

June 2023

Roll No.

Total No. of

Questions : 09

B.Tech. (AI&ML)/ (AI) and Data Science/ (CSE)/ (Data Science) (Sem-3)
(Internet of Things and Cyber Security including Block Chain
Technology) (Sem-3)

DEVELOPMENT OF SOCIETIES

Subject Code : HSMC101-18

M.Code : 76439

Date of Examination : 24-06-2023

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 Clan system?
- b) Who explored Social System?
- c) To what extent is an individual shaped by a society?
- d) Give two major views about Social structure.
- e) Describe main ideas of political systems.
- f) Nature of Governing system.
- g) What are Socialism's essential features?
- h) Throw light on the concept of development in Pre-British Time.
- i) Examine idea of development in current context.
- j) Define Swaraj.



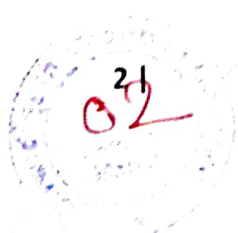
SECTION-B

2. Throw light on the role of family in a society.
3. What is Human being in a society?
4. Examine importance of political system in history.
5. Describe main features of Capitalism.
6. Critically examine Gandhian approach to Decentralized planning.

SECTION-C

7. Write a detailed note on the four concepts of origin of society.
8. Critically examine the best practices of Governing system.
9. Discuss in detail about the relevance of Gandhian model of development.

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SECTION-B

2. Give the algorithm of Tower of Hanoi problem with n disks. Derive the total number of moves in this problem.
3. The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \bmod 10$ and linear probing. What is the resultant hash table (also show intermediate tables)?
4. Write algorithms to insert and delete an element from array implementation of circular queue.
5. Illustrate execution of quick-sort (in increasing order) in the sequence

44 33 11 55 77 90 40 60 99 22 88

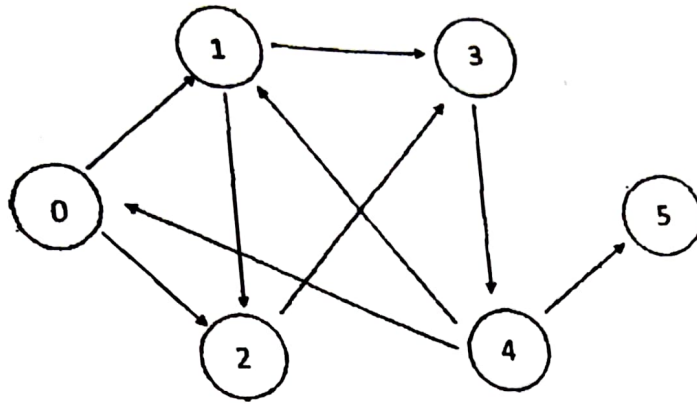
6. Find the time complexity of the following code and mention it in Big O

```
int fun(int n)
{
    int count = 0;
    for (int i = n; i > 0; i /= 2)
        for (int j = 0; j < i; j++)
            for (int k = 0; k < j; k++)
                count += 1;
    return count;
}
```

SECTION-C

7. Write an algorithm to delete all the occurrences of an element say 'n' from given linear linked list.
8. Define B tree. Draw the B tree of order 5 of the following data :
92, 24, 6, 7, 11, 8, 22, 4, 5, 16, 19, 20, 78

9. What is DFS and BFS traversal of graph? Give the DFS and BFS traversal (starting with node 0) of graph. Show all intermediate steps



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Roll No.

Total No. of Pages : 02

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B.Tech. (AI&ML / AI&ML and Data Science / CSE / Cyber Security / IOT /
Data Science / Internet of Things and Cyber Security including Block
Chain Technology) (Sem-3)

MATHEMATICS-III

Subject Code : BTAM304-18

M.Code : 76438

Date of Examination : 01-06-2023

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) Examine for saddle points $f(x,y) = xy$.
- b) Change order of integration for $\int_{y=0}^1 \int_{x=y^2}^{\sqrt{y}} f(x,y) dx dy$.
- c) Prove that convergent sequence has a unique limit.
- d) Discuss convergence of $\sum \frac{2n^2 - 2}{2^n + 1}$.
- e) State Cauchy integral test.
- f) Prove that if $M(x,y)dx + N(x,y)dy = 0$ is exact then $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$.
- g) Define Bernoulli's equation.
- h) Solve $(D^3 + D)y = 0$.



i) Define Legendre's differential equation

j) Solve $(x-1)^2 y'' - (x-1)y' + y = 0$.

SECTION-B

2. If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, show that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}\right)^2 u = -9(x+y+z)^{-2}$.

3. Test for convergence the series $\sum \frac{n!}{(n+1)^n} x^n$.

4. Discuss uniform convergence of $\sum \frac{a^n x^n}{n^2 + 1}$.

5. Solve $(xy^3 + y)dx + 2(x^2y^2 + x + y^4)dy = 0$.

6. Using the method of variation of parameters, solve $\frac{d^2 y}{dx^2} + y = \tan x$.

SECTION-C

7. Find the volume bounded by the paraboloid $x^2 + y^2 = az$, the cylinder $x^2 + y^2 = 2ay$ and the plane $z = 0$.

8. Solve $\frac{dy}{dx} - \frac{dx}{dy} = \frac{x}{y} - \frac{y}{x}$.

9. Solve $\frac{d^2 y}{dx^2} + \frac{1}{x} \frac{dy}{dx} = 12 \frac{\log x}{x^2}$.

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B.Tech. (Artificial Intelligence & Machine Learning / Artificial Intelligence (AI) and Data Science/CSE/(CSE) (Artificial Intelligence & Machine Learning)/(CSE) (Data Science)/(CSE) (IOT)/(Data Science)/CSE (Internet of Things and Cyber Security including Block Chain Technology)) (Sem-3)

OBJECT ORIENTED PROGRAMMING

Subject Code : BTCS-302-18

M.Code : 76437

Date of Examination : 03-06-2023

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 input and output statements in C++?
- b) Define function overloading.
- c) How an external function is made friend of a class?
- d) What do you mean by parameter passing by reference?
- e) Differentiate between private and protected keywords?
- f) What is the sequence of execution of constructors and destructors in Inheritance?
- g) Are virtual functions hierarchical?
- h) Distinguish between early binding and late binding.
- i) What are the keywords associated with exception handling in C++?
- j) What are the various classes available for file operations in C++?

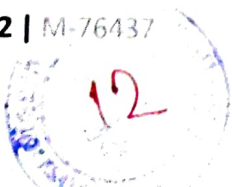
SECTION-B

2. Discuss any two loop statements used in C++ with one example of each.
3. What do you mean by constructor? What are the various types of constructors?
4. What is protected base class inheritance?
5. What is an abstract class? Explain the procedure to create an abstract class with Citable examples.
6. What are the various file streams available in C++? Explain the various methods of opening files in C++ giving suitable examples.

SECTION-C

7.
 - a) What is a scope resolution operator? Describe its different uses.
 - b) Define Operator overloading. How do you achieve operator overloading using friend function?
8. What is inheritance? Explain the different types of Inheritance. How do you inherit multiple base classes?
9.
 - a) Explain the concept of Virtual function.
 - b) Discuss the concept of exception handling and different types of exceptions.

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B.Tech. (Artificial Intelligence (AI) and Data Science / CSE /
(CSE)(AI&ML) /(CSE)(Data Science) /(CSE)(IOT)/(Data Science)/ IT / CSE
(Internet of Things and Cyber Security including Block Chain
Technology)) (Sem.-3)

DIGITAL ELECTRONICS

Subject Code : BTES301-18

M.Code : 76435

Date of Examination : 24-05-2023

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 digital electronics? Discuss.
- b) List the various disadvantages of Boolean algebra.
- c) Differentiate between combinational and sequential circuits.
- d) What is the need of a flip flop? Discuss.
- e) What do you mean by MUX? Discuss.
- f) What do you mean by excitation table? Discuss.
- g) What do you mean by race around condition? Discuss.
- h) Discuss the significance of D flip-flop.
- i) Write down the need of sample and hold circuit.
- j) What do you mean by memory cycle? Discuss.



SECTION-B

2. Implement the half adder using :
 - a) AOI
 - b) NAND gates only .
3. In an industry four operations Temperature, Pressure, Level and Humidity are to be encoded. Design a priority encoder in which Temperature must have the highest priority then Pressure followed by Level and Humidity is having the lowest priority.
4. Explain the working of a JK flip-flop. Also, discuss how the problem of SR flip flop is solved in JK flip flop?
5. Draw the diagram and discuss the working of R-2R type D/A converter in detail.
6. Explain the ROM organization and its comparison with RAM.

SECTION-C

7. Draw and explain the working of Successive approximation and dual slope A/D converters.
8. a) Reduce the following expression to simplest form using K map method $F(A,B,C,D) = \sum m (0,2,5,6,7,10,11,12)$
b) Draw the logical diagram and explain the working of BCD adder.
9. **Explain :**
 - a) FPGA
 - b) Gray and Excess 3 codes

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Total No. of Pages : 03

Total No. of Questions : 09

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

MATHEMATICS – III

Subject Code : BTAM-302

M.Code : 70808

Date of Examination : 02-06-2023

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) State Dirichlet's conditions for expansion of $F(x)$ in Fourier series
- b) Find the Laplace transform of $e^{-2t} \sin 4t$.
- c) Form partial differential equation by eliminating constant from following relation.

$$z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$$

- d) Differentiate between Type I error and Type II error.
- e) Explain Null Hypothesis and Alternative Hypothesis.
- f) Write formula of Modified Euler's method for ordinary differential equation.
- g) Write necessary and sufficient condition for $F(z)$ to be analytic.
- h) Determine the Binomial distribution whose mean is 9 and standard deviation is $3/2$.
- i) Define Eigen Value and Eigen Vectors.
- j) Define first shifting theorem in Laplace transform.

SECTION-B

2. Find the Fourier series for the function $f(x) = x + x^2, -\pi < x < \pi$. Hence show that

$$\frac{\pi^2}{6} = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots$$

3. Evaluate using Laplace transform $\int_0^{\pi} t^3 e^{-t} \sin t dt$.

4. Find the general solution of partial differential equation :

$$\frac{d^2 z}{dx^2} - 3 \frac{\partial^2 z}{\partial x \partial y} + 2 \frac{\partial^2 z}{\partial y^2} = e^{2x-y} + \cos(x+2y).$$

5. Two independent sample of sizes 7 and 6 had the following values:

Sample A	28	30	32	33	31	29	34
Sample B	29	30	30	24	27	28	

Examine whether the samples have been drawn from normal populations having the same variance.

6. Consider an ordinary differential equation $\frac{dy}{dx} = x^2 + y^2, y(1) = 1.2$. Find $y(1.05)$ using the fourth order Runge - Kutta Methods.

SECTION-C

7. a) Prove that the function $f(z)$ defined by $f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, z \neq 0$ & $f(0)=0$ is continuous and the Cauchy-Riemann equations are satisfied at the origin yet $f'(0)$ does not exist.

- b) Determine the analytic function $w = u + iv$ if $v = \log(x^2 + y^2) + x - 2y$

8. a) Fit a Poisson distribution to the following data and calculate theoretical frequencies.

X	0	1	2	3	4
Y	122	60	15	2	1

(given $e^{-0.5} = 0.61$)

b) Show that Poisson distribution is a limiting case of Binomial Distribution.

9. Find the largest Eigen value of the matrix by power method

$$\begin{bmatrix} 1 & -3 & 2 \\ 4 & 4 & -1 \\ 6 & 3 & 5 \end{bmatrix}$$

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE) (Sem. 3)
COMPUTER ARCHITECTURE

Subject Code : BTCS-301

M.Code : 56591

Date of Examination : 19-05-2023

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 Accumulator logic.
- b) Discuss Register transfer language.
- c) Define Control Unit.
- d) What are Memory reference instructions?
- e) What is meant by Instruction cycle?
- f) Write use of interrupts.
- g) What are CPU registers?
- h) Discuss virtual memory.
- i) Briefly explain array processors.
- j) List advantages of pipelining.

SECTION-B

2. Explain different arithmetic operations used in computer architecture.
3. What are the advantages and disadvantages of microprogrammed design approaches?
4. What is DMA? Give an example where DMA mode of data transfer is useful.
5. Discuss the role of cache memory in computer architecture.
6. Write a short note on Inter processor communication and synchronization.

SECTION-C

7. Briefly explain the use of RISC and CISC architecture in computer?
8. What is the need of peripheral devices? Explain the modes of data transfer.
9. Discuss the role of Pipelining for data processing in computer organization. How it increases the speed?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS-303

M.Code : 56593

Date of Examination: 29-05-2023

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) Convert $(10-110111)_2$ to octal number.
 - b) What is 1's complement? Explain with example.
 - c) What is the Canonical form of the Boolean Expression?
 - d) Explain the NOR Gate. Specify its symbol.
 - e) Compare between TTL and CMOS logic families.
 - f) Differentiate between Multiplexer and Demultiplexer.
 - g) Explain level triggering.
 - h) Explain in brief about Shift Registers.
 - i) What is EEPROM?
 - j) What do you mean by Analog Signals? Explain .

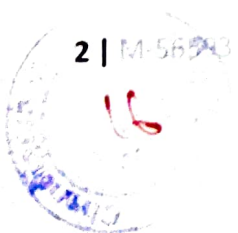
SECTION-B

2. Write a detailed note on following codes :
 - a) Weighted BCD
 - b) Excess 3 code.
3. Explain the following in brief :
 - a) Sum of Products (SOP)
 - b) Products of Sums (POS).
4. Write a short note on following :
 - a) DTL
 - b) MOS.
5. Write a detailed note on Karnaugh Maps.
6. Explain the working of Counter type A/D converter. Also, write its advantages and disadvantages.

SECTION-C

7. Explain the working of following Flip flops in detail :
 - a) Synchronous Counters
 - b) Ring Counters
8. Write a detailed note on following:
 - a) Multiplexer
 - b) Encoder
9. Explain different types of RAM along with their advantages and disadvantages.

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B.Tech. (AI&ML)/ (Artificial Intelligence (AI) and Data Science/ (Artificial Intelligence)/ (Computer Engineering)/ (CSE)\(Cyber Security)/ (IOT)/Data Science/ (Internet of Things and Cyber Security including Block Chain Technology) (Sem-4)

DESIGN & ANALYSIS OF ALGORITHMS

Subject Code : BTCS-403-18

M.Code : 77629

Date of Examination : 22-06-2023

Time : 3 Hrs.

P.T.U Question
B.Tech CSE Sem

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) Describe Big 'O' notation used in algorithms.
- b) What is flow network?
- c) How is an algorithm's time efficiency measured?
- d) What is recursive call?
- e) What is Knapsack problem?
- f) What are the advantages of topological sorting?
- g) Define state space of the problem.
- h) What is best-case efficiency?
- i) What are dynamic trees?
- j) What is approximate solution?

SECTION-B

2. What do you mean by time complexity and space complexity of an algorithm?
3. Write the general procedure of dynamic programming.
4. What are heuristics? What are their characteristics?
5. What do you mean by Asymptotic Notations? Explain.
6. Find the longest common subsequence for the following two sequences using dynamic programming. Show the complete process.

X = 100101001

Y = 101001.

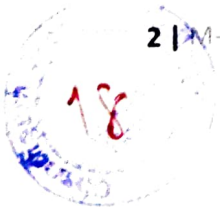
SECTION-C

7. What are NP- hard and NP-complete problems? Explain with example.
8. **Write a detailed note on the following :**
 - a) Substitution Method
 - b) Network Flow Algorithm.
9. Explain fractional knapsack problem with example.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem-4)
DISCRETE STRUCTURES

Subject Code : BTCS-402

M.Code : 71106

Date of Examination : 10-06-2023

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 reflexive closure.
- b) What is Poset?
- c) List two applications of recurrence relation.
- d) Define semi group.
- e) Differentiate between path and trail.
- f) What is chromatic number?
- g) What is graph homomorphism?
- h) List two applications of generating functions.
- i) What is Coset?
- j) Define Sum Of Products (SOP) form.



SECTION-B

2. Determine the numbers of integers between 1 and 260, which are divisible by any of the integers 2, 3, 5, 7.
3. Prove that a field is an integral domain.
4. In how many ways can 5 male and female be seated on round table so that no two ladies are together?
5. Prove that a given connected graph G is an Euler graph if all vertices of G are of even degree.
6. Draw a graph which contains an Euler Circuit but not hamilton circuit.

SECTION-C

7. Show that the edge chromatic number of a graph must be at least as large as the maximum degree of a vertex of the graph.
8. Consider the group $G = \{1, 5, 7, 11, 13, 17\}$ under multiplication modulo 18.
 - a) Build the multiplication table of G .
 - b) Finds $5^{-1}, 7^{-1}, 17^{-1}$
 - c) Identify whether G is cyclic.
 - d) Find the order and group generated by 5 and 13.
9. Solve the recurrence relation $a_n = 4a_{n-1} - 4a_{n-2} + (n + 1) + 2^n$.

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B.Tech. (AI&ML)/ (Artificial Intelligence (AI) and Data Science)/ (Artificial Intelligence)/ (Computer Engineering)/ (CSE)/(AI&ML)/(Cyber Security)/ (Data Science)/(IOT)/(Data Science)/ (Internet of Things and Cyber Security including Block Chain Technology) (Sem-4)

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 77627

Date of Examination : 28-06-2023

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 in brief about register transfer language.
- b) Explain in brief about the main memory.
- c) What is a write-through cache?
- d) What is Interprocessor communication?
- e) What is Microprocessor?
- f) What is the difference between machine and instruction cycles?
- g) Why does increasing the capacity of the cache tend to increase its hit rate?
- h) How many 128x8 ROM memory chips are needed to provide a memory capacity of 4096x16?
- i) Differentiate between Computer Architecture and Organization.
- j) What is a microprogram sequencer?

SECTION-B

2. What are the various types of interrupts? Explain.
3. List and explain the steps involved in the execution of a complete instruction.
4. **Discuss :**
 - a) Hardwired and micro programmed design control unit.
 - b) Hierarchical Memory Organization.
5. Explain direct and indirect register addressing mode with a suitable example.
6. Discuss the role of cache coherency in parallel processors.

SECTION-C

7. Explain the vector processor and array processors in detail.
8. What is meant by associative memory? Explain briefly the hardware organization of such a memory.
9. What are the ways in which peripheral devices can transfer data to a computer system? Write features of each of these ways and compare the pros and cons of each type of data transfer.

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Roll No.

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Total No. of Questions : 09

B.Tech. ((AI&ML)/(AI and Data Science)/(Artificial Intelligence)/(CSE)
(IOT)/(Data Science)/(Cyber Security)/(ECE)/(Sem-4)

UNIVERSAL HUMAN VALUES

Subject Code : HSMC-122-18

M.Code : 77630

Date of Examination : 26-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A Fill in the Blanks/ True/False.
2. SECTION-B contains FIVE questions in this section. Attempt ANY FOUR questions
3. SECTION-C contains THREE questions in this section. Attempt any two question.

SECTION-A

1. Fill in the blanks / True / False :

(2 × 10 = 20)

- a) Self-exporation is the process forEducation.
आत्म-अध्ययनशिक्षा के लिए प्रक्रिया है।
सवै-अधिअैनसिंधिआ लई पृकिरिआ है।
- b) is a feeling of having more than required physical facilities.
..... भौतिक सुविधाओं की आवश्यकता से अधिक होने की भावना है।
.....बैतिक सहुलतां दी लैड वल्ले जिआदा हेट दी भावना है।
- c) is the foundational value in relationships.
..... रिशतों में मूलभूत मूल्य है।
.....रिस्तियां विंच मुँदला मुँल है।
- d) Justice is Harmony in
न्याय..... में सामंजस्य है।
निआंविंच तालमेल है।
- e) There are.....orders in Nature.
प्रकृति मेंआदेश हैं।
कुदरत विंच आदेश हन।
- f) All the needs of Self are called Happiness.
स्वयं की सभी जरूरतों को खुशियाँ कहा जाता है।
सवै दी लैडं नुं खुशी किरिंदे हन।

23

- g) Giving all the priorities to Physical Facilities is living with Animal Consciousness.
 भौतिक सुविधाओं को सभी प्राथमिकताएं देना पशु चेतना के साथ रहना है।
 सरीरक सहुलतां नुं ही सारीआं पहिलां देणीआं पशु बिरती नाल रहिणां है।
- h) Respect is right evaluation.
 सम्मान सही मूल्यांक है।
 आदर तें भाव सही मुलांकण है।
- i) There are four orders in Nature.
 प्रकृति में चार आदेश हैं।
 प्रकृति नुं चार अवस्थावां विच वंडिआ जा सकदा है।
- j) Ethical Human Conduct leads to Mutual Fulfilment.
 नैतिक मानव आचरण से परस्पर पूर्ति हो जाती है।
 नैतिक मनुषी विउहार परस्पर पूरकता वल्ल लै जांदा है।

SECTION-B

(5 × 4 = 20)

2. Explain self-organisation and health.
 आत्म संगठन और स्वास्थ्य के बारे में बताएं।
 आत्म संगठन अਤੇ सिहत दे घारे विंच दॅसे।
3. 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?
 तुगाडा SVDD, SSDD अते SSSS तें की मतलब है? SSDD तें SSSS तॅक दी उबदीली किस तरां संभव है?
4. What are the implications of value based living?
 मूल्य आधारित जीवन यापन के अच्छे परिणाम क्या हैं?
 कदरां कीमतां आधारित जीवन जीउण दे चंगे नतीजे की हन?
5. Explain Competence in Professional-Ethics.
 पेशेवर नैतिकता में क्षमता समझाओ।
 पेशेवर नैतिकता विंच समरंभा समझाओ।
6. What are the five dimensions of Human Endeavour in society?
 समाज में मानव प्रयास के पांच आयाम क्या हैं?
 समाज विंच मनुष्य कोशिस दे पंज पहिलू की हन?

