion Time System.
- i. What are the various types of values?
- j. Enumerate the objectives of personnel management.



request on any  
nt.

2. 'Management is a System of Authority.' Elaborate.
3. Explain the salient features and applications of the different types of marketing strategies.
4. Explain the principle of motion economy.
5. What are the reasons for low productivity?
6. Explain the steps involved in conducting value engineering studies explaining various phases involved.

**SECTION-C**

7.
  - a. Discuss various levels of management and their functions.
  - b. Define Total Quality Management. Explain Malcolm Baldrige Criteria for Performance Excellence Model of TQM.
8.
  - a. What is market segmentation and why is it important? Explain different types of market segmentation.
  - b. Explain the block diagram representing Time Study procedure? How are allowances calculated in time study?
9.
  - a. Why is employee training necessary? What are the different types of training programmes for employees? Explain.
  - b. Explain the criteria for recruitment and selection of employees.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



## SECTION-B

2. Show that two simple harmonic motions with frequency  $p$  and  $2p$  when added will result in a periodic function of frequency  $p$ .
3. A simple pendulum of length  $L$ , bob mass  $m$ , and rod mass  $M$ , is vibrating in the vertical plane. Calculate the frequency of free vibration.
4. What are forced vibrations? Derive an expression for amplitude and phase difference for a system subjected to harmonic excitation  $F_0 \sin \omega t$ .
5. Prove that logarithmic decrement is given by:

$$\delta = \frac{2\pi\xi}{\sqrt{1-\xi^2}}$$

6. Draw a neat sketch of centrifugal pendulum absorber and explain its working.

## SECTION-C

7. Derive frequency equation for a beam with both ends free and having transverse vibrations.
8. Explain matrix iteration method by taking suitable example of three masses connected by spring in series.
9. Explain following:
  - (a) Accelerometers
  - (b) Stodola method

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.**

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engg.) (Sem.-7)

**COMPOSITE MATERIALS**

Subject Code : BTME-612-18

M.Code : 90480

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Define "Composite Materials".
- b) Give application of glass fibers.
- c) Give the effect of high temperature exposure on the strength of ceramic fibers.
- d) What is wettability?
- e) Give the mechanical properties of polymer matrix composites.
- f) Enlist various types of metal matrix properties.
- g) What are different applications of carbon matrix composites?
- h) What do you understand by flux pinning?
- i) Give ablative properties of carbon matrix composites.
- j) What is magnetic resonance imaging?



## SECTION-B

2. Compare ceramic fibers and carbon fibers in terms of properties and applications.
3. Differentiate between thermoplastics and thermosets by giving suitable examples.
4. Discuss the high-pressure processing of carbon matrix composites.
5. Give an overview of different processes for the production of metal matrix composites.
6. Elaborate the processing of A15 superconductors.

## SECTION-C

7. Explain the vacuum bag molding technique for fabricating polymer matrix composites with a neat sketch.
8. Discuss cold pressing and sintering technique for the manufacturing of ceramic composites.
9. Explain the test used for the measurement of following properties of composites :
  - a) Interfacial strength
  - b) Flexural strength.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**



### SECTION-B

2. Explain in detail the different functions of industrial engineering department in an industry.
3. What are the functions of management? Discuss Douglas Mc-Gregor's Theory X and Theory Y.
4. Discuss the concept of delegation of authority in context to designing of organization structure.
5. Briefly describe the basic elements of control process along with different principles of control.
6. Define the term method study. What are its objectives? Discuss step by step procedure for method study.

### SECTION-C

7. What is plant layout? Discuss product and process type plant layout with their merits, demerits and applications.
8. What is work measurement? What are its objectives? Enlist the different techniques of work measurement. Explain in detail any two work measurement techniques.
9. Write short notes on the following:
  - a) Types of values.
  - b) Maslow's hierarchy of human needs.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student..**





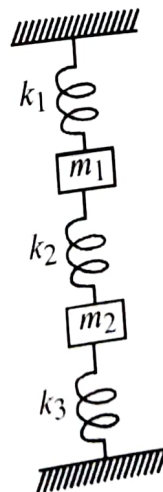
- h) For a displacement measuring instrument operating above its natural frequency, giving reference to the relationship, state if the indicated relative amplitude would be less than or greater than the absolute amplitude of vibrations.
- i) A system comprises of two masses  $m_1$  and  $m_2$ . Mass  $m_1$  is attached to a support towards its left with the help of a string having stiffness  $K$ . The mass  $m_2$  is attached to the mass  $m_1$  by means of another spring of stiffness  $2K$ . Determine the four influence coefficients of the system.
- j) Determine the critical speed of a vertical shaft of stiffness  $k = 5000\text{N/m}$ , if it is carrying a disc of mass  $m = 0.5\text{ kg}$  at its mid-point.

### SECTION -B

2. Determine the magnitude ( $X_R$ ) of the resultant of the following two vectors, which represent two harmonic motions:

$$x_1 = 3 \sin 20 t \quad \text{and} \quad x_2 = 4 \sin (20 t + \pi/2)$$

3. A mass,  $m = 10\text{ kg}$  is supported on a suspension of stiffness,  $k = 1\text{ kN/m}$  and damping coefficient,  $c = 40\text{ N/m/s}$ . If the mass is given an initial displacement,  $X_0 = 25\text{mm}$ , determine the residual amplitude ( $X_2$ ) of free damped oscillations after two complete cycles.
4. Determine actual displacement,  $Y$  of a machine operating at  $2400\text{ rpm}$ , if a vibrometer having natural frequency,  $\omega_n = 4\text{Hz}$  placed on the machine shows a relative displacement,  $Z = 0.2\text{mm}$ . Assume damping ratio,  $\zeta = 0$  for vibrometer.
5. For the 2DoF spring-mass system shown in figure constrained at both ends, the two springs at the lower and upper ends have a stiffness of  $k_1 = 2000\text{ N/m}$ , while the spring in the middle has a stiffness of  $k_2 = 5000\text{N/m}$ . If  $m_1 = m_2 = 2\text{kg}$ , determine the natural frequencies of the system. Also draw the corresponding mode-shapes if the masses are farthest apart at time  $t = 0$ .



6. A cantilever steel shaft having diameter 2cm carries two masses. The first mass weighs 10kg and is at a distance of 20cm from the support, while the second mass weighs 5kg and is mounted at the free end, which is at a distance of 30cm from the support. Obtain an estimate of first natural frequency of the system, given  $E = 200 \text{ GPa}$  for steel.

### SECTION - C

7. Using analytical method, determine the Fourier harmonics for the periodic function, given by:  $f(t) = 20t$  for  $0 \leq t \leq 0.1$
8. The barrel of an artillery gun weighs 400kg. When it fires a shell weighing 0.5kg with a velocity of 1000 m/s, the barrel recoils by 20cm against a recoil spring. A viscous dashpot gets engaged at the end of the recoil stroke. Determine the damping coefficient of dashpot, if a damping factor of 1.2 is to be maintained. Neglecting preload of the recoil spring, determine the time taken by the barrel to return back to within 1 cm of the equilibrium position.
9. Derive the general solution for vibration of a stretched string for small amplitude of oscillation, so that the change in tension can be neglected. Assume a uniform distribution of mass ( $\rho$ ) per unit length of the string.



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

Roll No. \_\_\_\_\_

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (Mechanical Engg.) (Sem.-7,8)

**AUTOMATION IN MANUFACTURING**

Subject Code : BTME-702-18

M.Code : 90475

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a. Define Automation.
- b. What is the role of machining centers?
- c. What is the use of design data books?
- d. Write the basic principle of automated system.
- e. Define signal conditioning.
- f. List the different types of electrical drives.
- g. State the operating principle of electrical drives.
- h. Write the application of ball screw.
- i. Mention the different types of valves.
- j. What is the use of tool magazines?



- SEC
2. Differentiate between rigid and flexible automation with suitable example.
  3. Write the procedure for the selection of various components of an automated system.
  4. Explain the construction and principle of operation of sensors.
  5. Discuss the indexing mechanism with suitable example.
  6. Explain the automated material handling system with suitable example.

### SECTION-C

7. What are the different components of manufacturing system? Explain each.
8. Write the use of microprocessor and discuss their configuration and working.
9. Write **short notes** on the following :
  - a) Automation strategies.
  - b) Computer simulation of automated flow lines.
  - c) Carousel storage systems.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request**  
page of Answer Sheet will lead to UMC against the Student.