7. Describe basic human aspirations. What are the requirements to fulfill basic human aspirations?

ਬੁਨਿਆਦੀ ਮਾਨਵੀ ਆਕਾਂਸ਼ਾ ਕੀ ਹੈ? ਬੁਨਿਆਦੀ ਮਾਨਵੀ ਆਕਾਂਸ਼ਾਵਾਂ ਨੂੰ ਪੂਰਾ ਕਰਨੇ ਦੇ ਲਈ ਆਵਸ਼ਯਕਤਾਵਾਂ ਕੀ ਹਨ?

ਬੁਨਿਆਦੀ ਮਾਨਵੀ ਆਕਾਂਸ਼ਾਵਾਂ ਨੂੰ ਪੂਰਾ ਕਰਨ ਲਈ ਜ਼ਰੂਰਤਾਂ ਕੀ ਹਨ?

OR

What is the meaning and purpose of Self-Exploration?

स्वयं-अन्वेषण के अर्थ और उद्देश्य क्या हैं?

ਆਤਮ ਅਧਿਐਨ ਦੇ ਮਤਲੱਬ ਅਤੇ ਉਦੇਸ਼ ਕੀ ਹਨ?

8. Compare the Four Orders in Nature on the basis of their salient aspects.

मुख्य पहलुओं के आधार पर प्रकृति में चार आदेशों की तुलना करें।

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

OR

How is a human-being co-existence of Self and Body? Explain Pre-Conditioning, Sensation and Natural-Acceptance.

इंसान स्वयं और शरीर का सह-अस्तित्व कैसे है? पूर्व-मान्यता, संवेदना और प्राकृतिक-स्वीकृति समझाओ।

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

9. What are the broad holistic criteria for evaluation of technologies, production systems and management models? How do they map with the comprehensive human goal?

प्रौद्योगिकी, उत्पादन प्रणाली और प्रबंधन मॉडल के मूल्यांकन के लिए व्यापक समग्र मापदंड क्या हैं? कैसे वे व्यापक मानव लक्ष्य के साथ मेल खाती हैं?

ਤਕਨਾਲੋਜੀ, ਉਤਪਾਦਨ ਸਿਸਟਮ ਅਤੇ ਪ੍ਰਬੰਧਨ ਮਾਡਲ ਦੀ ਪੜਤਾਲ ਕਰਨ ਲਈ ਵਿਆਪਕ ਮਾਪਦੰਡ ਕੀ ਹਨ? ਕਿਵੇਂ ਉਹ ਵਿਆਪਕ ਮਨੁੱਖ ਲਕਸ਼ ਦੇ ਨਾਲ ਮੇਲ ਖਾਂਦੀ ਹੋ?

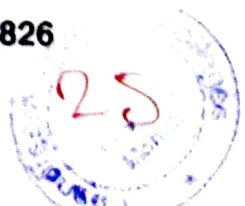
OR

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

मौजूदा समय में पेशे के मुख्य अनैतिक तरीके क्या हैं? मूल कारण और संभव समाधान का विश्लेषण करें।

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

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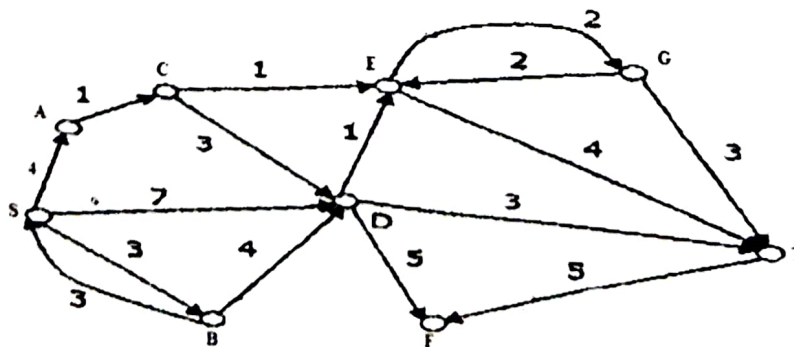
- h) State fundamental theorem on Relations,
- i) What will be the chromatic number of complete graph with n - vertices.
- j) The number of diagonals of a polygon is 20. Find the number of its sides.

SECTION-B

2. 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.
3. Give an example of a non abelian group G and a normal subgroup H of G such that quotient group G/H is abelian.
4. a) How many numbers greater than 1000000 can be formed by using digits 1, 2, 0, 2, 4, 2, 4.
b) Find the number integers between 1 and 60 which are divisible by 2 nor by 3 and nor by 5.
5. a) Prove that $p \rightarrow q \wedge r = p \rightarrow q \wedge p \rightarrow r$.
b) **Check the validity of the following argument :**
If I work, I cannot study. Either I work or pass mathematics.
I passed mathematics, Therefore I study.
6. Prove that in a graph the number of vertices of odd degree is even.

SECTION-C

7. Find the shortest path between A to T using Dijkstra's algorithm for the following graph :



8. a) If H is a subgroup of G of index 2 in G . The H is normal subgroup of G .
- 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.
9. a) Let $f: R \rightarrow R$ and $g: R \rightarrow R$ be a real valued function defined by $f(x) = 2x^3 - 1, x \in R$ and $g(x) = \left[\frac{x+1}{2} \right]^{\frac{1}{3}}, x \in R$. Show that each f and g is inverse of other.
- b) If $f: N \rightarrow N$ and $f(j) = j(\text{mod } 4)$. Determine whether f is one to one or onto or both or neither.

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SECTION-B

2. Difference between multiprogramming, multitasking and multiprocessing OS.
3. Discuss the Dining Philosopher problem in process synchronization.
4. Discuss the necessary and sufficient condition for a deadlock to occur in system.
5. Compare and contrast the different disk space or file allocation methods.
6. What is virtual memory? Discuss the benefits of virtual memory techniques.

SECTION-C

7. What is IPC? Discuss the producer consumer problem using Semaphores.
8. What is page replacement? Discuss different page replacement algorithms and by using a reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Assume there are three frames. Apply LRU and find out how many page faults occurs.
9. Write a Short note on :
 - a. Demand Paging
 - b. SCAN vs. C-SCAN disk scheduling algorithm

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SECTION-B

2. **Write CSS code for the following :**
 - a) Set the background color of a page.
 - b) Position the background image on top left.
 - c) Set and apply four borders around text.
3. Write down 4 HTML audio/video methods and explain them using code.
4. Explain various string functions of PHP with example.
5. How will you generate a dialogbox using JavaScript? Give example.
6. Write down the advantages and disadvantages of AJAX.

SECTION-C

7. **Answer the following :**
 - a) Write code to embed PHP code in an HTML page?
 - b) List the main types of errors in PHP and explain their differences.
8. Write code of functionality of JSON with AJAX? How it improves the performance of a website. Explain with programming illustration.
9. **Answer the following :**
 - a) How CSS3 is better than previous version? What are its features?
 - b) How to include CSS in the webpage? How would you set margins, padding, positioning, and text formatting using CSS? Write code to justify your answer.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CSE/IT) (Sem-5)
COMPUTER NETWORKS-II

Subject Code : BTCS-501

M.Code : 70534

Date of Examination : 22-06-2023

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 internet key exchange.
- b) Explain IKE header format.
- c) What is 2.5G TDMA?
- d) Discuss the class field in IP address.
- e) What are the metrics used by routing protocols?
- f) What are the functions of MAC?
- g) What is a Bluetooth?
- h) What is Zig Bee?
- i) Discuss the importance of IPSec in network security.
- j) Explain the importance of IEEE 802.11 standard.

SECTION-B

2. Describe in brief about IPv6.
3. Discuss about transition from IPv4 to IPv6.
4. Discuss briefly about Wireless LAN Technologies.
5. What are 'the Cellular Networks? Explain in detail.
6. What is the access method used by wireless LANs?

SECTION-C

7. Explain the frame format, operation and ring maintenance feature of IEEE 802.5 MAC protocol.
8. How is network security achieved at various layers? What is the fundamental difference in key exchange for digital signatures and achieving confidentiality?
9. State the criteria for distinguishing LANs, MANs and WANs. Also discuss the evolution of MAC protocols based on carrier sensing.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS503-18

M.Code : 78322

Date of Examination : 17-06-2023

Time : 3 Hrs.

Max. Marks : 60

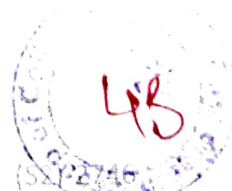
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) What are software components?
- b) What do you mean by requirement gathering?
- c) Define software engineering as defined in IEEE 610.12.1990 standard.
- d) Which SDLC model is best? Explain.
- e) What is Software prototyping and POC?
- f) What are software reliability metrics? Explain.
- g) What is SGL environment?
- h) Differentiate between white-box and black-box testing.
- i) Explain in detail about SEI CMMI.
- j) What is Domain Analysis in context of software reuse?



SECTION-B

2. Describe the Software Development process in brief.
3. Explain the concept of modularization.
4. Write a detailed note on Rayleigh-Norden results.
5. How test coverage is helpful in measuring the effectiveness of the testing?
6. What do you understand by the term Software Development Life Cycle? Why it is important to adhere to the life-cycle model while developing a large software product?

SECTION-C

7. **Explain the following Software life cycle models in detail with suitable diagrams :**
 - a) Prototyping Model
 - b) Spiral Model.
8. **Write short notes on the following :**
 - a) Architectural Design
 - b) Create a DFD on "Project Management"
 - c) Decision trees
 - d) LOC AND KLOC
9. What do you mean by project scheduling? How PERT charts are used to plan the scheduling of a project? How PERT Chart is different from GANTT Chart?

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SECTION-B

2. Explain the Chomsky hierarchy of grammars. Show the correspondence between the automation and types of Grammar.
3. Discuss the procedure to convert NFA to DFA with the help of suitable example.
4. What is parsing? How Left most and right most derivation helps to find out the ambiguity in a CFG?
5. 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?
6. What do you understand by tractable and Intractable problems with reference to Turing Machines?

SECTION-C

7. What is Turing Machine? Explain the different variants of Turing Machines.
8. Discuss Push down Automation in detail. Design PDA for $\{wcwT \mid w=\{a,b\}^*\}$
9. **Write a Short note on :**
 - a. Minimization of FA
 - b. Cook Levin Theorem

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Roll No. _____

Total No. of Pages : 02

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B.Tech. (CSE) (Sem-5)
ENTERPRISE RESOURCE PLANNING

Subject Code : BTES 501-18

M.Code : 78319

Date of Examination : 14-06-2023

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) CRM
- b) SSA Global
- c) BPR
- d) TQM
- e) e-Commerce
- f) Data Mining
- g) Oracle
- h) Main characteristics of MIS
- i) Solutions offered by QAD
- j) Benefits of SAP.



SECTION-B

2. List the limitations and benefits of ERP.
3. What are the various tasks performed during pre-implementation?
4. What are the Business Modules present in an ERP package?
5. Write down functions of JD Edwards and its different product modules.
6. How ERP and E-Commerce are related? Explain it with examples.

SECTION-C

7. What are the 12 rules of OLAP? Explain direct and indirect benefits of ERP?
8. Explain various ERP modules and parameters of materials management in ERP system.
9. Explain the various ERP implementation strategies and how the performance of ERP model is maximised?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem.-5)
DATABASE MANAGEMENT SYSTEMS

Subject Code : BTCS-501-18

M.Code : 78320

Date of Examination : 07-06-23

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 benefit of foreign key? Give an example.
- b) What is benefit of implementing data abstraction?
- c) Write SQL commands to create an employee table and then add one record to the same table.
- d) Explain the concept of lossy and lossless decomposition.
- e) What do you mean by composite entity? Give an example of composite entity with the help of ER-Diagram symbols.
- f) What is a join? Give an example of right outer join.
- g) What do you mean by partially committed state? How can a process move from partially committed state to failed state?
- h) What is non-recoverable schedule? Give an example of non-recoverable schedule.
- i) Differentiate between authentication and authorization.
- j) List the various benefits of using RBAC.



SECTION-B

2. What is relational algebra? Explain the various operations of relational algebra with the help of an example of each.
3. Explain in detail, various algorithms for query optimization.
4. What is the need of concurrency control protocols? Explain any 1 concurrency control, in detail.
5. What is the benefit of implementing checkpoints? Explain which transaction requires undo and which transaction requires redo with the help of a common example.
6. What is SQL injection and how it can be controlled? Give a suitable example.

SECTION-C

7. Explain in detail, various components of the database architecture.
8. What is serializability? Explain in detail, conflict and view serializability with the help of an example of each.
9. **Write short note on :**
 - a) Various DML commands.
 - b) Distributed databases.

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Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS504-18

M.Code : 78323

Date of Examination : 05-06-2023

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 Bandwidth and Bandwidth Utilization for a communication channel.
- b) What is the purpose of sliding window protocol?
- c) What is wireless LAN. Which IEEE standard governs it?
- d) How is multiple access of a channel achieved? List the challenges.
- e) Define attenuation and latency of transmission channels.
- f) What are the components of data link layer and their respective roles?
- g) Discuss various types of framing techniques.
- h) What do you mean by routing? Define link state routing strategy.
- i) What factors lead to congestion in a network?
- j) Which protocol is used for multimedia transmission? Give its frame structure.

SECTION-B

2. What issues of OSI model led towards TCP/IP model development?
3. Compare and contrast various multiplexing techniques.
4. What do you mean by Cryptography? Discuss its types.
5. What are the challenges of CSMA / CD? How it is purposed to improve?
6. Compare UDP and TCP protocol giving their frame structure.

SECTION-C

7. **Write Short notes on :**
 - a) DDNS
 - b) TELNET
 - c) HTTP.
8. Using suitable example, discuss two error correction techniques in data transmission.
9. What are the advantages of IPV6 addressing? Give frame structure of IPV6 header. Explain which network layer protocol is responsible for address resolution?

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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 : 23-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

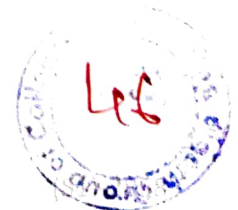
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Applications of cloud computing
- b) VPN
- c) API
- d) Community Cloud
- e) Cloud Security Risks
- f) Load Balancing in Cloud
- g) Service Level Agreement
- h) Vendor Lock-In
- i) Grid Computing
- j) Multitenancy.

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SECTION-B

2. Write a note on Historical developments and challenges of cloud computing.
3. What do you understand by virtualization in cloud computing? Explain various technologies available under virtualization.
4. How scalability and elasticity is achieved in the cloud? Explain in detail.
5. Explain in detail user account and service hijacking.
6. Discuss and compare AWS, AZURE and Google Cloud services.

SECTION-C

7. An existing Bicycle Manufacturing unit wants to migrate existing stand alone IT Infrastructure to the cloud; explain the steps involved in migrating towards the cloud.
8. An existing IT Company A.Ltd spans multiple states; suggest the Cloud deployment model for A.Ltd. Explain the Pros and Cons of the suggested Deployment Model over other available models.
9. Write note on the issues and measures for improving Cloud security.

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Total No. of Pages : 02

Total No. of Questions : 09

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

COMPILER DESIGN

Subject Code : BTCS-601-18

M.Code : 79249

Date of Examination : 09-06-2023

Time : 3 Hrs.

Max. Marks : 60

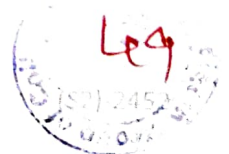
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Lexeme vs Token
- b) Parse tree
- c) Role of look ahead pointer in input buffering
- d) What do you meant by an empty entity in the parsing table?
- e) Phase vs Paas
- f) Ambuiguis grammar
- g) Left factor
 $S \rightarrow iCtS \mid iCtSeS \mid a$
 $C \rightarrow b$
- h) Handle and Handle Pruning
- i) Macro
- j) Purpose of using Symbol Table



SECTION-B

2. Write a note on error handling and recovery techniques.
3. How LR(0) parsing is performed on the given below grammar, create its parsing table and explain in detail.

$E \rightarrow T + E / T$

$T \rightarrow \text{id}$

4. Explain in detail three address codes along with their implementation.
5. Explain in various data structures used for the symbol table.
6. Explain in detail how DAG is created for basic blocks using a suitable example.

SECTION-C

7. Explain the various code optimization techniques in detail using suitable examples.
8. How does a string position = initial + rate * 60 pass through various compiler phases?
9. Write a note on :

a) YACC

b) Lex.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE/EE/ECE) (Sem-6)

COMPUTER NETWORKS

Subject Code : BTCS-504-18

M.Code : 79264

Date of Examination : 10-06-2023

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 advantage of network topology.
- b) What is OSI model?
- c) Define Wireless LAN?
- d) What is ARQ used for?
- e) What is meant by piggybacking.
- f) Write advantage of IPv6 in networking.
- g) What are virtual circuit networks?
- h) Differentiate between UDP and TCP Protocol.
- i) What is use of DDNS?
- j) Write about QoS.

SECTION-B

2. How CSMA/CA protocol is used to avoid the collision in networks?
3. What do you mean by error detection and correction? Discuss cyclic redundancy check.
4. What is routing protocol? Write about any one algorithm used in it.
5. What is multiplexing? Compare TDM, FDM and WDM.
6. How does congestion control work in computer networks.

SECTION-C

7. Discuss in detail, the transmission media used in computer networks for transmission of signals?
8. What is the use of firewalls in networking? Discuss open source available software and tools in networking.
9. Explain, how Cryptography is used to provide security in computer networks?

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SECTION-B

2. Describe about the Android development environment with suitable examples.
3. Describe different types of Android user interface controls.
4. Explain briefly about the mobile software engineering with framework and tools.
5. Discuss important characteristics of mobile applications.
6. How broadcast and telephony APIs are used in Android studio?

SECTION-C

7. Describe Service in mobile apps giving its states and lifecycle.
8. **Define the following terms :**
 - a) Shared preferences
 - b) VUI
 - c) Peer-To-Peer Architecture
 - d) Mobile Agents.
9.
 - a) Explain myths of security and hacking of Android application with a suitable example.
 - b) Explain about active transactions in Android series. How data will be secured while transacting data?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS-620-18

M.Code : 79258

Date of Examination : 19-06-2023

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) Android SDK
- b) System permissions
- c) Mobile platforms
- d) Intents
- e) Text-to-Speech techniques
- f) Sync Task
- g) SQLite
- h) Android user
- i) Multithreading
- j) Mobile apps Testing.

SECTION-B

2. Describe about the Android development environment with suitable examples.
3. Describe different types of Android user interface controls.
4. Explain briefly about the mobile software engineering with framework and tools.
5. Discuss important characteristics of mobile applications.
6. How broadcast and telephony APIs are used in Android studio?

SECTION-C

7. Describe Service in mobile apps giving its states and lifecycle.
8. **Define the following terms :**
 - a) Shared preferences
 - b) VUI
 - c) Peer-To-Peer Architecture
 - d) Mobile Agents.
9.
 - a) Explain myths of security and hacking of Android application with a suitable example.
 - b) Explain about active transactions in Android series. How data will be secured while transacting data?

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Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem-6)
MACHINE LEARNING
Subject Code : BTCS618-18
M.Code : 79257
Date of Examination : 20-06-2023

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 various issues in machine learning.
- b) Write a short note on Data Cleaning
- c) What is data reduction?
- d) What is the need of data pre-processing?
- e) Describe briefly how is the performance of regression models evaluated?
- f) Discuss various applications of clustering.
- g) Differentiate between mutation and elitism in genetic algorithms.
- h) What is the role of selection in the process of genetic algorithm optimization?
- i) Differentiate between precision and recall.
- j) How does the acceptable error impact the accuracy of a correlation analysis using R-square?



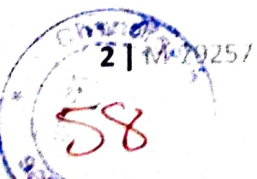
SECTION-B

2. Compare and contrast the advantages and disadvantages of decision trees and random forests in machine learning.
3. Explain the concept of Support Vector Machine (SVM) and its application in binary classification problems. Discuss the advantages and limitations of SVM compared to other classification algorithms.
4. Explain the basic concepts of genetic algorithms, including gene representation and fitness function. Discuss the importance of genetic operators such as selection, crossover, and mutation in the optimization process.
5. Describe the Naive algorithm for finding association rules and explain the importance of support and confidence in this algorithm.
6. Explain the concepts of Multiple Linear Regression and Polynomial Regression, including the assumptions and limitations of these regression models.

SECTION-C

7. Explain the importance of splitting a dataset into training and testing sets in machine learning. Describe the process of randomly splitting a dataset into training and testing sets and explain the potential issues with this approach.
8. Explain the concept of Reinforcement Learning (RL) and its application in machine learning. Discuss the difference between model-based and model-free RL approaches and explain when each approach is appropriate to use.
9. Explain the concept of Neural Networks and their applications in machine learning. Discuss common activation functions and explain the advantages and limitations of each function.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(CE)/(CSE)/ME) (Sem-6)

COMPUTER AIDED DESIGN

Subject Code : BTME-613-18

M.Code : 79658

Date of Examination : 20-06-2023

Time : 3 Hrs.

Max. Marks : 60

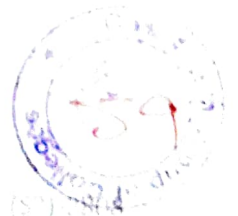
INSTRUCTIONS TO CANDIDATES :

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 Geometric Modelling?
- b) Explain a synthetic curve-using example.
- c) Give the benefits of CAD.
- d) Discuss the concept of Plane Surface.
- e) What are fundamentals of a solid design?
- f) Explain various data transfer formats used in Assembly design?
- g) Give applications of transformation for design engineer.
- h) What is the role of coordinate system in designing of a model?
- i) Explain what is parametric space of a curve?
- j) Define B-spline surface and give its applications.



SECTION-B

2. Discuss the historical development of Computer Aided design in India.
3. Discuss the representation and characteristics of B-spline curve.
4. Discuss the basic fundamentals of surface design using suitable examples.
5. What do you mean by continuity as well as composite solids and give their applications in CAD?
6. Discuss using example, the construction of a solid geometry using Boolean operations.

SECTION-C

7. Discuss various types of 2-D Transformations using suitable examples.
8. Discuss the analytical and relational properties of assembly modeling design.
9. Write a short note on Constructive Solid Geometry.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS-601

M.Code : 71107

Date of Examination : 24-05-2023

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 the various applications of Simulation.
- b) What are the various worldviews in discrete event system modeling?
- c) Give examples of few popular simulation software in industry.
- d) What is statistical model in simulation?
- e) Give the two applications of Queueing models.
- f) Explain the pseudo random numbers.
- g) What is meant by biased and unbiased estimator?
- h) Define output analysis.
- i) What is meant by Metamodeling?
- j) List few simulation languages and environments.



SECTION-B

2. Discuss the Event Scheduling/Time Advanced algorithm in discrete event simulation.
3. Explain the role of exponential distribution and properties in statistical modeling.
4. Suggest a step by step procedure to generate random variates using Inverse transform technique for exponential distribution.
5. What do you understand by verification and validation of Simulation Models?
6. With illustrative examples, describe the Output analysis for Steady state simulation.

SECTION-C

7. What do you mean by discrete-event simulation? With a neat flow diagram, explain the various steps in a simulation study.
8. Explain the characteristics of queuing system. Also, explain the queuing notations in general.
9.
 - a) Discuss the role of simulation in comparing two systems.
 - b) Write a note on simulation of Computer Systems.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CSE / EEE / EE / ECE) (Sem-7)
DATABASE MANAGEMENT SYSTEM

Subject Code : BTCS-501-18

M.Code : 90493

Date of Examination : 30-05-2023

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. What is Data Independence?
2. What is Transitive Dependency?
3. Differentiate between single value and multi valued attributes.
4. What do you mean by integrity of data? List any two integrity constraints.
5. Define Atomicity in transaction management.
6. List the two commonly used Concurrency Controlled techniques.
7. What do you mean by distributed database?
8. Mention the kind of constraints we can specify in the create command DDL.
9. Define DAC model
10. Why database security is important?

P.T.U Questions
B.Tech CSE Sem



SECTION-B

11. What are Integrity Constraints? Why they are important?
12. What is the purpose of normalization in DBMS?
13. Discuss the various concurrency control techniques.
14. Discuss the candidate key, primary key, super key, composite key and alternate key.
15. Explain Distributed Databases with its advantages.

SECTION-C

16. Write note on hashing.
17. What are Object-Oriented databases? Write its advantages and disadvantages.
18. What do you mean by Normalization? What do you mean by Multi-valued and Join Dependency. Also Explain 4th and 5th Normal forms with the help of 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. (CSE) (Sem.-7)
NETWORK SECURITY AND CRYPTOGRAPHY

Subject Code : BTCS-701-18

M.Code : 90487

Date of Examination : 17-05-23

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 analysis?
- b. Give example of few active threats.
- c. What is non-repudiation?
- d. State Fermat theorem.
- e. Why SHA is more secure than a hash function?
- f. What is the difference between firewall and antivirus?
- g. What is Kerberos?
- h. What are digital signatures?
- i. Why do we use captchas?
- j. What is port scan attack?



SECTION-B

2. Explain various active threats with the help of an example.
3. What is a block cipher? Discuss block ciphers modes of operations.
4. Discuss the different requirements for message authentication.
5. Why do we need digital signatures? How digital signature works?
6. How do honeypots work? Discuss the placement of honeypots in a network.

SECTION-C

7. Describe the steps in finding the message digest using SHA-512 algorithm. What is the order of finding two messages having the same message digest?
8. Explain the working of RSA algorithm with the help of a suitable example. Mention any one technique attacking RSA.
9. Write a short note on :
 - a. Key distribution techniques
 - b. Purpose of S-box in DES.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE / IT) (Sem.-7)

ROUTING AND SWITCHING

Subject Code : BTEC-905A-18

M.Code : 90691

Date of Examination : 25-05-23

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) Why should you use CLI?
- b) Why Rapid Spanning Tree protocol is faster than Spanning Tree Protocol?
- c) What is the difference between dynamic IP and static IP addressing?
- d) What is OSPF?
- e) What are the different network security techniques?
- f) Describe Flow Control and Buffering in Transport Layer.
- g) Define Ethernet.
- h) What is ADSL Internet service?
- i) Difference between host name and IP address
- j) List the advantages of IPv6 routing.



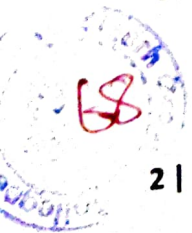
SECTION-B

2. Explain the term Authentication, Authorization and Accounting (AAA) used in network security.
3. What is Network Address Translation? Explain Translation method in brief.
4. Briefly explain the various fields of IPV6 address format.
5. What is Generic Routing Encapsulation? How does it work?
6. What are some of the possible services that a link-layer protocol can offer to the network layer? Which of these link-layer services have corresponding services in IP?

SECTION-C

7. An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it : 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. What are the valid allocation of address to A and B? Explain.
8. What are the services provided by application layer? Explain FTP and SMTP Application Layer Protocol in detail.
9. Explain the following :
 - a) VRP Operating System Image Management.
 - b) Establishing DSL/ADSL networks with PPPoE.

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Total No. of Pages : 02

Total No. of Questions : 09

PIT B.Tech. (CSE/ECE/IT/ME/EE) (Sem-7)

ARTIFICIAL INTELLIGENCE

Subject Code : BTEC-908A-18

M.Code : 90678

Date of Examination : 27-05-2023

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 intelligent control?
- b. What is declarative knowledge?
- c. Explain ANN.
- d. Explain Fuzzy Logic.
- e. What do you mean by open list?
- f. Define probability.
- g. Define temporal difference learning.
- h. What is state space?
- i. Role of AI in today's era.
- j. What do you mean by policy iteration?



SECTION-B

2. Explain Architecture of Intelligent control system?
3. Explain Self Organizing Networks in detail.
4. Explain Fuzzy set operations with suitable example.
5. What do you mean Mutation and Crossover probabilities? Explain.
6. Explain GA in route planning for travelling sales person.

SECTION-C

7. What are the characteristics of AI problem, explain with the help of example.
8. Explain Crisp Vs Fuzzy set theory in detail with appropriate example.
9. Explain Single and multi-point crossover operation in detail with suitable examples.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engg.) (Sem.-7)

AGILE SOFTWARE DEVELOPMENT

Subject Code : BTCS-710-18

M.Code : 90501

Date of Examination : 20-05-2023

Time : 3 Hrs.

Max. Marks : 60

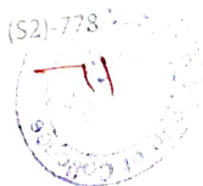
INSTRUCTIONS TO CANDIDATES :

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) Software and Software development.
- b) Role of team members in software development.
- c) Benefits of the Agile in software development.
- d) Kanban framework.
- e) Scrum framework.
- f) Product and Process.
- g) Interface segregation principle.
- h) Product backlog in agile.
- i) Basic tools of XP.
- j) Code refactoring.



SECTION-B

2. What are Artifacts? How do they affect the software development?
3. List down the design principle of agile software design in detail.
4. Explain the concept of 3 C's model in agile software development in detail.
5. What are the various agile manifesto's, principles that are followed in software development?
6. Explain Liskov Substitution Principle used in Agile design methodology.

SECTION-C

7. Explain in Software Development Life Cycle in detail.
8. What is the role of product owner, team member and scrum master for the success in the software development?
9. List down the differences between the following :
 - a) Alpha testing and Beta testing.
 - b) Waterfall Model and Incremental Model.

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Total No. of Pages : 02

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B.Tech. (CSE) / (ME) (Sem-7,8)
MAINTENANCE AND REALIABILITY

Subject Code : BTME617-18

M.Code : 90485

Date of Examination : 22-06-2023

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 advantages of total productive maintenance.
- b) Define maintenance engineering.
- c) What do you mean by Chemical control of corrosion?
- d) What is the need of maintenance record keeping?
- e) What is the application of work measurement in maintenance?
- f) What do you mean by reliability of parallel elements?
- g) Differentiate between Reliability and Maintainability.
- h) What do you mean by Breakdown time distribution?
- i) Discuss Stand by redundancy optimization.
- j) Discuss cut set method in fault tree analysis.

P.T.U Question
B.Tech CSE 8-



SECTION-B

2. Discuss in detail various costs associated with manpower planning and training in maintenance.
3. What are maintenance requirements of mechanical, electrical, process and service equipments?
4. Discuss the use of reliability concept in design and maintenance of different systems.
5. What do you mean by concept of accuracy and confidence of reliability estimation?
6. Explain the concept of reliability simulation.

SECTION-C

7. Explain in brief, different types of maintenance organizations.
8. Discuss the importance of reliability improvement in an organization. Also explain the concept of redundant and standby systems.
9. Explain the steps of fault tree construction with the help of a suitable 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.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem-7,8)
DATA MINING AND DATA WAREHOUSING

Subject Code : BTCS702-18

M.Code : 90488

Date of Examination : 21-06-2023

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.

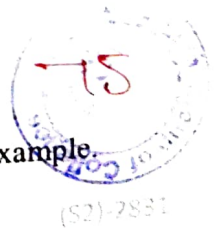
SECTION-A

1. Write briefly :

- a) Define Data Warehouse.
- b) Name some open source data mining tools.
- c) Write some data cube operations.
- d) Differentiate between Classification and clustering.
- e) Define Information Gain.
- f) Let us suppose that there are 200 pages available on internet for machine learning. The search on this term returns total 210 pages, out of which 190 belongs to Machine Learning, calculate precision and recall for our algorithm.
- g) What is density based methods in clustering?
- h) What is enterprise search?
- i) What are different challenges in clustering the data?
- j) What is web usage mining?

SECTION-B

2. What is Data Mining and explain the knowledge discovery process.
3. What is classification? Explain decision tree induction by taking a suitable example.



4. What is web content mining? Write its different steps.
5. The distance between some Indian cities are given below, Apply the clustering algorithm to make three clusters. Indicate intermediate steps.

	Bathinda	Patiala	Delhi	Amritsar	Mathura
Bathinda	0	190	400	250	460
Patiala	190	0	240	225	300
Delhi	400	240	0	450	60
Amritsar	250	225	450	0	510
Mathura	460	300	60	510	0

6. Explain Naive Bayes Classification.

SECTION-C

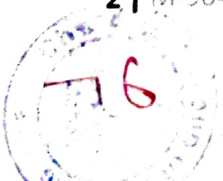
7. Explain the association rule mining problem. Consider an example with the following set of transactions. There are 10 items.

TID	Items bought
001	B, M, T, Y
002	B, M
003	A, T, S, P
004	A, B, C, D
005	A, B
006	T, Y, E, M
007	A, B, M
008	B, C, D, T, P
009	D, T, S
010	A, B, M

Assume that we wish to find association rules with at least 30% support and 60% confidence. Find the frequent itemsets and then the association rules.

8. Explain the architecture of search engine in detail. Draw suitable diagrams.
9. What is OLAP? Explain its architecture, characteristics and multi dimensional view.

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Total No. of Pages : 02

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

Subject Code : BTCS-702

M.Code : 71894

Date of Examination : 15-06-2023

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) Mealy machine
- b) Grammar vs Language
- c) Transition function
- d) Left context
- e) Ambiguity in CFG
- f) Define Turing Machine
- g) Acceptability of a string
- h) GNF productions
- i) Halting problem of TM
- j) Define Kuroda Normal Form.



SECTION-B

2. Differentiate between DFA and NFA with help of example.
3. Construct a finite automata equivalent to the regular expression:

$$(0+1)^*(00+11)(0+1)^*$$

4. Define regular sets and write its closure properties.
5. Find a reduced grammar equivalent to the given grammar

$$S \rightarrow AC \mid B, \quad A \rightarrow a, \quad C \rightarrow c \mid BC, \quad E \rightarrow aA|e$$

6. State and describe pumping lemma

SECTION-C

7. Design PDA for $\{wcw^T \mid w=\{a,b\}^*\}$
8. Design Turing Machine of $\{0^n1^n2^n \mid n \geq 1\}$
9. Write a note on cellular automaton.

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Roll No.

Total No. of Pages : 02

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B.Tech.(CSE) (Sem-7,8)
THEORY OF COMPUTATION
Subject Code : BTCS-702
M.Code : 71894
Date of Examination : 15-06-2023

Time : 3 Hrs.

Max. Marks : 60

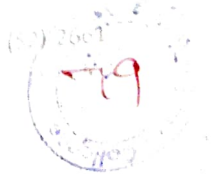
INSTRUCTION TO CANDIDATES :

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) Mealy machine
- b) Grammar vs Language
- c) Transition function
- d) Left context
- e) Ambiguity in CFG
- f) Define Turing Machine
- g) Acceptability of a string
- h) GNF productions
- i) Halting problem of TM
- j) Define Kuroda Normal Form.



SECTION-B

2. Differentiate between DFA and NFA with help of example.
3. Construct a finite automata equivalent to the regular expression:

$$(0+1)^*(00+11)(0+1)^*$$

4. Define regular sets and write its closure properties.
5. Find a reduced grammar equivalent to the given grammar

$$S \rightarrow AC \mid B, \quad A \rightarrow a, \quad C \rightarrow c \mid BC, \quad E \rightarrow aA \mid e$$

6. State and describe pumping lemma

SECTION-C

7. Design PDA for $\{wcw^T \mid w=\{a,b\}^*\}$
8. Design Turing Machine of $\{0^n1^n2^n \mid n \geq 1\}$
9. Write a note on cellular automaton.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (Sem-7,8)
ADHOC AND WIRELESS SENSOR NETWORKS

Subject Code : BTCS-716-18

M.Code : 90507

Date of Examination : 30-05-2023

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 Wireless sensor network.
- b) What is S-MAC protocol?
- c) Define proactive routing.
- d) What is contention-based protocol?
- e) List the classification of MAC .protocol
- f) List the services provided by IEEE 802.15.4.
- g) Define hybrid routing.
- h) What is flooding attack?
- i) What is tampering black hole attack?
- j) How is secure routing done in wireless channel?

SECTION-B

2. Explain the architecture of wireless sensor networks.
3. What are the design goals of a MAC protocol for Ad Hoc wireless networks?
4. How duty cycle approach is used to transit between listen state and sleep state in S-MAC protocol?
5. Explain network architecture in detail.
6. Why secure routing protocols are needed?

SECTION-C

7. **Write a note on**
 - a) DSDV
 - b) AODV
8. Explain TCP over Ad hoc wireless.
9. Explain key distribution and management scenario for sensor network security.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE/CSE) (Sem.-7, 8)

SOFT COMPUTING

Subject Code : BTEC-908D-18

M.Code : 90681

Date of Examination : 22-05-2023

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 principle of the center of gravity defuzzification method?
- b) State two features of the Ant colony algorithm.
- c) What are two point crossover methods?
- d) Differentiate soft computing and hard computing.
- e) Explain the fuzzy set and fuzzy operators in brief.
- f) Differentiate supervised and unsupervised learning.
- g) What is the principle of swarm intelligence optimization?
- h) Explain the role of rule base in fuzzy logic.
- i) Explain perceptron learning in a neural network.
- j) What is the Adaline network? Draw and explain.



SECTION-B

2. State and explain Hebb's learning rule for the neural network in detail.
3. Define activation function. Explain the purpose of activation function in multilayer neural networks with two examples.
4. What is the principle of swarm intelligence in Bee colony optimization? Explain it with a neat diagram.
5. Compare Mamdani and Sugeno fuzzy inference systems with the help of a suitable block diagram.
6. With a neat sketch, explain training and testing operation in a recurrent neural network.

SECTION-C

7. Explain the steps of a Genetic Algorithm to solve an optimization problem.
8. What is a self-organizing feature map? Also, discuss Kohonen's map and its features in detail.
9. Describe the modeling and implementation of a Fuzzy logic controller for a washing machine.

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B. Tech (CSE)

Roll No.

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Total No. of Questions : 09

P.T.U Questions
B.Tech IT Ser

B.Tech.(IT) (Sem-3)
MATHEMATICS-III
Subject Code : BTAM-304-18
M.Code : 76393
Date of Examination : 29-05-2023

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) Examine continuity of $f(x, y) = \frac{x^3 - y^3}{x^2 + y^2}$, $(x, y) \neq 0$ at $(0, 0)$.
 $0, (x, y) = 0$

b) If $u = e^{ax+by} f(ax - by)$, prove that $b \frac{\partial u}{\partial x} + a \frac{\partial u}{\partial y} + a = 2abu$.

c) State Bolzano-Weirstrass theorem.

d) If $\sum a_n$ is convergent then prove that $a_n \rightarrow 0$ as $n \rightarrow \infty$.

e) State Leibnitz test for alternating series.

f) Define exact differential equation. Also give necessary condition for differential equation $M(x, y)dx + N(x, y)dy = 0$ to be exact.

g) Define Clairaut's equation.

h) Define higher order homogeneous and non-homogeneous ordinary linear differential equations.

i) Solve $(D^4 - 4)y = 0$.



j) Solve $(2x + 3)^2 y'' + (2x + 3)y' + y = 0$.

SECTION-B

2. Prove that the rectangular solid of maximum volume which can be inscribed in a sphere is a cube.
3. Discuss convergence of $\{a_n\}$, where $a_n = 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$.
4. Discuss the convergence of the series $\sum_{n=1}^{\infty} \frac{n^n x^n}{n!}$.
5. Solve $\frac{dz}{dx} + \frac{z}{x} \log z = \frac{z}{x} (\log z)^2$.
6. Solve the method of variation of parameters $y'' - 2y' + y = e^{-x} \log x$.

SECTION-C

7. Evaluate $\iint_R (x+y)^2 dx dy$, where R is the parallelogram in the xy -plane with vertices $(1,0)$, $(3,1)$, $(2,2)$, $(0,1)$ using the transformations $u = x + y$ and $v = x - 2y$.
8. Solve $p^2 + 2py \cot x = y^2$.
9. Solve $x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x$.

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Total No. of Pages : 02

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

Subject Code : BTES-302-18

M.Code : 76394

Date of Examination : 19-05-2023

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) Distinguish between micro and macro instruction.
- (b) What is an interrupt?
- (c) What is an instruction pipeline?
- (d) What are the memory reference instructions? Give examples.
- (e) What is asynchronous data transfer?
- (f) What is register transfer language?
- (g) What is the principle of working of the cache memory? Explain.
- (h) When DMA mode of data transfer is suitable?
- (i) What are the main advantages of the hardwired control?
- (j) What are registers? Can they be called memory?



SECTION-B

2. What is an addressing mode? Explain various addressing modes in detail.
3. What are the types of instructions supported by 8085? Explain.
4. What is the role of interrupts in process transitions? Explain.
5. What is pipelined control? Explain.
6. Explain the concept of memory interleaving in detail.

SECTION-C

7. Calculate the following Problems using BOOTH'S algorithm :
 - (a) $(+13) \times (+6)$
 - (b) $(+13) \times (-6)$
 - (c) $(-13) \times (=6)$
 - (d) $(-13) \times (-6)$.
8. What are the ways in which the peripheral devices may transfer data to a computer system? What are the features of each of these ways? Compare the pros and cons of each type of data transfer.
9. With a neat hypothetical memory hierarchical picture, describe the concept of virtual memory and analyze the memory hierarchical questions with reference to it. Explain how performance improvement is achieved?

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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: 26-05-2023

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 identifiers and keywords? Give example.
- b) What is the use of break and continue statements?
- c) Differentiate between switch and nested if.
- d) How you can open and close a file?
- e) Differentiate between early and late binding.
- f) Discuss different methods to pass arguments to a function.
- g) What do you mean by an abstract class? Discuss its usage with example.
- h) What do you mean by function overloading? Give example.
- i) Discuss various file accessing modes.
- j) What is an inline function? How it is used?



SECTION-B

2. Explain various looping statements of C with suitable examples.
3. What is a friend function? Explain its importance with an example.
4. What do you mean by Multiple Inheritance? Explain with the help of an example.
5. What is a constructor? Write its main characteristics. Discuss its types.
6. Explain various files operations in C++ with examples.

SECTION-C

7. What is an exception? How exceptions are handled in C++. Explain with the help of a suitable example.
8. What is Polymorphism? How do we attain Run time Polymorphism? Explain with an example.
9. WAP using array of objects to enter roll no, name and marks of students. Find average marks of the students.