## SECTION-B

2. The capacity of a refrigerator is 200 TR when working between  $-6^{\circ}\text{C}$  and  $25^{\circ}\text{C}$ . Determine the mass of ice produced per day from water at  $25^{\circ}\text{C}$ . Also, find the power required to drive the unit. Assume that the cycle operates on reversed Carnot cycle. Latent heat of ice is  $335 \text{ kJ/kg}$ .
3. Describe the mechanism of a simple vapour compression refrigeration system.
4. List out the advantages of vapour refrigeration system over air refrigeration system.
5.
  - a) What are the desirable properties of an ideal refrigerant?
  - b) Name the different refrigerants generally used.
6. Atmospheric air at  $16^{\circ}\text{C}$  DBT and 25% RH passes through a furnace and then through a humidifier in such a way that the final DBT is  $30^{\circ}\text{C}$  and RH 50%. Determine :
  - a) Heat and moisture added to air.
  - b) Sensible heat factor of the process

## SECTION-C

7. An air craft is flying at a speed of 1000 km/h. The ambient temperature and pressure are  $-15^{\circ}\text{C}$  and 0.35 bar respectively. The compressor, turbine, and ram efficiencies are 0.85 and 0.85 respectively. The pressure ratio of compressor is 5.0. The heat exchanger effectiveness is 0.8 and the pressure drop in the heat exchanger is 0.1 bar. The cabin pressure is 1.06 bar and the air leaves the cabin at  $25^{\circ}\text{C}$ . Assuming simple aircraft conditioning cycle, find the temperature and pressure at various state points, COP, mass flow rate, ram work, compressor work and turbine work.
8. Which factors influence human comfort? Explain these factors.
9. Which equipments are used in refrigeration system? Briefly explain their classification and working.

NOTE : Disclosure of Identity by writing M  
page of Answer

2 | M Code 710

Roll No  
Total

Time

INSTR

1. S
- e
2. S
- h
3. S
- h

1.

2.

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (ME) (Sem.-7/8)  
**MAINTENANCE AND RELIABILITY**

Subject Code : BTME 617-18

M.Code : 90485

Date of Examination : 16-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) Discuss the advantages and disadvantages of breakdown maintenance.
- b) Explain briefly, Cost of equipment v/s cost of replacement.
- c) Define maintenance scheduling.
- d) Enumerate maintenance costs and its classification.
- e) How Maintenance Record keeping is different from Inventory record keeping?
- f) Briefly explain: Reliability and Availability.
- g) What are the benefits of Reliability estimation?
- h) What is maintainability and how the maintainability is improved?
- i) Differentiate between MTBF and MTTF?
- j) How spare parts management is important to ensure system reliability?

**SECTION-B**

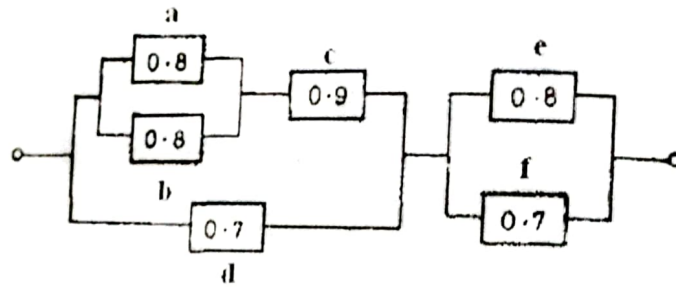
2. What are different maintenance techniques? Discuss the objective of maintenance and its important functions.



3. What is meant by maintenance work planning? Make a flow chart for emergency and explain.
4. What is Total Productive Maintenance? Explain prerequisite for implementing in any organization.
5. What impact Reliability and Maintainability would have on availability? Explain.
6. What is Redundant? How element redundancy is better? Discuss.

### SECTION-C

7. What do you understand by diagnostic maintenance? How predictive Maintenance different from preventive maintenance? Explain with examples.
8. Define the concept of Failure Tree Analysis (FTA). Explain the key elements and involved in FTA. State some applications/uses of FTA.
9. a) Find the system reliability. The components reliabilities are given as shown below.



- b) How reliability can be incorporated in the design of equipment/system? Explain?

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**