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Total No. of Pages : 02

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

Subject Code : BTIT-301-18

M.Code : 76391

Date of Examination : 17-05-2023

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 time complexity of finding the minimum or maximum value in a binary heap?
- b. How can you optimize the performance of binary search on a sorted array with repetitive elements?
- c. What is time-space tradeoff in algorithm design?
- d. What is the difference between in-place sorting algorithms and out-of-place sorting algorithms?
- e. How does the choice of data structure affect the efficiency of an algorithm?
- f. Differentiate between various Graph traversal algorithms.
- g. How circular linked list is different from simple linked list and what is its advantage?
- h. Write down the algorithm of linear search.
- i. What is a minimum spanning tree?
- j. What is the different type of notations for algorithm analysis?



SECTION-B

2. How can a graph be represented using an adjacency matrix? What is the time complexity of adding or removing edges using this representation?
3. Which data structure can be used to implement a breadth-first search algorithm? Elaborate by giving an example.
4. What is the difference between a stack and a deque (double-ended queue)? When would you use one over the other? Illustrate using deletion operation.
5. How does the performance of bubble sort depend on the initial ordering of the input elements? How can this be used to optimize the algorithm for specific types of input?
6. What is the maximum number of elements that can be stored in a stack of fixed size? How can a stack be used to reverse a string or a list? Write down steps for string "UNIVERSITY".

SECTION-C

7. How can a tree data structure be used to represent a hierarchical structure, such as a file system or an organization chart? What is the time complexity of finding the minimum or maximum value in a binary heap? How can this operation be performed efficiently?
8. How can a graph data structure be used to represent a social network? How can Dijkstra's algorithm be used to find the shortest path between two vertices in a weighted graph? What is the time complexity of this algorithm?
9. How does the time complexity of Merge sort compare to other sorting algorithms? Write down steps for Merge sort and Quick sort and explain using a sample array of numbers.

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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 : 07-06-2023

Time : 3 Hrs.

P.T.U Questions Pa

B.Tech IT Sem-

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 Protocols?
- b) What are the advantages of Optic fiber as a transmission media?
- c) Differentiate between Pure ALOHA and Slotted ALOHA.
- d) Explain the term Hamming Distance in brief.
- e) Explain the BOOTP protocol in brief.
- f) How many bits are consumed by IPv4 and IPv6 addresses respectively.
- g) What do you mean by congestion? Also explain the cause of congestion?
- h) Explain the UDP protocol in brief.
- i) What do you mean by Domain Name Space (DNS)? Explain
- j) Explain the term HTTP.



SECTION-B

2. Write a detailed note on following transmission media.
 - a) Twisted- pair
 - b) Co-axial cable
3. Write a detailed note on CSMA/CD.
4. Explain in detail about RARP protocol.
5. Write a detailed note on Token Bucket Algorithm.
6. Write a detailed note on Firewalls.

SECTION-C

7. Write a detailed note on OSI Model.
8. **Write a detailed note on the following protocols :**
 - a) Stop & wait
 - b) Go back-N ARQ
 - c) Selective repeat ARQ
9. **Explain the following terms in detail :**
 - a) DDNS
 - b) WWW
 - c) Bluetooth

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.



Total No. of Pages : 02

Roll No. _____

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 : 16-06-2023

Time : 3 Hrs.

Max. Marks : 60

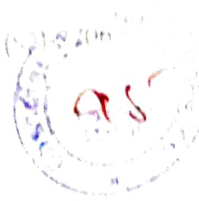
INSTRUCTIONS TO CANDIDATES :

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) Asymptotic analysis
- b) Recurrence relation
- c) Backtracking
- d) Dynamic Programming
- e) Shortest path algorithm
- f) Network flow
- g) Intractable Problems
- h) Cook's Theorem
- i) Computability Classes
- j) Heuristics.



SECTION-B

2. Explain the general principle of Greedy method and also list the applications of Greedy method.
3. Elaborate the asymptotic analysis of an algorithm with an example.
4. What is Minimum cost spanning tree? Explain an algorithm for generating minimum cost spanning tree.
5. Give solution to Subset sum problem using Backtracking technique.
6. Discuss the various characteristics of heuristics with suitable examples.

SECTION-C

7. Write an algorithm to compute 0/1 Knapsack problem using dynamic programming and explain it.
8. *"A topological ordering of a directed graph is a linear ordering of its vertices in which 'u' occurs before V in the ordering for every directed edge 'uv' from vertex 'u' to vertex V. Topological sorting has many applications, particularly in ranking issues like the feedback arc set." Justify.*
9. Define an Algorithm. Discuss the key characteristics of algorithm.

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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: 30-05-2023

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 Clan.
- b) What is social system?
- c) Explain the political system.
- d) Explain Swaraj.
- e) What is decentralization?
- f) Define Jajmani?
- g) What is history?
- h) What is regulation of society?
- i) What do you understand by term Marxism?
- j) Define Social Structures.



SECTION-B

2. Explain the concept of development in Pre-British phase.
3. Explain the different models of governing system.
4. What is the relationship between origin of family?
5. Explain the meaning and scope of Buddhist economics.
6. Explain the criteria of different social systems.

SECTION-C

7. Explain the implications of E.F Schumscher's idea of development.
8. Explain the ideas of political system as learnt from history.
9. Explain the nature and scope of relation between human being and society.

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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 : 02-06-23

Time : 3 Hrs.

Max. Marks : 60

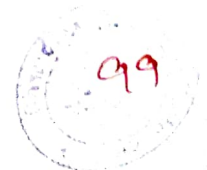
INSTRUCTIONS TO CANDIDATES :

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) List the various operating system services.
- b) What do you mean by Time-sharing systems?
- c) What is a thread?
- d) What is process control block?
- e) Differentiate between Deadlock Prevention and Deadlock Avoidance.
- f) Explain in brief about the term Compaction.
- g) Explain briefly the term Demand Paging
- h) What is critical section problem?
- i) Explain in brief about mutual exclusion in reference to Inter-process communication.
- j) Explain in brief about Bad Blocks.



SECTION-B

2. What is a process? Explain about process scheduling? Explain the different types of schedulers in detail.
3. Write a detailed note on Reader's & Writer's problem.
4. Write a detailed note on Deadlock Detection and Recovery.
5. Write short note on following in reference to memory management :
 - a) Page Fault
 - b) Working set
6. Write a detailed note on Direct Memory Access.

SECTION-C

7. Explain the following structure of an operating system in detail :
 - a) Layered
 - b) Monolithic
 - c) Microkernel
8. Write a detailed note on following :
 - a) Device independent I/O software
 - b) Device Controllers
 - c) Interrupt handler
9. Write a detailed note on following in reference to Inter-process communication :
 - a) Dining philosopher problem
 - b) Monitors

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 the model of investigating and prosecuting cybercrime under Cyber Law.
3. List and discuss the responsibilities and challenges of Law Enforcement agencies.
4. Explain in brief the remedies in enforcing Intellectual Property Rights.
5. Compare and discuss the various aspects of Privacy and Security.
6. Explain the different challenges of Global Law Enforcement agencies.

SECTION-C

7. What are the different roles of Certifying Authorities? Explain.
8. Explain the different forms of Intellectual Property Rights.
9. Explain in detail, Infringement of copyright and Permitted use of Copyright.

Total No. of Pages : 02

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Roll No. _____

Total No. of Questions : 09

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

CYBER LAWS AND IPR

Subject Code : BTIT-509-18

M.Code : 78263

Date of Examination : 06-06-2023

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 Cyber Law?
- b) What are three categories of cyber crime?
- c) Define the term Malware.
- d) What is Cyber fraud?
- e) What do you mean by cybercriminals?
- f) What is a copyright? What are its characteristics?
- g) List the grey areas of Information Technology Act, 2000.
- h) List the objectives of IT Act, 2000.
- i) Explain the importance of copyright.
- j) What do you understand from right of reproduction?

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P.T.U Questions
B.Tech IT Sem



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

SOFTWARE ENGINEERING

Subject Code : BTIT-504-18

M.Code : 78259

Date of Examination : 08-06-2023

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 term feasibility study.
- b) Write at least two advantages of Evolutionary model.
- c) Explain the term Cohesion in brief.
- d) Explain at least two uses of Structure chart.
- e) Differentiate between static and dynamic analysis.
- f) Define the term test case.
- g) Explain quality management.
- h) Explain GANTT charts.
- i) Explain the uses of cost estimation.
- j) What is Six Sigma in software engineering? Discuss.

SECTION-B

2. What are the advantages and disadvantages of Spiral Model of software life cycle?
3. Explain in detail about Function oriented software design.
4. Explain in detail about reliability growth modeling.
5. Write a detailed note on white box testing.
6. Write a detailed note on Component based software development.

SECTION-C

7.
 - a) Write a detailed note on functional and non-functional requirements.
 - b) Explain in detail about Requirements Gathering.
8.
 - a) Write a detailed note on coding standards.
 - b) Explain in detail about Object Modeling using UML.
9. Write a detailed note on ISO and SEI CMMI.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem-5)
DATABASE MANAGEMENT SYSTEMS

Subject Code : BTIT502-18

M.Code : 78257

Date of Examination : 09-06-2023

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 data independence.
- b. What is the difference between alter and update command in SQL?
- c. What is referential integrity constraint?
- d. State 1 NF.
- e. Define hashing in DBMS.
- f. What is conflict serializability?
- g. What is the meaning of deferred update?
- h. Give an example of authentication methods.
- i. Give real life example of distributed databases.
- j. What is intrusion detection?



SECTION-B

2. Discuss the different mapping cardinalities in ER Models with the help of examples.
3. Explain the role of Normalization in databases. How Normalization helps in better quality for maintaining the databases.
4. Explain the difference between GroupBy and OrderBy clause in SQL. Give suitable example for support of your answer.
5. What is B-Tree? Discuss the different properties of B-Trees.
6. Discuss Timestamp ordering protocol for concurrency control management.

SECTION-C

7. What is access control? Compare and Contrast DAC, MAC and RBAC models of access controls.
8. Explain the process of query optimization in DBMS? Discuss cost-based query optimization algorithm.
9. **Write a Short note on :**
 - a. ACID Properties
 - b. Object Relational Databases.

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 : 04

Total No. of Questions : 11

B.Tech (IT) (Sem-5)
UNIVERSAL HUMAN VALUES-2

Subject Code : HSMC-122-18

M.Code : 78260

Date of Examination : 10-06-23

Time : 3 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. Write True/False and Fill in the blanks :

(1 × 10 = 10)

- i) is the foundational value in relationships.
..... रिश्तों में मूलभूत मूल्य है।
..... रिश्तियाँ विच मूल्य मूल है।
- ii) There are orders in nature.
प्रकृति में आदेश हैं।
कुदरत विच आदेश हन।
- iii) The process for value education is
मूल्य शिक्षा के लिए प्रक्रिया है।
मूल सिद्धिआ लड़ी प्रक्रिया है।
- iv) Right understanding + = mutual prosperity.
सही समझ + = पारस्परिक समृद्धि।
ठीक समझ + = आपसी सुखहाली।
- v) To be in a state of liking is
पसंद के हिसाब से एक अवस्था में होना है।
पसंद के हिसाब वलें ईक दसा विच होना है।



- vi) Giving all the priorities to physical facilities is living with animal consciousness.
 शारीरिक सुविधाओं को सभी प्राथमिकताएँ देना पशु चेतना के साथ रहना है।
 ਸਰੀਰਕ ਸਹੂਲਤਾਂ ਨੂੰ ਹੀ ਸਾਰੀਆਂ ਪਹਿਲਾਂ ਦੇਣੀਆਂ ਪਸ਼ੂ ਬਿਰਤੀ ਨਾਲ ਰਹਿਣਾ ਹੈ।
- vii) Prosperity and wealth are equivalent.
 समृद्धि और धनवन्तता बराबर हैं।
 ਖੁਸ਼ਹਾਲੀ ਅਤੇ ਅਮੀਰੀ ਬਰਾਬਰ ਹਨ।
- viii) Amassing weapons is the best way of ensuring fearlessness in society.
 हथियारों को एकत्र करना समाज में निर्भयता सुनिश्चित करने का सबसे अच्छा तरीका है।
 ਹਥਿਆਰਾਂ ਨੂੰ ਇਕੱਠੇ ਕਰਨਾ ਸਮਾਜ ਵਿੱਚ ਨਿਰਭੈਤਾ ਸੁਨਿਸ਼ਚਿਤ ਕਰਣ ਦਾ ਸਭ ਤੋਂ ਵਧੀਆ ਢੰਗ ਹੈ।
- ix) Ethical human conduct leads to mutual fulfilment.
 नैतिक मानव आचरण से परस्पर पूर्ति हो जाती है।
 ਨੈਤਿਕ ਮਨੁੱਖੀ ਵਿਉਹਾਰ ਪਰਸਪਰ ਪੂਰਕਤਾ ਵੱਲ ਲੈ ਜਾਂਦਾ ਹੈ।
- x) Natural acceptance remains constant with time.
 प्राकृतिक स्वीकृति समय के साथ स्थिर रहती है।
 ਪ੍ਰਾਕ੍ਰਿਤਿਕ ਸਵੀਕ੍ਰਿਤਿ ਸਮਯ ਕੇ ਸਾਥ ਸਥਿਰ ਰਹਿੰਦੀ ਹੈ।

SECTION-B

(5 × 4 = 20)

2. How there is recyclability and self-regulation in nature?
 प्रकृति में आत्म नियमन और पुनरावृत्ति कैसे है?
 ਕੁਦਰਤ ਵਿੱਚ ਆਤਮ-ਨਿਯਮਤਾ ਅਤੇ ਚੱਕਰੀ-ਕ੍ਰਮ ਕਿਵੇਂ ਹੈ?
3. Explain harmony in family.
 परिवार में तालमेल के बारे में बताएं।
 ਪਰਿਵਾਰ ਵਿੱਚ ਤਾਲਮੇਲ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।
4. Differentiate between intention and competence. How do we come to confuse between the two?
 इरादे और क्षमता के बीच क्या अंतर है? कैसे हम गलती करते हैं?
 ਇਰਾਦੇ ਅਤੇ ਸਮਰੱਥਾ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ? ਕਿਵੇਂ ਅਸੀਂ ਗਲਤੀ ਕਰਦੇ ਹਾਂ?
5. Explain competence in professional-ethics.
 पेशेवर नैतिकता में क्षमता समझाओ।
 ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਸਮਰੱਥਾ ਸਮਝਾਓ।

6. What are the basic guidelines of value education?

मूल्य शिक्षा के बुनियादी दिशा निर्देश क्या हैं?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੇ ਬੁਨਿਆਦੀ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

SECTION-C

(5 × 6 = 30)

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

मौजूदा समय में पेशे के मुख्य अनैतिक तरीके क्या हैं? मूल कारण और संभव समाधान का विश्लेषण करें।

ਮੌਜੂਦਾ ਸਮੇਂ ਵਿਚ ਪੇਸ਼ੇ ਦੇ ਮੁੱਖ ਅਨੈਤਿਕ ਤਰੀਕੇ ਕੀ ਹਨ? ਮੂਲ ਕਾਰਨ ਅਤੇ ਸੰਭਵ ਸਮਾਧਾਨ ਦਾ ਵਿਸ਼ਲੇਸ਼ਣ ਕਰੋ।

ਜਾਂ

What is the need of value-education?

मूल्य-शिक्षा की क्या जरूरत है?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਕੀ ਜ਼ਰੂਰਤ ਹੈ?

8. What is the meaning and purpose of self-exploration?

स्वयं-अन्वेषण के अर्थ और उद्देश्य क्या है?

ਆਤਮ-ਅਧਿਐਨ ਦੇ ਮਤਲੱਬ ਅਤੇ ਉਦੇਸ਼ ਕੀ ਹਨ?

ਜਾਂ

How is a human-being and co-existence of self and body? Explain pre-conditioning, sensation and natural-acceptance.

इंसान स्वयं और शरीर का सह-अस्तित्व कैसे है? पूर्व-मान्यता, संवेदना और प्राकृतिक-स्वीकृति समझाओ।

ਮਨੁੱਖ ਸਵੈ ਅਤੇ ਸਰੀਰ ਦਾ ਸਹਿ-ਅਸਤਿਤਵ ਕਿਵੇਂ ਹੈ? ਪੂਰਵ-ਮਾਨਤਾ, ਸੰਵੇਦਨਾ ਅਤੇ ਸਹਿਜ-ਸਵਿਕਰਿਤੀ ਸਮਝਾਓ।

9. Compare the four orders in nature on the basis of thie salient aspects.

मुख्य पहलुओं के आधार पर प्रकृति में चार आदेशों की तुलना करें।

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

ਜਾਂ

What do you mean by reaction and response? Give some examples.

आप का प्रतिक्रिया और अनुक्रिया से क्या मतलब है? कुछ उदाहरण दें।

ਤੁਹਾਡਾ ਯੁਕਤ-ਕਿਰਿਆ ਅਤੇ ਪ੍ਰਤੀ-ਕਿਰਿਆ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ? ਇਸ ਦੇ ਕੁਝ ਉਦਾਹਰਣ ਦਿਓ।

10. What is happiness and prosperity? What are the wrong notions about attaining happiness and prosperity?

ਸੁਖ ਔਰ ਸਮ੍ਰਿਢਿ ਕਯਾ ਹੈ? ਖੁਸ਼ੀ ਔਰ ਸਮ੍ਰਿਢਿ ਕੋ ਪ੍ਰਾਪਤ ਕਰਨੇ ਕੇ ਬਾਰੇ ਮੇਂ ਗਲਤ ਖਾਰਯਾ ਕਯਾ ਹੈ?

ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਕੀ ਹੈ? ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਨੂੰ ਪ੍ਰਾਪਤ ਕਰਨੇ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਨਾ ਕੀ ਹੈ?

ਜਾਂ

What is the expanse of human living? Why it is necessary to understand harmony at all levels? Critically evaluate the current state of living at the level of self.

ਮਾਨਵ ਜੀਵਨ ਕੀ ਫੈਲਾਵ ਕਿਤਨਾ ਹੈ? ਸਭੀ ਸ਼ਤਰੋਂ ਪਰ ਸਾਮੰਜਸਯ ਸਮਝਨਾ ਕਯੋਂ ਜ਼ਰੂਰੀ ਹੈ? ਸਟੀਕਤਾ ਸੇ ਸਵਯੰ ਕੇ ਸ਼ਤਰ ਪਰ ਰਹਨੇ ਕੀ ਵਰਤਮਾਨ ਸ਼ਿਥਿਤਿ ਕਾ ਮੂਲਯਾਂਕਨ ਕਰੋ।

ਮਨੁੱਖ ਜੀਵਨ ਦੀ ਫੈਲਾਵ ਕਿੰਨਾ ਹੈ? ਸਾਰੇ ਸਤਰਾਂ ਉੱਤੇ ਤਾਲਮੇਲ ਸਮਝਣਾ ਕਿਉਂ ਜ਼ਰੂਰੀ ਹੈ? ਆਪਣੇ ਸਵੈ ਦੇ ਆਧਾਰ ਦੇ ਪੱਧਰ ਉੱਤੇ ਰਹਿਣ ਦੀ ਵਰਤਮਾਨ ਹਾਲਤ ਦਾ ਅਲੋਚਨਾਤਮਿਕ ਮੁਲਾਂਕਣ ਕਰੋ।

11. What are the problems faced due to the wrong notions about happiness and prosperity?

ਸੁਖ ਔਰ ਸਮ੍ਰਿਢਿ ਕੇ ਬਾਰੇ ਮੇਂ ਗਲਤ ਖਾਰਯਾਔਂ ਕੇ ਕਾਰਯ ਪੇਸ਼ ਆ ਰਹੀ ਸਮਸਯਾਂ ਕਯਾ ਹੈਂ?

ਖੁਸ਼ੀ ਅਤੇ ਖੁਸ਼ਹਾਲੀ ਦੇ ਬਾਰੇ ਗਲਤ ਧਾਰਨਾਵਾਂ ਦੇ ਕਾਰਨ ਕੀ ਸਮੱਸਿਆਵਾਂ ਪੇਸ਼ ਆ ਰਹੀਆਂ ਹਨ?

ਜਾਂ

Describe in brief, the salient values in human relationships.

ਮਾਨਵੀਯ ਰਿਸ਼ਤੋਂ ਮੇਂ ਸੰਖਿਪਤ ਮੁਖਯ ਮੂਲਯੋਂ ਕਾ ਵਿਕਰਯ ਦੇਂ।

ਮਾਨਵੀ ਰਿਸ਼ਤਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਮੁੱਖ ਮੁੱਲਾਂ ਦਾ ਵਰਨਣ ਕਰੋ।

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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 : 01-06-2023

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.

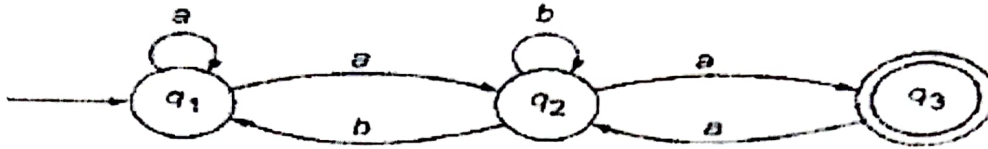
SECTION-A

1. Write briefly :
 - a) Type 1 grammar
 - b) Moore machine
 - c) Language
 - d) Chain rule
 - e) Instantaneous Description of TM
 - f) GNF productions
 - g) Halting problem of TM
 - h) Define Kuroda Normal Form
 - i) NP-complete
 - j) Context sensitive grammars.



SECTION-B

2. Explain with example procedure to convert a Moore machine to a Mealy machine.
3. Prove that string represented by following transition system is $(a+a(b+aa)^*b)^* a(b+aa)^*a$.



4. Define Ambiguous? Explain with example when the grammar is ambiguous.
5. Find a reduced grammar equivalent to the given grammar

$$S \rightarrow AC \mid B, \quad A \rightarrow a, \quad C \rightarrow c \mid BC, \quad E \rightarrow aA \mid e$$

6. Describe the Cook-Levin Theorem

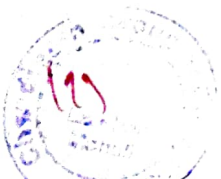
SECTION-C

7. Find a grammar in GNF equivalent to the grammar

$$E \rightarrow E + T \mid T \quad T \rightarrow T * F \mid F \quad F \rightarrow (E) \mid a$$

8. Discuss the Universality of Cellular Automata.
9. Design PDA for $\{a^n b^m \mid n > m > 1\}$.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

MACHINE LEARNING

Subject Code : BTIT 608-18

M.Code : 79627

Date of Examination : 17-06-2023

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. Candidates have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each. Candidates have to attempt any TWO questions.

P.T.U Questions

B.Tech IT Sem-

SECTION-A

1. Answer the following questions :

- a. Discuss the meaning and need of feature scaling.
- b. What do you mean by training data and testing data?
- c. Define root mean squared error and mean absolute error.
- d. Discuss the role of gradient descent in logistic regression.
- e. Explain the working of support vector machine.
- f. Differentiate between sensitivity and specificity.
- g. Write about the density based methods of clustering.
- h. Write a brief note on fitness function. How is it used in genetic algorithm?
- i. Explain the process of polynomial regression.
- j. What do you mean by overfitting?



(S)-2568

SECTION-B

2. Define a well posed learning problem. Discuss any two examples of a well posed learning problem.
3. What is the need of data preprocessing? Explain any three methods of data preprocessing.
4. With the help of a suitable example, explain how machine learning based simple linear regression is carried out. How the scatter plot is used in this process?
5. How is decision tree used for classification? Explain the usage of information gain and ginni index in the construction of decision trees.
6. What are association rules? Write down the steps of apriori algorithm for association rule mining.

SECTION-B

7. Write a detailed note on types of machine learning. With the help of suitable examples discuss the differences between the types.
8. **Explain the working of following algorithms:**
 - a) Random forest classification
 - b) Naive Bayes algorithm.
9. Discuss the need and applications of artificial neural networks. Explain the architecture of an artificial neural network and discuss how it is inspired from the biological neuro transmission. What is significance of activation functions?

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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 : 30-05-2023

Time : 3 Hrs.

Max. Marks : 60

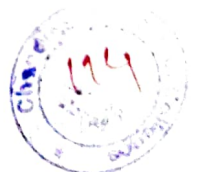
INSTRUCTIONS TO CANDIDATES :

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) WWW
- b) PHP
- c) Operators
- d) HTML
- e) Meta Tags
- f) SSL
- g) MySQL
- h) GET method
- i) POST method
- j) JSON.



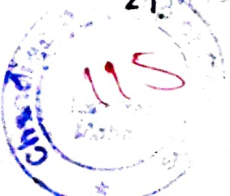
SECTION-B

2. Explain various types of data types we can use in PHP
3. Explain the layout of HTML in detail with example?
4. Write short note on style sheets.
5. How we can connect My Sql database in PHP? Explain with the help of an example.
6. Explain JavaScript DOM in detail.

SECTION-C

7. What is the role of Client/Server programming in the web designing?
8. What is HTML? Explain the various types of HTML tags. Distinguish between HTML and DHTML.
9. Write advantages and disadvantages of AJAX and also explain how we can read and write JSON on client and server.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

CLOUD COMPUTING

Subject Code : BTIT613-18

M.Code : 79632

Date of Examination : 03-06-23

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) Characteristics of Cloud
- b) IT as a Service
- c) Virtualization
- d) Utility Computing
- e) Cloud Service Models
- f) Hypervisor and its types
- g) Vertical Scalability
- h) Private Cloud
- i) Account and Service hijacking
- j) Multitenancy.



SECTION-B

2. Define Cloud Computing and what is the vision of cloud computing? Explain
3. Differentiate between :
 - a) Grid computing and Utility computing
 - b) Elasticity and Scalability.
4. What are pros and cons of Virtualization?
5. Compare the following :
 - a) SaaS model and PaaS model
 - b) Public Cloud and Private Cloud.
6. Discuss the different methods to reduce cloud security breaches.

SECTION-C

7. What are the different driving factors towards cloud? What are the applications of Cloud Computing?
8. What are the different types of cloud migration strategies? Discuss in details.
9. What are the main differences between Cloud Platforms and Web Services? 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 : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-6)
AGILE SOFTWARE DEVELOPMENT

Subject Code : BTIT609-18

M.Code : 79628

Date of Examination : 17-05-2023

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 role of product owner in Scrum Framework?
- b) What are the major benefits of Agile Software Development?
- c) What are the important agile methods? Explain briefly.
- d) Is Agile software development faster than traditional methods? Comment and explain.
- e) What are the two attributes of open closed principle?
- f) "If the dependencies are inverted, it is object oriented design". Explain.
- g) What do you mean by agility of software?
- h) What is test driven development?
- i) What do you understand by refactoring?
- j) What do you understand by Agile design practices?



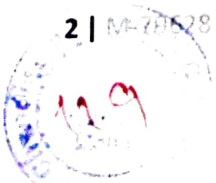
SECTION-B

2. Explain the Liskov substitution in detail.
3. Discuss the project phases in Agile Scrum Framework.
4. Discuss the Agile Principles in detail.
5. Discuss Agile lifecycle and its impact on testing in detail.
6. "*Kanban is not a software methodology or a project management system*". Explain the concept in detail.

SECTION-C

7. What is the importance of abstraction in following the open closed principle? Explain through appropriate examples.
8. **Compare :**
 - a) Class and object interfaces
 - b) Scrum and Kanban
9. What is the present market scenario and adoption of Agile? Explain the business benefits risks and mitigation with Agile development methodology.

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SECTION-B

2. Discuss an example of passive attack on network system.
3. How Euclidean algorithm is useful in Network Security Applications?
4. What is role of DES algorithm in cryptography?
5. Discuss security of Hash Function and Macs.
6. What is access and security controls in Network?

SECTION-C

7. What are key distribution techniques? Explain any one with example.
8. What is the concept of MD5 Algorithm? How it is used in Cryptography?
9. Discuss about design and types of Firewalls. How they are used in securing the Computer Networks?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

BIG DATA

Subject Code : BTIT-601-18

M.Code : 79623

Date of Examination : 29-05-2023

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. Explain the following in brief:

- a) Data Node and Block
- b) JSON
- c) PIG
- d) What are the limitations of conventional systems?
- e) Advantages of HADOOP approach
- f) Future Scope of ERP
- g) Data Mart
- h) What is XML?
- i) What is hive used for?
- j) What are the challenges of Big Data?



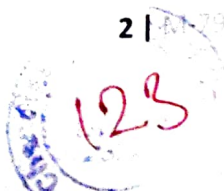
SECTION-B

2. What are the 3 V's of Big data? Explain with the help of two big data case studies.
3. Explain the terms in brief with respect to analytical tool R:
 - a) Differentiate between vector, List, Matrix and Data frame.
 - b) Differentiate between library() and require() functions.
4. What is a Big data analytic tool? Is MongoDB faster than Cassandra? What are the key differences between two?
5. What is Data Visualization? Discuss the modern tools and packages used for data visualization.
6. Differentiate between classification and clustering terms used with respect to big data.

SECTION-C

7. Discuss Hadoop Ecosystem? Also explain various components of Hadoop Ecosystem.
8. Explain following in brief with respect to MongoDB :
 - a) Collections and documents
 - b) Indexing and retrieval
9.
 - a) Discuss in detail HDFS architecture with diagram.
 - b) Discuss in detail GPFS architecture with diagram.

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Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-7,8)
SOFTWARE TESTING AND QUALITY ASSURANCE

Subject Code : BTIT 701-18

M.Code : 90569

Date of Examination : 01-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

*P.T.U Questions Paper
B.Tech IT Sem-7*

1. Write briefly :

- a) Testing can detect the presence of errors, not their absence. Why?
- b) Testing should begin requirements analysis phase. Why?
- c) Quality without timeliness and cost considerations is meaningless. Why?
- d) Why is it important to develop test cases for valid and invalid input conditions?
- e) What are the types of testing required for client server systems?
- f) What are the objectives of software testing? List out the various testing techniques.
- g) What is the difference between verification and validation?
- h) What is Test case? How does it differ from test plan?
- i) What is scenario based testing?
- j) What do you understand by control structure testing?



SECTION-B

2. What are the quality assurance activities? Explain.
3. Define the terms :
 - a) Verification
 - b) Validation
 - c) Failure
 - d) Error
 - e) Fault
4. Explain the concepts of random and partition testing for classes in object oriented testing methods.
5. What are the important issues in Object Oriented testing? Explain.
6. Discuss configuration management for web engineering.

SECTION-C

7. What are the various quality assurance standards? Explain briefly.
8. **Explain testing :**
 - a) Web based systems
 - b) Multi platform systems.
9. What are the characteristics of a good test case? Develop a set of test cases for testing the routine that reads in three integer values representing three sides of a triangle and calculate its area.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem.-7, 8)
DATAWARE AND MINING

Subject Code : BTIT-706-18

M.Code : 90558

Date of Examination : 18-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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SECTION-A

1. Write briefly :

- a) OLAP
- b) Data Warehousing
- c) Gini Index
- d) Pre-processing
- e) Data Store
- f) Schema
- g) DHP
- h) K-mediods
- i) Data vs. Information
- j) MOLAP.



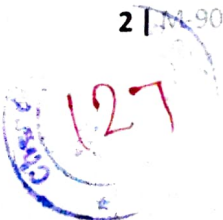
SECTION-B

2. Explain the data pre-processing process in detail.
3. Explain the multidimensional schemas - Star, Snowflake, and Fact Constellation.
4. What is data mart? Differentiate between data mart and data warehouse.
5. Differentiate between decision tree and decision tree induction.
6. Describe in detail the operations performed on a cube.

SECTION-C

7. Explain with help of example Apriori algorithm and association rule mining.
8. Write a detailed note on Bayes theorem and Naive Bayes algorithm.
9. Describe various techniques for accuracy estimation. How to increase the accuracy of classifier?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Information Technology) (Sem.-7, 8)

SOFTWARE PROJECT MANAGEMENT

Subject Code : BTIT702-18

M.Code : 90550

Date of Examination : 20-05-2023

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 disadvantages of Spiral Model?
- b. Define COCOMO₂ model.
- c. What is meant by cost flow forecasting?
- d. Define Monte Carlo simulation.
- e. What is Project Sequencing?
- f. What is Software Quality Assurance Plan?
- g. Discuss behavior analysis.
- h. Discuss Hackman & Oldham's Job Characteristics Model.
- i. What are the benefits of test automation?
- j. Write a short note on Software Reliability.



SECTION-B

2. What are the steps in cost-benefit analysis? Discuss the cost-benefit evaluation techniques.
3. Define following :
 - a. Impact of Stress, Health and Safety on organizational structure.
 - b. Nature and Types of Risk Management.
4. Illustrate the PERT method for identifying the critical path of project.
5. Distinguish between CMMI and ISO models.
6. What are the types of Contracts and its stages?

SECTION-C

7. Write in detail the monitoring and control of software project management cycle. Discuss the various project reviewing techniques.
8. What are the criteria's for selecting the right person for the Job in Software Company?
9. Explain the different approaches for Project Management. Give the overview of any one tool for Project Management.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering/Electronics & Communication Engineering) (Sem-3)

PHILOSOPHY

Subject Code : HSMC-102-18

M.Code : 77082

Date of Examination : 07-06-2023

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.

P.T.U Questions Paper
B.Tech ECE Sem -

SECTION-A

1. Write briefly :

- a) What is ignorance?
- b) What is the main theme of Nasadiya Sukta of Rig Veda?
- c) What is the main content of Plato's Symposium?
- d) What is the best tool of acquiring knowledge?
- e) What are ethics?
- f) What do you mean by the transcendental self?
- g) Is knowledge discovered or invented?
- h) What does Foucault mean by knowledge is power?
- i) What did Francis Bacon mean by knowledge is power?
- j) What is Vakyapadiyam?



SECTION-B

2. Write a note on knowledge according to Greek Philosophy.
3. Discuss the difference between moral values and ethical values.
4. What is Satyam in Indian Philosophy?
5. What is knowledge as depicted in the Bhagavad Gita?
6. "*Word is the root of knowledge*". Discuss according to Bhartrahari's interpretation.

SECTION-C

7. Discuss the different tools of acquiring knowledge.
8. Discuss the different schools of Indian Philosophy.
9. Discuss the subject matter of the Upanishads.

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-3)
NETWORK THEORY
Subject Code : BTEC-304-18
M.Code : 76447

Date of Examiantion : 29-05-2023

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 an impedance function with zeroes at $s=-1$ and -3 , poles at $s=0$ and $s=(-2)$. Comment on whether it will generate RC, RL or RC circuit?
- b. What are hybrid parameter? Where are they used?
- c. Represent and derive the series interconnection of 2-port network.
- d. What are the properties for a polynomial to be Hurwitz?
- e. What is the difference between network synthesis and network analysis?
- f. A series RL circuit has $R=10\Omega$, $L=10$ mH. Find $i(t)$ when $V=10V$.
- g. Find $f(t)$ if $F(s)=\frac{s+8}{s^2+81}$
- h. Define reciprocity theorem and state its applicability.
- i. What do you-mean by active and reactive power?
- j. State any two properties of Fourier Transform.

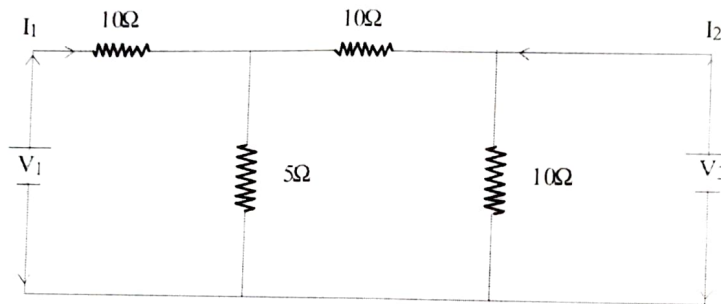


SECTION-B

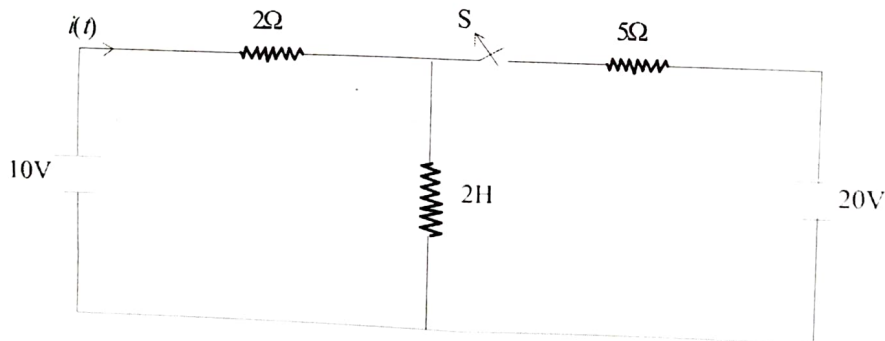
2. What are positive real functions? Discuss the necessary and sufficient conditions of PR functions. Check if the function is PR?

$$Z(s) = \frac{s^3 + 5s^2 + 9s + 3}{s^3 + 4s^2 + 7s + 9}$$

3. What are different types of filters? Explain any two in detail.
4. Obtain the transmission parameters of the following network:

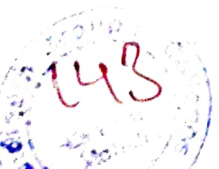


5. What are the advantages of 3-phase supply? Explain Millman's method for solving unbalanced systems.
6. In the given Fig, Switch S is closed and steady state has been reached. S is opened at $t=0$. Find current through inductor, $i(t)$.

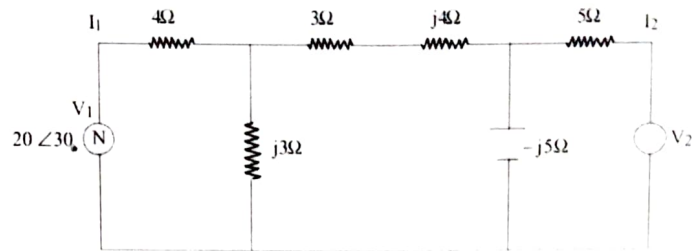


SECTION-C

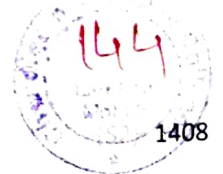
7. If a constant-K high pass filter has cut-off frequency of 10 KHz and nominal impedance R_o is 7000Ω , design the T- and π -sections of this filter. Determine its characteristic impedance, phase constant at 25 KHz, and attenuation at 8KHz.



8. Realize the following function using all four canonical forms:
9. Find V_2 so that there is no current in $(3+j4)\Omega$ branch.



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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-3)
ELECTROMAGNETIC WAVES

Subject Code : BTEC-303-18

M.Code : 76446

Date of Examination: 26-05-2023

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 reflection and refraction of a plane wave. Explain.
- b) Explain how VSWR can be determined using a smith chart.
- c) Classify the types of transmission lines.
- d) Define propagation constant.
- e) Define clearly dominant and degenerate modes with examples.
- f) State the significance of smith chart and its features.
- g) What is meant by characteristic impedance of transmission line?
- h) Define polarization.
- i) What is the equation of continuity for steady currents?
- j) What are the conditions for a field to be irrotational?



SECTION-B

2. Write and explain Maxwell's equation for static fields.
3. Explain that the electromagnetic wave is transverse in nature.
4. Discuss about lossless and distortionless transmission lines.
5. A rectangular waveguide with dimensions $4\text{cm} \times 2\text{cm}$ operates at 10 GHz. Find and of mode.
6. Write a short note on wave impedance for free space..

SECTION-C

7. Write a short note on reflection of uniform plane waves.
8. Discuss reflection of electromagnetic waves from a perfect insulator incident obliquely.
9. What is understood by polarization of EM waves? Explain linear, elliptical and circular polarization with appropriate figures.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-3)

MATHEMATICS III

Subject Code : BTAM-303-18

M.Code : 76448

Date of Examination : 24-05-2023

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) State second shifting theorem of Laplace transform.
- b) Evaluate $L^{-1} \left(\frac{9}{3s+2} \right)$.
- c) Find the Fourier coefficient a_n for the function $f(x) = x$.
- d) What is the Inversion formula for Fourier transform?
- e) What is the Z-transform of $\{ {}^n C_k \}$ where $0 \leq k \leq n$?
- f) State Final value theorem of Z-transform.
- g) What do you mean by mutually exclusive events?
- h) The mean and variance of binomial distribution is 9 and $\frac{4}{3}$ respectively. Find $P(X \geq 1)$.
- i) Define Degrees of Correlation.
- j) Explain the term, "Simple and Composite hypothesis" with examples.



SECTION-B

2. Find the Laplace transform of the following function of t , $t \geq 0$.

$$e^{2t} \sin 3t \cos t.$$

3. Evaluate $L^{-1} \left(\frac{1}{(s^2 + 6s + 13)^2} \right)$

4. Find the Z-transform of $\left(\frac{3}{4}\right)^n - \left(-\frac{1}{3}\right)^n$.

5. A bag contains 4 red and 3 black balls. A second bag contains 2 red and 4 black balls. One ball is selected at random. From the selected bag, one ball is drawn. Find the probability that the ball drawn is red.

6. Fit a straight line to the following data considering y as a dependent variable:

x	1.1	2	3	5	6.5
y	0	1	2	3	4

SECTION-C

7. Express $\sin x$ as a cosine series in $0 < x < \pi$.

8. Fit a poisson distribution to the following data:

x	0	1	2	3	4
f	109	65	22	3	1

9. Apply Convolution theorem to find inverse Laplace transform of $\left(\frac{1}{s(s^2 + 9)^2} \right)$.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem-3)
DIGITAL SYSTEM DESIGN

Subject Code : BTEC-302-18

M.Code : 76445

Date of Examination : 05-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. Write briefly :

- a) Design NOR gate using universal gates.
- b) Minimize using Boolean algebra $x'yz + yz' + x$.
- c) Discuss VHDL constructs.
- d) Convert $(1011110)_{\text{Binary}}$ to Gray code.
- e) Multiply 101101 by 1001.
- f) Convert $(1001\ 1000)_{\text{BCD}}$ to Excess-3 code.
- g) Implement 4:1 multiplexer using 2:1 multiplexers.
- h) Convert the following expressions to canonical POS : $(A'+B+C)(B'+C')$.
- i) Write De-Morgan's theorem.
- j) Design Half Subtractor circuit.



SECTION-B

2. Implement the following function using Decoder

$$F(A,B,C,D) = \sum m(0,1,2,3,6,7,8,12).$$

3. Design BCD to 7 Segment Display.
4. How Master slave flip flop is used to avoid race around condition.
5. Write short note on PAL, PLA, CPLD.
6. Discuss various modeling styles in VHDL.

SECTION-C

7. Describe the various characteristics of D/A convertor. Also, explain the working of R-2R D/A convertor.
8. Design MOD 7 counter using JK flip flop.
9. Minimize using K Map technique :

$$F(w,x,y,z) = \sum m (0,1,2,3,5,7,8,12,13,14,15)+ d(4,11)$$

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 varactor diode and draw its symbol? Explain its V-I characteristics.
3. Explain the diffusion current and drift current.
4. Explain how ideal diode work as switch. Draw its equivalent circuit.
5. What is construction process of Depletion-type MOS?
6. Explain the process of photolithography.

SECTION-C

7. Compare the three configurations of transistor: CE, CB and CC.
8. Explain the construction and working of I-V characteristics of MOSFET.
9. Write short note on the following :
 - a) Ebers Moll model
 - b) Tunnel diode

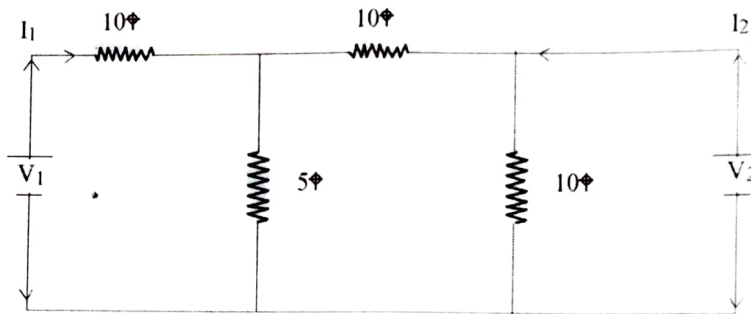
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SECTION-B

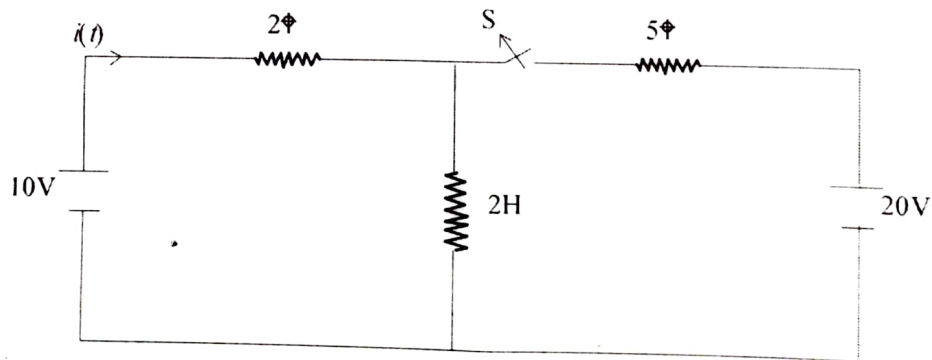
2. What are positive real functions? Discuss the necessary and sufficient conditions of PR functions. Check if the function is PR?

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3. What are different types of filters? Explain any two in detail.
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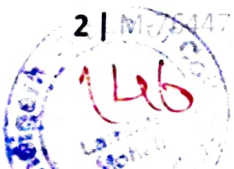


5. What are the advantages of 3-phase supply? Explain Millman's method for solving unbalanced systems.
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SECTION-C

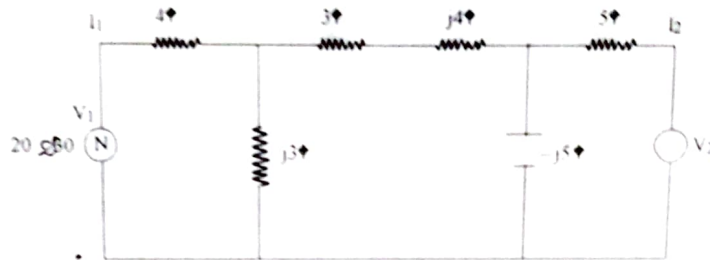
7. If a constant-K high pass filter has cut-off frequency of 10 KHz and nominal impedance R_0 is 7000Ω , design the T- and π -sections of this filter. Determine its characteristic impedance, phase constant at 25 KHz, and attenuation at 8KHz.



8. Realize the following function using all four canonical forms:

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

9. Find V_2 so that there is no current in $(3+j4)\Omega$ branch.



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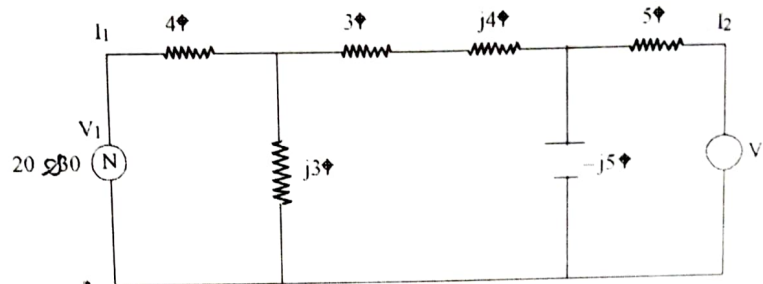


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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-3)

NETWORK THEORY

Subject Code : BTEC-304-18

M.Code : 76447

Date of Examination : 29-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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SECTION-A

1. Write briefly :

- a. Write an impedance function with zeroes at $s=-1$ and -3 , poles at $s=0$ and $s=(-2)$. Comment on whether it will generate RC, RL or RC circuit?
- b. What are hybrid parameter? Where are they used?
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- d. What are the properties for a polynomial to be Hurwitz?
- e. What is the difference between network synthesis and network analysis?
- f. A series RL circuit has $R=10\Omega$, $L=10$ mH. Find $i(t)$ when $V=10V$.
- g. Find $f(t)$ if $F(s)=\frac{s+8}{s^2+8}$
- h. Define reciprocity theorem and state its applicability.
- i. What do you-mean by active and reactive power?
- j. State any two properties of Fourier Transform.

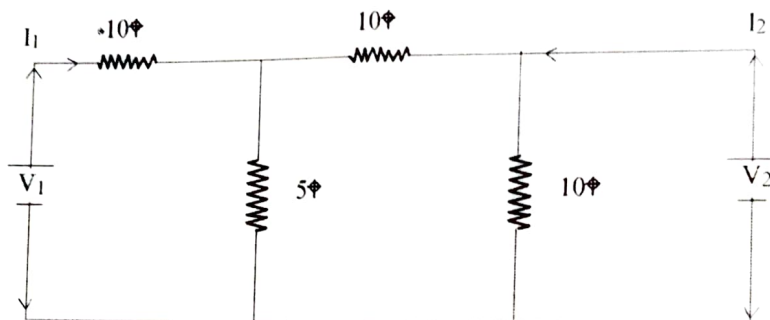


SECTION-B

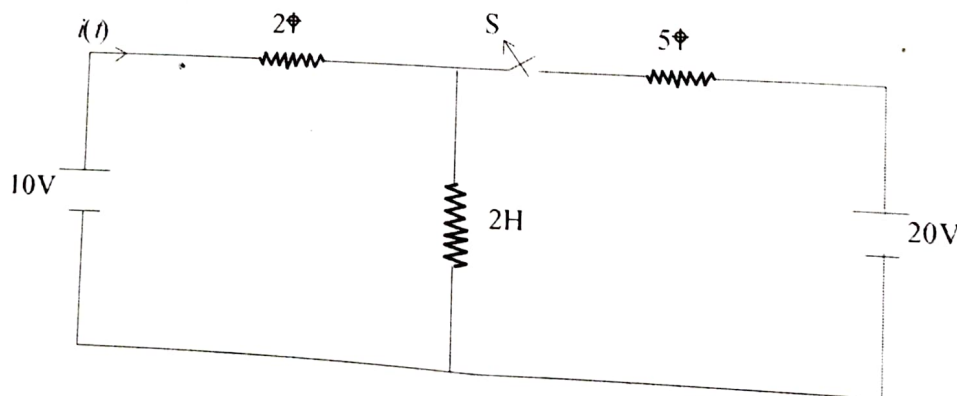
2. What are positive real functions? Discuss the necessary and sufficient conditions of PR functions. Check if the function is PR?

$$Z(s) = \frac{s^3 + 5s^2 + 9s + 3}{s^3 + 4s^2 + 7s + 9}$$

3. What are different types of filters? Explain any two in detail.
4. Obtain the transmission parameters of the following network:



5. What are the advantages of 3-phase supply? Explain Millman's method for solving unbalanced systems.
6. In the given Fig, Switch S is closed and steady state has been reached. S is opened at $t=0$. Find current through inductor, $i(t)$.



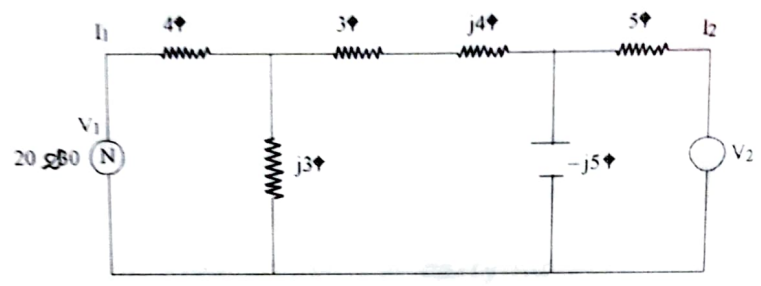
SECTION-C

7. If a constant-K high pass filter has cut-off frequency of 10 KHz and nominal impedance R_o is 7000Ω , design the T-and π -sections of this filter. Determine its characteristic impedance, phase constant at 25 KHz, and attenuation at 8KHz.

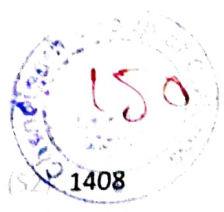
8. Realize the following function using all four canonical forms:

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

9. Find V2 so that there is no current in $(3+j4)\Omega$ branch.



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Roll No.

Total No. of Pages : 03

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 : 23-06-20

P.T.O Questions Pak
B.Tech ECE Sem-4

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 Q-point in transistor biasing?
- b) Compare the common collector configuration to common emitter of BJT amplifier.
- c) What is negative voltage clamping?
- d) Draw the output and transfer characteristics of MOSFET.
- e) Draw the circuit diagram for Colpitt oscillator.
- f) What is Barkhausen criteria?
- g) Compare Class-B to Class-C power amplifier.
- h) What is Zener breakdown in PN junction diode?
- i) Draw the high-frequency model of BJT.
- j) Define the stability factors of the BJT amplifier.



SECTION-B

2. For the following circuit, if $R_B = 1K \Omega$, $R_E = 1 K\Omega$, $R_C = 10K\Omega$, $V_{BE} = 0.7 V$, $V_{cc} = 5 V$ common base current gain (α) of the transistor is 0.99. Find out the base current.

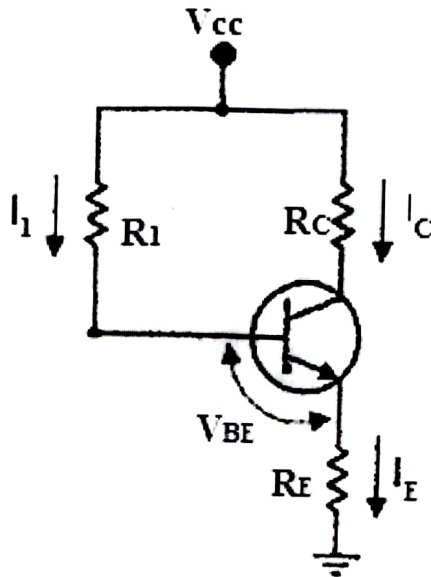


Fig.

3. a) The open loop gain (A_{OL}) of a voltage amplifier is 50. The overall gain (A_{CL}) was reduced to 25 when negative feedback was applied. Calculate the fraction of the output voltage feedback.
- b) If this fraction is maintained, calculate the value of the amplifier gain required if overall stage gain is to be 30.
4. Determine and sketch output voltage, V_o for the network shown in the following figure:

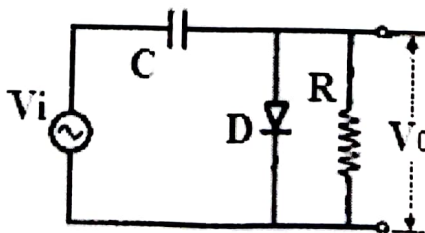


Fig.

Input voltage V_i is a square pulse varying from $-20 V$ to $+20 V$. Diode D is the ideal diode. Justify your answer.

5. A Hartley Oscillator circuit having two individual inductors of 0.5mH each, are designed to resonate in parallel with a variable capacitor that can be adjusted between 100pF and 500pF . Determine the upper and lower frequencies of oscillation and also the Hartley oscillators bandwidth.
6. What is cross-over distortion? How can that be eliminated?

SECTION-C

7. a) Differentiate a power amplifier from a voltage amplifier.
b) Derives the maximum efficiency of Class-B power amplifiers.
8. Derive an expression for input impedance, output impedance, voltage gain and current gain for the emitter follower circuit.
9. a) Discuss types of feedback and compare them.
b) Explain the operation of RC-phase shift oscillator.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

MICROPROCESSORS AND MICROCONTROLLERS

Subject Code : BTEC-402-18

M.Code : 77566

Date of Examination : 09-06-2023

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 microprocessor and microcontroller.
- b) Explain the function of ALE signal.
- c) What is the use of HOLD and HLDA.
- d) Draw the program memory organization in 8051.
- e) State the function of RS1 and RSO bits in the flag register of 8051.
- f) List the various registers used in 8051.
- g) What is the default priority of the interrupts in 8051?
- h) What is the difference between opcode and operand?
- i) What is the difference between parallel and serial interfacing?
- j) Explain the role of cache memory in brief.



SECTION-B

2. Explain the following instructions of 8085 with the help of suitable examples :
LXI, SBI, CMP, JC, XRA.
3. Differentiate between RISC and CISC.
4. Classify different types of instructions in 8051 microcontrollers. Explain one instruction of each type with suitable example.
5. Describe the DAC interfacing with 8051 microcontroller using suitable diagram.
6. Discuss PSW registers in detail.

SECTION-C

7. Explain the pin configuration of 8085 microprocessor in detail.
8. Describe the stepper motor interfacing with microcontroller in detail.
9. **Write a short note on the following :**
 - a) Input-output ports
 - b) Assembler directives
 - c) Stack.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-4)
ELECTROMAGNETICS AND ANTENNAS

Subject Code : BTEC-403

M.Code : 57595

Date of Examination : 13-06-2023

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) Calculate the critical frequency for a medium at which the wave reflects if the maximum electron density is 1.24×10^6 electrons/cm³.
- b) A radio station radiates a total power of 10KW and a gain of 30. Find the field intensity at a distance of 100km from the antenna. Assume free space propagation.
- c) Write down the Maxwell's equation in differential form.
- d) What is the condition for low loss transmission line?
- e) What is Brewster angle?
- f) Define Scanning array.
- g) Define Virtual height.
- h) Define phase centre of a horn antenna.
- i) Outline the principle of working of a phased array.
- j) Differentiate between conduction current and displacement current.



SECTION-B

2. Discuss the electromagnetic wave propagation in conducting medium and dielectric medium.
3. Describe the working of slot and reflector antenna.
4. Discuss in detail the effects of earth's magnetic field on ionospheric radio waves.
5. Derive the Friss Transmission formula. Discuss its significance.
6. Discuss in detail field equivalence principle.

SECTION-C

7. Derive the field component when the wave is propagating in rectangular waveguide with the TE mode of propagation.
8. Obtain the excitation coefficients of a nine element binomial array.
9. Describe the following with respect to the propagation of radio waves:
 - a) Skip Distance
 - b) Critical Frequency.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-4)
DATA STRUCTURE AND ALGORITHMS

Subject Code : BTCS-301-18

M.Code : 77567

Date of Examination : 02-06-2023

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 asymptotic analysis? Why are asymptotic notations important?
- b. Compare array and link list.
- c. Discuss the sequential representation of a tree.
- d. Discuss the concept of merge sort.
- e. Differentiate between BFS and DFS.
- f. What are linear and non-linear data structures?
- g. What are Binary search trees? Give example.
- h. What is hashing? Discuss the various hash functions with example.
- i. What is a priority queue? How it is used?
- j. What is threading? How it is used in binary trees?



SECTION-B

2. Write algorithm for selection sort and discuss the same for the following sequence.

12 34 16 14 23 11 19 15 20

3. Compare the adjacency list and matrix representations of a graph.
4. Define binary tree. Write a recursive algorithm for Preorder and Postorder traversals of a binary tree.
5. Write algorithm to insert a new node at the beginning of a singly link list.
6. Write algorithm for postfix evaluation. Give the postfix form of following expression :

$(a - b * c + d) / (e + f)$.

SECTION-C

7. Develop a max heap from the following sequence of nodes and apply heap sort. Show all the intermediate steps.

7 32 9 14 52 45 68 48 39 20 42

8. Design an AVL tree from the following nodes by inserting nodes one by one. Show all the steps and rotations :

8, 9, 10, 2, 1, 5, 3, 6, 4, 7, 11, 12

9. What do you mean by circular queue? How insertion and deletion are performed on a circular queue? Write algorithm and give example.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-4)
ANALOG COMMUNICATION SYSTEMS

Subject Code : BTEC-401

M.Code : 57593

Date of Examination : 02-06-2023

Time : 3 Hrs.

Max. Marks : 60

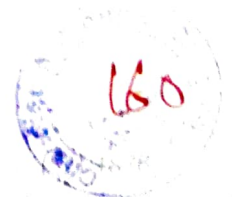
INSTRUCTION TO CANDIDATES :

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) How many AM broadcast stations can be accommodated in a 100-kHz bandwidth, if the highest frequency modulating a carrier is 5kHz?
- b) Draw only the circuit diagram of PWM detector.
- c) What is Heterodyning principal of FM receiver.
- d) Define the terms selectivity and fidelity.
- e) State sampling theorem.
- f) What is vestigial side band transmission?
- g) Write the role of RF and IF amplifiers in AM receiver.
- h) Compare high level and low level AM transmission system.
- i) A 2kHz audio signal modulates a 50MHz carrier, causing a frequency deviation of 2.5kHz. Determine the band width of the FM signal.
- j) Derive the expression of total power of AM system.



SECTION-B

2. Derive an expression for a single tone frequency modulated wave.
3. Draw the circuit diagram of varactor diode modulator and explain its working.
4. Derive the expression for the percentage power saving in AM-SSB-SC with respect to AM-DSB-FC under Tone Modulation.
5. A frequency modulated signal which is modulated by a 3-kHz sine wave reaches a maximum frequency of 100.02MHz and minimum frequency of 99.98MHz.
 - a) Determine the carrier swing.
 - b) Find the carrier frequency.
 - c) Calculate the frequency deviation of the signal.
 - d) What is the modulation index of the signal?
6. Explain Envelop detection receiver in detail.

SECTION-C

7. Explain the following:
 - a) Self excited Additive Mixers
 - b) PPM modulator and demodulator circuit.
8.
 - a) Explain the difference between narrowband FM and wide band FM.
 - b) Explain Armstrong method of FM transmission.
9.
 - a) Explain with derivation the phase shift method of SSB generation.
 - b) What do you mean by Aliasing? When it occurs? How aliasing can be avoided in case of sampling of practical information signals?

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SECTION-B

2. Determine whether $x[n]$ is energy or power signal

$$x[n] = u[n]$$

3. Consider an input $x[n]$ and a unit-impulse response of an LTI system $h[n]$ given by

$$x[n] = r[n], \quad h[n] = u[n]$$

Where $r[n]$ is a ramp sequence given by $r[n] = nu[n]$. Find the response $y[n]$.

4. Calculate the Fourier transform of the following signal

$$x(t) = \text{sgn}(t)$$

5. Explain probability distribution function in brief.

6. Determine the Z-transform of

$$x[n] = 7\left(\frac{1}{3}\right)^n u[n] + 6\left(\frac{1}{2}\right)^n u[n]$$

SECTION-C

7. Explain the following in brief:

a) Unit step signal

b) Unit impulse signal

c) Signum function

d) Sinc function

8. Explain CTFT and its properties in detail.

9. Explain the significance Region Of Convergence [ROC] in Z transform. Discuss any five properties of ROC.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTEC-502-18

M.Code : 78298

Date of Examination : 05-06-2023

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

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B.Tech E

1. Write briefly :

- a) $x(n) = \cos 3\pi n$, determine whether the given signal is periodic or non-periodic, also compute the fundamental period.
- b) Differentiate between energy and power signals.
- c) Give the computational efficiency of FFT over DFT.
- d) State the convolution property of Z-transform.
- e) How the stability of the linear time variant system is calculated?
- f) What are the advantages of representing the digital filter in the block diagram form?
- g) What do you mean by truncation and rounding errors?
- h) Give the four properties of ROC.
- i) What is meant by frequency warping? What is the cause of this effect?
- j) What is the need of Multirate Signal Processing?



SECTION-B

2. Compute the convolution $y(n)=h(n)*x(n)$ for the values of $x(n)$ and $h(n)$ as given below
 $x(n)=(1/2)^n u(n)$ and $h(n)=(1/4)^n u(n)$
3. Determine the Z-transform and sketch the ROC of:

$$x(n) = \left(\frac{1}{2}\right)^n [u(n) - u(n - 10)].$$

4. Determine the inverse z-transform of the following function

$$X(z) = \frac{1}{1 - 1.5z^{-1} + 0.5z^{-2}}$$

For ROC : $|z| > 1$ and ROC : $|z| < 0.5$.

5. The system function of the analog filter is given as

$$H_a(S) = \frac{s + 0.1}{(s + 0.1)^2 + 9}$$

Obtain the system function of IIR digital filter by using impulse invariance method.

6. Obtain the direct form-1, cascade & parallel structure for the following system

$$y(n) = \frac{1}{2} y(n - 1) + \frac{1}{4} y(n - 2) + x(n) + x(n - 1).$$

SECTION-C

7. Design the symmetric FIR low pass filter using rectangular window, whose desired frequency response is given as

$$H_d(\omega) = \begin{cases} e^{-j\omega\tau} & \text{for } |\omega| \leq \omega_c \\ 0 & \text{otherwise} \end{cases}$$

The length of the filter should be 9 and $\omega_c = 1$ radian/sample.

8. With the help of $N=8$, explain radix-2 Decimation-In-Time (DIT) FFT algorithm for computation of DFT.
9. With the help of a block diagram, explain the architecture of a TMS processor.

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Total No. of Pages : 03

Roll No. _____
 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 : 06-06-2023

Max. Marks : 60

Time : 3 Hrs.

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

- Write briefly :
 - Discuss the importance of transfer function.
 - What do you mean by system response? Explain.
 - What do you mean by transient accuracy? Discuss.
 - Define time constant. Discuss its importance.
 - What do you mean by feed forward control? Discuss.
 - Discuss the concept of stability in brief.
 - Explain the importance of tuning of a controller.
 - List the important characteristics of Non-linear system.
 - What are the advantages of state variable analysis? Explain.
 - What do you mean by state model? Discuss.

SECTION-B

- Determine the gain of the Signal Flow Graph shown in fig

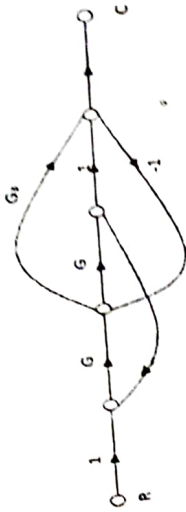


Fig.

- For a unity feedback control system the forward path transfer function is given by

$$G(s)/H(s) = \frac{2(s^2 + 3s + 20)}{s(s+2)(s^2 + 4s + 10)}$$

Determine the steady state error coefficients of the system. When the inputs are a) 5 b) 4t c) 4t²/2.

- Find the stability of a closed loop control system having characteristics equation $s^6 + s^5 - 5s^3 + 3s^2 + 2s^2 - 4s - 8 = 0$
- Test the controllability of the system given below :

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u(t)$$

SECTION-C

- Explain (in detail) the principle and working of synchro transmitter and receiver used in control systems.
- The block diagram of a unity feedback control system is shown in fig

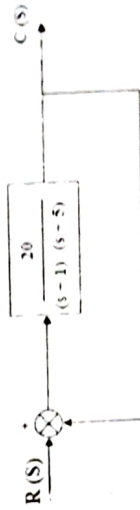


Fig.



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (IT) (Sem-5)
CYBER LAWS AND IPR
Subject Code : BTIT-509-18
M.Code : 78263

Date of Examination : 06-06-2023

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 Cyber Law?
- b) What are three categories of cyber crime?
- c) Define the term Malware.
- d) What is Cyber fraud?
- e) What do you mean by cybercriminals?
- f) What is a copyright? What are its characteristics?
- g) List the grey areas of Information Technology Act, 2000.
- h) List the objectives of IT Act, 2000.
- i) Explain the importance of copyright.
- j) What do you understand from right of reproduction?

SECTION-B

2. Explain the model of investigating and prosecuting cybercrime under Cyber Law.
3. List and discuss the responsibilities and challenges of Law Enforcement agencies.
4. Explain in brief the remedies in enforcing Intellectual Property Rights.
5. Compare and discuss the various aspects of Privacy and Security.
6. Explain the different challenges of Global Law Enforcement agencies.

SECTION-C

7. What are the different roles of Certifying Authorities? Explain.
8. Explain the different forms of Intellectual Property Rights.
9. Explain in detail, Infringement of copyright and Permitted use of Copyright.

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SECTION-B

2. Write spectral characteristics of frequency modulated signals.
3. Explain the importance and use of Prediction in Differential Pulse Code Modulation (DPCM).
4. Explain Adaptive delta modulation, in detail and compare its performance with Delta Modulation.
5. Explain double side band transmitter system.
6. Explain the concept of time division multiplexing.

SECTION-C

7. Compare modulation techniques of FSK, QAM and MSK.
8. With block diagram and derivation explain phase shift method of SSB transmitter.
9. What are Random signals? What is the significance of random signals in probability theory? Also, write the concept of random process with Gaussian noise characteristics.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

PROGRAMMING IN JAVA

Subject Code : BTEC-905D-18

M.Code : 78710

Date of Examination : 13-06-2023

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 JDK?
- b) What are abstract data types?
- c) Discuss generalization?
- d) Write about AWT.
- e) What are static members in Java?
- f) What are string functions?
- g) Write about interfaces in Java.
- h) What is use of Applets in Java?
- i) What is the Common Object Request Broker Architecture (CORBA)?
- j) What is Java IDL?



SECTION-B

2. **Explain following :**
 - a) Invoking a method in Java
 - b) Looping Statement in Java
3. Discuss various operators and expressions available in Java. Show their syntax.
4. What is the Applet class in Java and what is its purpose?
5. Write a short note on commonly used Swing components?
6. Explain Java I/O handling. Discuss file input stream and file output streams.

SECTION-C

7. What is Java Database Connectivity (JDBC) and how is it used to connect Java applications to databases?
8. What are exceptions in Java? How Try and Catch are used to handle the exception?
9. What are Java Beans and how do they simplify the development of Java applications?

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SECTION-B

2. Explain the various benefits of Project Management.
3. Describe the Project Selection. How Capital Budgeting is helpful in project selection?
4. Explain the components of Project Management Information System.
5. Discuss the role of project manager in success of a project.
6. Who will do the project Audit? What are the duties of auditors?

SECTION-C

7. What is project control? What are the tools for controlling the time and what are the tools for cost planning?
8. Following are the durations of activities of a project :

Activity	A	B	C	D	E	F	G
Predecessors	-	-	A	B	B	C, D	E
Duration (Weeks)	11	7	9	13	8	8	9

Draw the network and find the critical path and calculate the floats of activities.

9. Write short notes on :
 - a) Line of Balance
 - b) Mixed Organization Systems

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SECTION-B

2. How op-amp can be used as an integrator and differentiator?
3. What are the factors that affect the input offset voltage, input bias and input offset currents? Explain the circuit designing for input offset voltage compensation.
4. With help of a neat diagram and waveform, explain the Instrumentation Amplifier circuit
5. Derive the expression for output frequency and gain of phase shift oscillator
6. Draw the circuit of a first order and second order active low pass filter and derive its transfer function.

SECTION-C

7. a) Describe PLL with block diagram. Also discuss applications of PLL in phase detector.
b) What is slew rate? What are its causes? Derive the expression of maximum frequency of operation for a desired output swing in terms of slew rate.
8. a) Draw the astable multivibrator using 555 timer and derive its frequency of oscillation.
b) Design an astable multivibrator having an output frequency of 10 KHz with a duty cycle of 25%.
9. The following specifications are given for the dual input balanced output differential amplifier $R_c = 2.4\text{ k}\Omega$, $R_l = 4.5\text{ k}\Omega$, $R_{in1} = R_{in2} = 60\text{ }\Omega$, $V_{CC} = 10\text{V}$, $V_{EE} = 10\text{V}$, $\beta_{dc} = \beta_{ac} = 100$ and $V_{BE} = 0.715\text{V}$ typically.

Determine :

- a) I_{CQ} and V_{CEQ} values.
- b) Voltage gain A_v .
- c) Input and output resistances.

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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 : 03-06-2023

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) Differentiate between linear & nonlinear systems.
- b) What do you mean by stability of discrete time systems?
- c) Give the difference between Fourier Transform and Discrete Fourier Transform.
- d) Give the difference between Linear and Circular Convolution.
- e) Give the two properties of ROC.
- f) What is Gibbs phenomenon?
- g) What are the advantages of representing the digital filter in the block diagram form?
- h) Why is folding of signal required in convolution of two signals?
- i) What is meant by frequency warping? What is the cause of this effect?
- j) What do you mean by pipelined structure in DSP processor?

SECTION-B

2. What are the basic building blocks of digital signal processing? Give the advantages of digital signal processing over analog signal processing.
3. Determine the Z-transform and sketch the ROC of :

$$x(n) = \begin{cases} \left(\frac{1}{3}\right)^n, & n \geq 0 \\ \left(\frac{1}{2}\right)^{-n}, & n < 0 \end{cases}$$

4. An LTI system is characterized by the transfer function,

$$H(z) = \frac{3 - 4z^{-1}}{1 - 3.5z^{-1} + 1.5z^{-2}}$$

Determine $h(n)$ for the following conditions :

- a) The system is stable.
 - b) The system is causal.
 - c) The system is non-causal.
5. Compute the auto correlation of the signal $x(n) = a^n u(n)$, $0 < a < 1$
 6. The system function of the analog filter is given as :

$$H_a(s) = \frac{s + 0.1}{(s + 0.1)^2 + 9}$$

Obtain the system function of IIR digital filter by using impulse invariance method.

SECTION-C

7. Explain the different types of structures for the realization of FIR filter.
8. With the help of $N=8$, explain radix-2 Decimation-In-Time (DIT) FFT algorithm for computation of DFT.
9. Explain the data memory and program memory maps for ADSP 2181 processor.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem-6)
MICROWAVE AND ANTENNA ENGINEERING

Subject Code : BTEC-603-18

M.Code : 79376

Date of Examination : 27-06-2023

Time : 3 Hrs.

P.T. Questions Pa

B.Tech ECE Sem

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 Travelling Wave Tube (TWT).
- b) What is backward wave oscillator?
- c) What is transferred electron device?
- d) What is directional coupler?
- e) What is the difference between isolator and circulator?
- f) Define Standing Wave Ratio (SWR).
- g) Define antenna efficiency and temperature.
- h) Define End fire antenna array.
- i) Define aperture antenna.
- j) List the applications of IMPATT diode.

SECTION-B

2. With the help of a suitable diagram, explain the working principle of phase shifter.
3. What is cavity resonator? Derive the equation for resonant frequency in rectangular cavity resonator.
4. Explain the operation of a two cavity klystron amplifier. Derive expressions for bunched beam current.
5. What are slow wave structures? Explain how a helical TWT achieve amplification?
6. What is Babinet's principle? Explain slot antenna and its radiation mechanism.

SECTION-C

7. For a broad side antenna array of n elements, derive the expression of direction of pattern maxima, pattern minima and beam width of major lobe. Assume the distance between each element is ' d ' and each antenna element carries current of equal amplitude and phase.
8. Derive an expression for the far field component of a half wave dipole of an antenna. With the help of proper mathematical expressions, explain how single wire antenna radiates?
9. Derive the S-matrix for directional coupler. Using the properties of scattering matrix of a lossless reciprocal microwave junction, prove that for a four port network if all the four ports are matched, the device shall be a directional coupler.

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SECTION-B

2. Consider a cellular system with four cell reuse patterns. The bandwidth allocated is 60 MHz to a FDD cellular telephone system using two 30 KHz simplex channels for providing full duplex control of one channel. Calculate the total number of channels available in one cell.
3. Explain various Parameters of mobile multipath channels.
4. Draw and Explain IS-95 forward link in detail.
5. Compare FDMA, TDMA and CDMA multiple access techniques in detail.
6. Draw and Explain GSM signal processing in detail.

SECTION-C

7. Explain the diversity techniques in detail.
8. Write a short note on pure ALOHA and slotted ALOHA.
9. What is hand-off in cellular communication? Explain different hand-off strategies.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem-6)
OPTICAL FIBERS & COMMUNICATION

Subject Code : BTEC-602-18

M.Code : 79375

Date of Examination : 12-06-2023

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 higher order dispersion?
- b) How a transmitting media is important for a communication system?
- c) What is the basic difference between step indexed and graded indexed Fibers?
- d) Discuss Group velocity dispersion.
- e) What are Absorption losses?
- f) What is Rayleigh scattering?
- g) What do you mean by LED modulation bandwidth?
- h) What is pulse broadening?
- i) What is non-linear phase modulation?
- j) What is spectral line width?



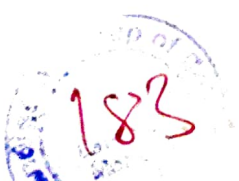
SECTION-B

2. What is the difference between a connector and a splice? When a connector used instead of a splice?
3. Draw and explain the tunable semiconductor Lasers.
4. What is WDM light wave systems. Explain in detail.
5. A single-mode fiber is measured to have $\lambda^2(d^2n/d\lambda^2) = 0.02$ at $0.8 \mu\text{m}$. Calculate the dispersion parameters β_2 and D .
6. Draw and explain the working principle of avalanche photodiode.

SECTION-C

7.
 - a) Draw and explain the block diagram of communication system.
 - b) Compare the two simple techniques used for the measurement of numerical aperture of optical fiber.
8.
 - a) Discuss the various design issues in the implementation of WDM light wave system.
 - b) What is the meant by the following terms when they are used in relation to injection lasers :
 - i) relaxation oscillations
 - ii) self pulsation
 - iii) partition noise.
9. Write short note on following :
 - a) Optical TDM systems
 - b) Frequency Chirping

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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 : 17-05-2023

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. Why transferred electron devices able to operate at higher frequency than BJT?
- b. What is a directional coupler?
- c. Explain tunnelling effect.
- d. List applications of TRAPATT diode.
- e. Explain the modes of Gunn diode.
- f. What is gyrator?
- g. What is meant by radar range?
- h. Define Doppler shift in pulsed radar.
- i. List the two advantages of CW radar.
- j. Define standing wave ratio.

SECTION-B

2. Derive power output and efficiency of a reflex klystron.
3. Derive an expression for velocity modulation in two cavity Klystron with the help of a neat diagram.
4. Explain the different methods used for measuring microwave frequency.
5. Explain with block diagram the working of MTI Radar with power amplifier and power oscillator.
6. Derive Radar range equation.

SECTION-C

7. Derive the expression for axial electric field in the TWT.
8. Explain with neat diagram, the working of CW radar with non-zero IF.
9. A reflex klystron operates under the following conditions: $V_0 = 600V$, $R_{sh} = 15 K\Omega$, $fr = 9 GHz$, $L = 1 mm$, $e/m = 1.759 \times 10^{11}$. The tube is oscillating at fr at the peak of the $n = 2$ or $1\frac{3}{4}$ mode. Assume that the transit time through the gap and beam loading to be neglected. Determine, the value of the repeller voltage, the direct current necessary to give a microwave gap voltage of 200 V, and the electronic efficiency under this condition

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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 : 29-05-2023

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) LAN, MAN, WAN
- b) PPP
- c) Bandwidth and Throughput
- d) TCP and UDP
- e) Bridge and Router
- f) Ring topology
- g) FTP
- h) Twisted pair cable
- i) Pure Aloha and Slotted Aloha
- j) Fading.



SECTION-B

2. Discuss the advantages and disadvantages of different network topologies.
3. Explain with example multiplexing and de-multiplexing at transport layer.
4. Explain in detail error detection and correction control methods.
5. Discuss token bucket congestion control algorithm.
6. Differentiate between synchronous and asynchronous TDM.

SECTION-C

7. Write a detailed note on ISO-OSI reference model.
8. What is DNS? Differentiate between recursive and iterative queries. Explain the formats of the query and response messages used in DNS.
9. Explain the four way process of handshaking to terminate the connection in TCP.

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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 Examintion : 29-05-2023

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 rms delay spread and excess delay spread of a multipath fading channel.
- b. Differentiate between frequency selective fast and slow fading.
- c. What is frequency reuse in cellular communication system?
- d. Define cell splitting and sectoring.
- e. Define co-channel interference and co-channel reuse ratio.
- f. Define TDMA and FDMA.
- g. Define Equal Gain Combining.
- h. Define forward and reverse CDMA channel.
- i. Define handoff and its types.
- j. What is the difference between Pure and Slotted ALLOHA?



SECTION-B

2. Explain the performance criteria and operation of cellular system. Draw the block diagram of basic cellular system.
3. Derive the desired Carriers to Interference (C/I) Ratio from a normal case in an Omni Directional Antenna System.
4. How diversity technique improves the performance of receiver in multipath scenario? Explain maximal ratio combining in detail.
5. What are the advantages of spread spectrum multiple access over FDMA and TDMA? Explain direct sequence spread spectrum in detail.
6. Explain IS-54 and IS-136 US digital cellular system along with their key parameters.

SECTION-C

7. With the help of proper block diagram, explain the frame structure, architecture and speech processing of GSM system. Why are so many logical channels used in the GSM?
8. Explain the impulse response model of multi path channel. Using time dispersion and frequency dispersion parameter, classify and explain different types of fading in detail.
9. **Write a short note on :**
 - a. Paging system
 - b. Bluetooth
 - c. CDMA 2000 standards and specification

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE/EE/IT/ME) (Sem-7)

ELECTRONIC DEVICES

Subject Code : BTEC-301-18

M.Code : 90606

Date of Examination : 10-06-2020

P.T.U Questions

B.Tech ECE Sem-

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) Describe the behaviour of p-n junction diode under forward and reverse biased conditions.
- b) Give the Energy band diagrams of Intrinsic and Extrinsic Semiconductors
- c) Differentiate between Drift current and Diffusion current in a semiconductor.
- d) What do you understand by: i) Knee voltage and ii) Breakdown voltage?
- e) What is Ebers - Moll model in Transistors?
- f) Mention any two advantages of MOSFET over JFET.
- g) What is the purpose of Sputtering in Fabrication process of ICs or devices?
- h) Give the circuit symbols for Zener diode, Tunnel diode, Varactor diode and a Transistor.
- i) Derive the relation between α and β with respect to BJT.
- j) What is the significance of etching?



SECTION-B

2. Draw Ebers-Moll model and hence explain Transistor action.
3. Explain the construction and working of a MOSFET. Give its $V - I$ characteristics.
4. What are the three important configurations in which the transistor can be connected? Discuss any one of them.
5. **Define :**
Diffusion and Ion-Implantation. What are the various types of Ion-implantation techniques that are commonly used in fab line?
6. What do you mean by oxidation process? Explain in detail. Also give characteristics of different oxide films.

SECTION-C

7. Draw and explain Half-wave and full - wave (centre - tapped & bridge) rectifiers 10 with suitable circuit diagrams. Which one is preferable and why?
8. In a CE configuration, the collector supply voltage is 10V. When a resistor $R_C = 1K\Omega$ is connected in the collector circuit, the voltage drop across it is 0.5 V. For $\alpha = 0.98$, determine the collector-emitter voltage and the base current.
9. How doping done using ion implantation? Draw and explain the working of ion implanter.

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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 : 22-05-2023

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 are the characteristics of an embedded system?
- b) What are the functions of RTOS?
- c) Define interrupt latency. How to avoid it?
- d) What are the various modes of serial communication?
- e) Compare RISC and CISC architecture.
- f) Differentiate the user threads and kernel threads.
- g) Compare the Dataflow model and finite state model.
- h) What is RFID? Explain.
- i) Explain the importance of the program status register (PSR).
- j) What is a pointer in C programming? Explain it with a suitable example.



SECTION-B

2. Explain CPU bus organization and protocol in detail.
3. Describe in detail the data transfer mechanism using DMA in Embedded System.
4. Explain semaphore and their applications in detail with suitable examples.
5. What is the need for an ADC module? Draw and explain the interfacing circuit of ADC in an ARM processor.
6. What are the various types of Conditional execution and loop statements in C programming? Explain it with an example.

SECTION-C

7. Explain the design concept of an embedded system-based Elevator control mechanism using a sequential model.
8. With a suitable diagram, explain the design process of an embedded system for the automatic chocolate vending machine application.
9. Explain the various types of the instruction set and addressing modes used in an ARM processor in detail.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.-7,8)
ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Subject Code : BTEC-909D-18

M.Code : 90686

Date of Examination : 16-05-2023

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) State the characteristics of an intelligent agent with the help of an example.
- b) Describe the Turing test for artificial intelligence.
- c) Differentiate between strong and weak artificial intelligence with the help of suitable examples.
- d) Write a brief note on fuzzy logic.
- e) Formulate the 8-puzzle problem as a state space search.
- f) Discuss the representation of categories in general ontology.
- g) Write a brief note on support vector machine.
- h) What are the various forms of learning?
- i) List the characteristics of non-parametric learning models.
- j) Explain the basic functioning of an expert system.



SECTION-B

2. Define artificial intelligence as a science. Define an artificial agent. Draw the block diagram of an artificial agent and describe its various components.
3. Discuss the history and features of SWI-Prolog. Explain the procedure of its installation and environment setup.
4. Differentiate between informed and uninformed search techniques. Discuss any two uninformed search algorithms in detail.
5. Write a brief note on representing mental events and mental objects in general ontology. What are propositional attitudes?
6. Explain how decision trees are constructed? Discuss various approaches used for variable selection in decision trees.

SECTION-C

7. Describe various types of environments an artificial agent may work in. Describe the characteristics of the environment of an autonomous vehicle. Discuss the concept of bounded and perfect rationality.
8. Write detailed notes on :
 - a) Theory of learning
 - b) Ensemble learning.
9. Explain the significance and process of reasoning with default information. List the issues in default reasoning.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem-7,8)
PYTHON PROGRAMMING

Subject Code : BTEC907D-18

M.Code : 90676

Date of Examination : 09-06-2023

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) Slicing of strings
- b) Tuple in Python
- c) Scope rules
- d) Pseudo code
- e) Numbers in Python
- f) Lists in Python
- g) Variable and its naming rules in Python
- h) Expression in Python
- i) ADT
- j) Differentiate between Intermediate mode and Script mode.



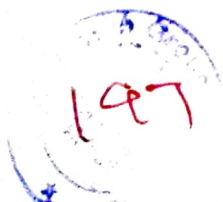
SECTION-B

2. Explain call by value and call by reference.
3. Write a code to count number of words in a file.
4. What is indexing and negative indexing in tuple?
5. Write a program to convert Celsius to Fahrenheit.
6. Explain values and items method used in dictionary with an example.

SECTION-C

7. What is Dictionary? Explain Python dictionaries in detail discussing its operations and methods.
8. What are the basic list operations that can be performed in Python? Explain each operation with its syntax and example.
9. Write Python code to sort n numbers using selection sort.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem-7,8)
COMPUTER ORGANISATION AND ARCHITECTURE

Subject Code : BTES-401-18

M.Code : 90491

Date of Examination : 07-06-2023

Time : 3 Hrs.

Max. Marks : 60

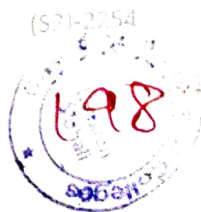
INSTRUCTIONS TO CANDIDATES :

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 note on following :

- a) What is I/O subsystem?
- b) Write use of registers?
- c) What is execution cycle?
- d) Write functioning of signed numbers.
- e) How multiplication is done in computer?
- f) Write use of DMA.
- g) What is USB?
- h) Write meaning of throughput.
- i) What are pipeline hazards?
- j) Discuss Memory Interleaving.



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem-3)
APPLIED THERMODYNAMICS-I
Subject Code : BTME-304
M.Code : 59114
Date of Examination : 15-06-2020

Time : 3 Hrs.

P.T.U Questions Paper
B.Tech ME Sem-3

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.
4. Use of steam tables is allowed.

SECTION-A

1. Answer briefly :

- a) Why excess air is supplied for combustion?
- b) What are Octane and Cetane numbers?
- c) Differentiate between conventional and high pressure boilers.
- d) Why 2-Stroke engines have been phased out?
- e) What is degree of reaction?
- f) Explain clearly the equivalent evaporation from and at 100°C.
- g) What is Dryness Fraction, how it is evaluated?
- h) What do you mean by the stage efficiency and overall efficiency of Impulse turbine?
- i) What is bleeding and for what is this carried out?
- j) What is the use of Cooling Tower in Steam Power Plant?



SECTION-B

2. Calculate the minimum quantity of air required for complete combustion of 1m^3 of gaseous fuel which has the following composition by volume : $\text{H}_2=30\%$, $\text{CH}_4=40\%$, $\text{CO}=15\%$, $\text{CO}_2=5\%$, $\text{O}_2=2\%$ and $\text{N}_2=8\%$.
3. Describe construction and working of any one High Pressure Boiler with a neat sketch.
4. What is the need of Compounding of Turbines? Explain methods of compounding of Impulse Turbine.
5. What is the effect of air leakage in a condenser? Explain. Explain the working of air extraction pump with a neat sketch.
6. Derive an expression for evaluating Height of Chimney.

SECTION-C

7. A five stage steam turbine has steam entering at 20 bar, 300°C and leaving at 0.05 bar and 0.95 dry. Determine the Reheat factor, condition of steam at exit from each stage considering efficiency ratio (η_s) = 0.555 and all stages doing equal work.
8. A steam nozzle is supplied with steam at 15 bar and 350°C and discharges steam at 1 bar. If the diverging portion of nozzle is 80 mm long and throat diameter is 6 mm, Determine the cone angle of the divergent portion. Assume 12% of total available enthalpy drop is lost in friction in divergent portion. Also determine the velocity and temperature of steam at throat.
9. Write short notes on following :
 - (a) Describe the phenomenon of detonation in I.C. engines. On what factors does detonation depend?
 - (b) Binary Vapour Power Cycle
 - (c) Adiabatic Saturation process and its applications.

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. (ME) (Sem-3)
THEORY OF MACHINES-I
Subject Code : BTME-302-18
M.Code : 76418
Date of Examination : 01-06-2023

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 mechanism.
- b) What is sliding pair? Give examples
- c) Write any two inversions of double slider crank chain.
- d) What is engine indicator?
- e) Define velocity ratio of belt drive.
- f) What is slip of belt?
- g) What is roller follower?
- h) Discuss single plate clutch.
- i) What is the function of flywheel?
- j) Define sensitivity of governor.



SECTION-B

2. PQRS is a four bar chain with link PS fixed. The lengths of the links are $PQ = 62.5$ mm; $QR = 175$ mm; $RS = 112.5$ mm; and $PS = 200$ mm. The crank PQ, rotates at 10 rad/s clockwise. Draw the velocity and acceleration diagram when angle $QPS = 60^\circ$ and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS.
3. What do you mean by straight line mechanism? Discuss Ackerman steering mechanism.
4. An open belt running over two pulleys 240 mm and 600 mm diameter connects two parallel shafts 3 metres apart and transmits 4 kW from the smaller pulley that rotates at 300 r.p.m. Coefficient of friction between the belt and the pulley is 0.3 and the safe working tension is 10N per mm width. Determine: 1. minimum width of the belt, i. initial belt tension, and 3. length of the belt required.
5. A vertical shaft supports a load of 20 kN in a conical pivot bearing. The external radius of the cone is 3 times the internal radius and the cone angle is 120° . Assuming uniform intensity of pressure as 0.35 MN/m², determine the dimensions of the bearing. If the coefficient of friction between the shaft and bearing is 0.05 and the shaft rotates at 120 r.p.m., find the power absorbed in friction.
6. The turning moment diagram for a multicylinder engine has been drawn to a scale 1 mm = 600 N-m vertically and 1 mm = 3° horizontally. The intercepted areas between the output torque curve and the mean resistance line, taken in order from one end, are as : + 52, -124, + 92, - 140, + 85, - 72 and + 107 mm², when the engine is running at a speed of 600 r.p.m. If the total fluctuation of speed is not to exceed $\pm 1.5\%$ of the mean, find the necessary mass of the flywheel of radius 0.5 m.

SECTION-C

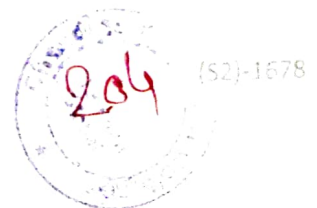
7. A cam, with a minimum radius of 25 mm, rotating clockwise at a uniform speed is to be designed to give a roller follower, at the end of a valve rod, motion described below :
 - a) To raise the valve through 50 mm during 120° rotation of the cam;
 - b) To keep the valve fully raised through next 30° ;
 - c) To lower the valve during next 60° ; and
 - d) To keep the valve closed during rest of the revolution i.e. 150° ;



The diameter of the roller is 20 mm and the diameter of the cam shaft is 25 mm. Draw the profile of the cam when the line of stroke of the valve rod passes through the axis of the cam shaft. The displacement of the valve, while being raised and lowered, is to take place with simple harmonic motion. Determine the maximum acceleration of the valve rod when the cam shaft rotates at 100 r.p.m.

8. The arms of a Porter governor are 300 mm long. The upper arms are pivoted on the axis of rotation. The lower arms are attached to a sleeve at a distance of 40 mm from the axis of rotation. The mass of the load on the sleeve is 70 kg and the mass of each ball is 10 kg. Determine the equilibrium speed when the radius of rotation of the balls is 200 mm. If the friction is equivalent to a load of 20 N at the sleeve, what will be the range of speed for this position?
9. **Write short note on :**
- a) Transmission dynamometer (any one type)
 - b) Beam engine

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ME) (Sem-3)
THEORY OF MACHINES-I

Subject Code : BTME-302

M.Code : 59112

Date of Examination : 01-06-2023

Time : 3 Hrs.

Max. Marks : 60

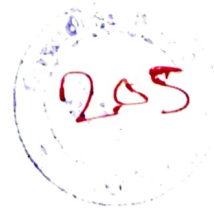
INSTRUCTION TO CANDIDATES :

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

I. Write Briefly :

- a) Define link.
- b) What is higher pair? Give one example of higher pair.
- c) Write any two inversions of single slider crank chain.
- d) List main applications of Pantograph.
- e) What is crowning of pulley?
- f) Define creep in belts.
- g) What is radial cam?
- h) List different types of brakes.
- i) What is the function of flywheel?
- j) Define hunting of governor.

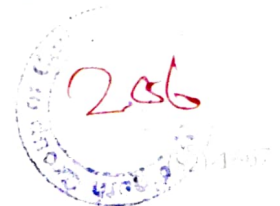


SECTION-B

2. The crank of a slider crank mechanism rotates clockwise at a constant speed of 300 r.p.m. The crank is 150 mm and the connecting rod is 600 mm long. Determine : a) linear velocity and acceleration of the midpoint of the connecting rod, and b) Angular velocity and angular acceleration of the connecting rod, at a crank angle of 45° from inner dead centre position.
3. Explain Davis steering gear mechanism with a neat sketch.
4. A shaft rotating at 200 r.p.m. drives another shaft at 300 r.p.m. and transmits 6 kW through a belt. The belt is 100 mm wide and 10 mm thick. The distance between the shafts is 4m. The smaller pulley is 0.5 m in diameter. Calculate the stress in the belt, if it is an open belt drive. Taken $\mu = 0.3$.
5. A conical pivot supports a load of 20 kN, the cone angle is 120° and the intensity of normal pressure is not to exceed 0.3 N/mm^2 . The external diameter is twice the internal diameter. Find the outer and inner radii of the bearing surface. If the shaft rotates at 200 r.p.m. and the coefficient of friction is 0.1, find the power absorbed in friction. Assume uniform pressure.
6. The turning moment diagram for a petrol engine is drawn to the following scales: Turning moment, $1 \text{ mm} = 5 \text{ N-m}$; crank angle, $1 \text{ mm} = 1^\circ$. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270 mm^2 . The rotating parts are equivalent to a mass of 36 kg at a radius of gyration of 150 mm. Determine the coefficient of fluctuation of speed when the engine runs at 1800 r.p.m.

SECTION-C

7. A cam rotating clockwise at a uniform speed of 100 r.p.m. is required to give motion to knife-edge follower as below :
 - a) Follower to move outwards through 25 mm during 120° of cam rotation,
 - b) Follower to dwell for the next 60° of cam rotation,
 - c) Follower to return to its starting position during next 90° of cam rotation, and
 - d) Follower to dwell for the rest of the cam rotation.



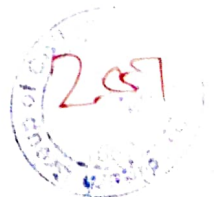
The minimum radius of the cam is 50 mm and the line of stroke of the follower passes through the axis of the cam shaft. If the displacement of the follower takes place with uniform and equal acceleration and retardation on both the outward and return strokes, find the maximum velocity and acceleration during outstroke and return stroke.

8. A Porter governor has all four arms 250 mm long. The upper arms are attached on the axis of rotation and the lower arms are attached to the sleeve at a distance of 30 mm from the axis. The mass of each ball is 5 kg and the sleeve has a mass of 50 kg. The extreme radii of rotation are 150 mm and 200 mm. Determine the range of speed of the governor.

9. Write short note on :

- a) Rope Brake Dynamometer
- b) Classification of Kinematic Pairs

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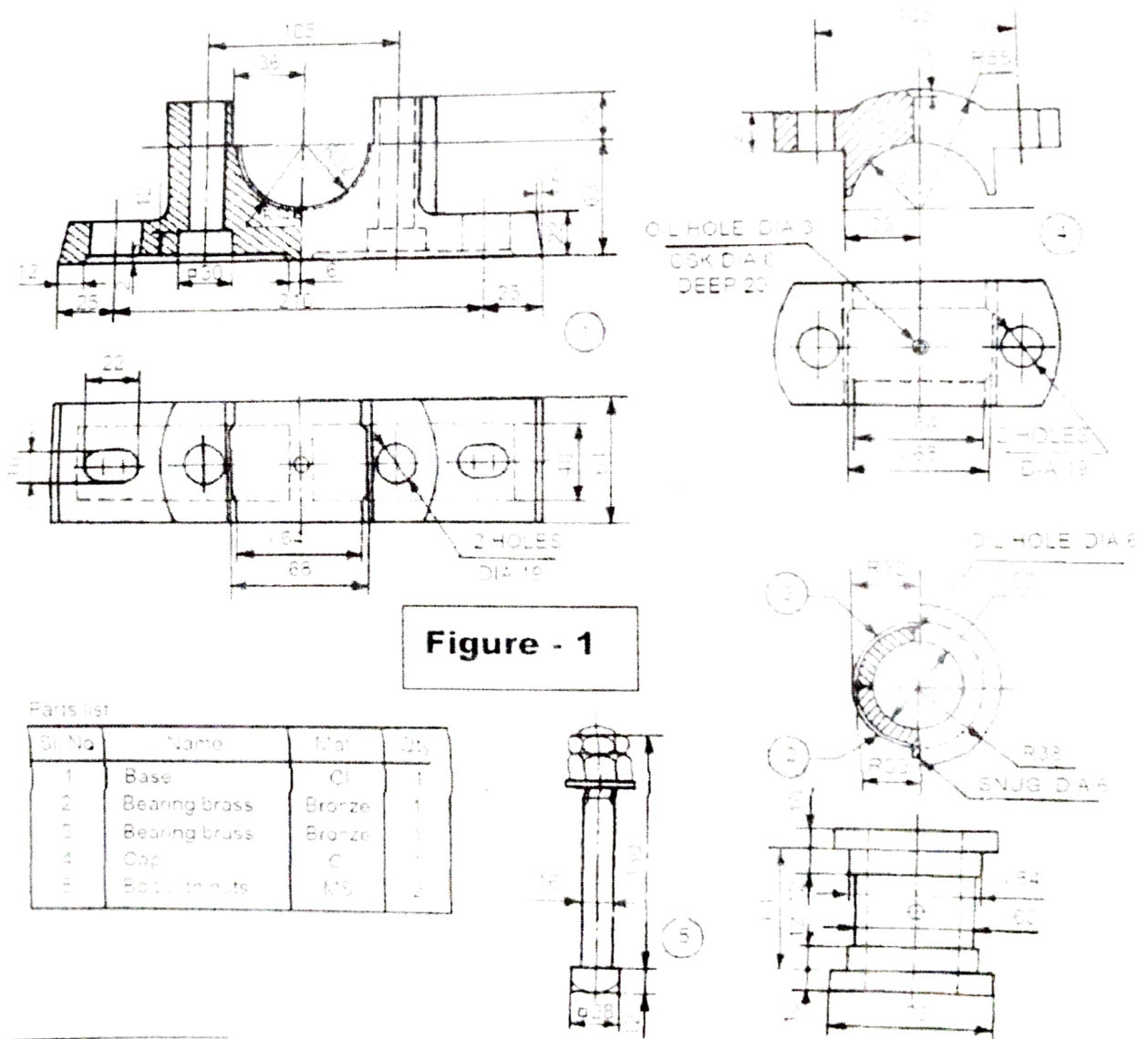


SECTION-B

2. Draw free hand, the full sectional front view and side view of a protected type flange coupling. (5)
3. Draw freehand, the sectional front view and side view of a Union Joint. (5)
4. Sketch freehand the top view and sectional front view of a double riveted Butt joint (zig-zag type) (5)

SECTION-C

5. The Figure 1 shows the part drawings of a Plummer Block. Draw its Front view with full section and Top View. (30)



6. The part drawings of a Screw Jack are shown in Figure 2. Assemble the part and draw full sectional view from the front and top view. (30)

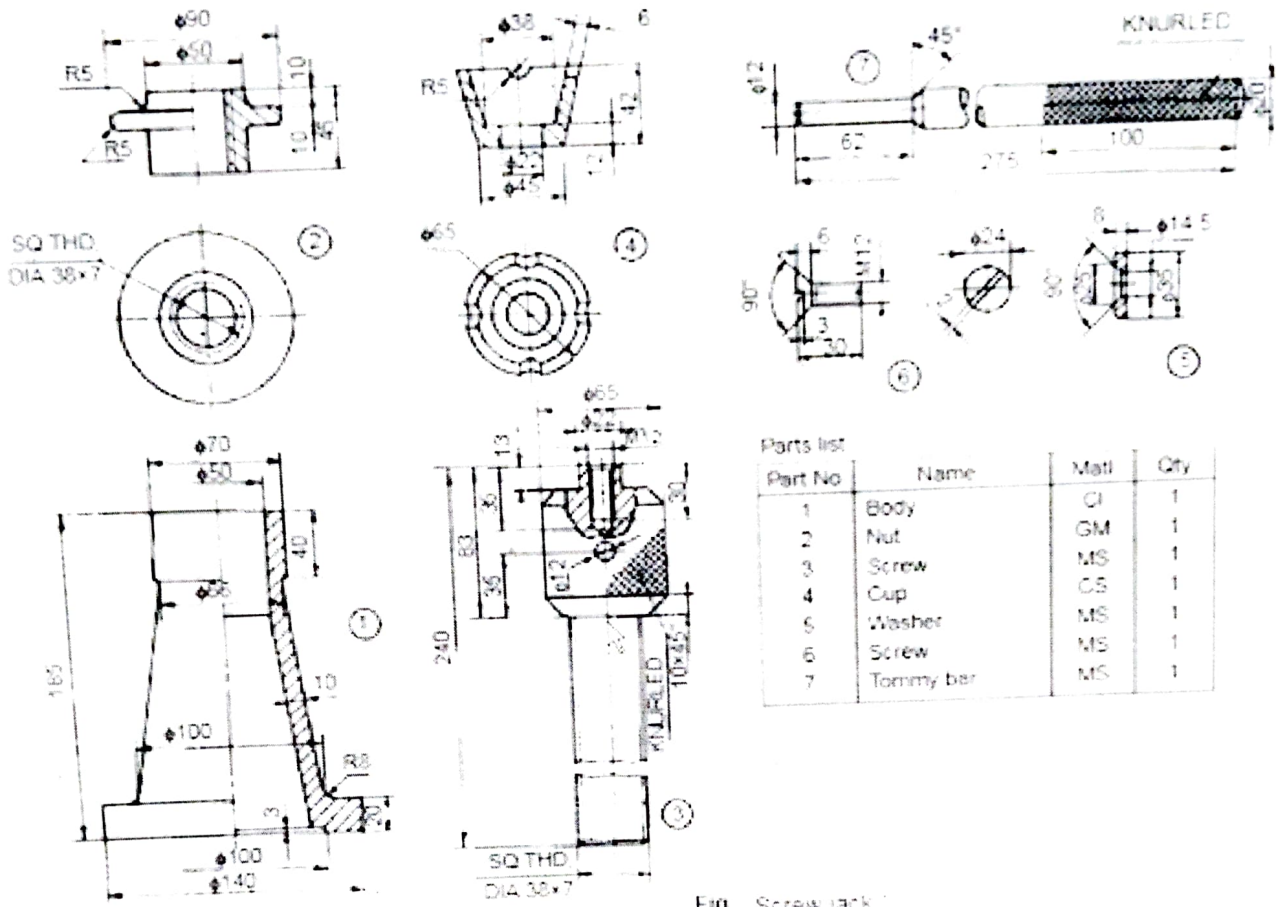


Fig. Screw jack

Fig. 2

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Roll No.

Total No. of Pages : 04

Total No. of Questions : 07

B.Tech. (Marine Engg.) (Sem.-3)

MACHINE DRAWING

Subject Code : BTME-303

M.Code : 59113

Date of Examination : 17-05-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of NINE questions carrying TWO marks each.
2. SECTION-B contains FOUR questions carrying FOUR marks each and students have to attempt any THREE questions.
3. SECTION-C contains TWO questions carrying THIRTY marks each and students have to attempt any ONE question.
4. Note : First angle projection to be used. You may assume any missing dimension.

SECTION-A

1) Answer briefly :

- a) Show conventional representation of internal threads and external threads in case of nut and bolt.
- b) With suitable sketch, explain the methods of dimensioning of i) Circle ii) Angle.
- c) Explain unilateral and bilateral tolerance with an example.
- d) What is a castle nut? Where is it used?
- e) When would you prefer pin type flexible coupling over rigid coupling?
- f) Draw a free hand sketch to show riveted butt joint.
- g) What are advantages of knuckle joint over muff coupling?
- h) What is the function of blow off cock?
- i) What is the function of clearance in cotter joint?

SECTION-B

2. Draw free hand sketch of a single plate friction clutch.
3. Draw profile of knuckle threads by taking pitch of 20 mm.
4. Draw free hand front view of a spigot and socket joint.
5. Draw plan and sectional elevation of a double riveted (zig-zag) butt joint. Take diameter of rivet 15 mm and thickness of plate 10 mm.

SECTION-C

6. Assemble the parts of screw jack given in Fig.1 and draw the following views:
 - a) Elevation (Right Half in Section)
 - b) Top view.
7. Assemble the parts of universal coupling given in Fig.2 and draw the following views:
 - a) Elevation
 - b) Plan.



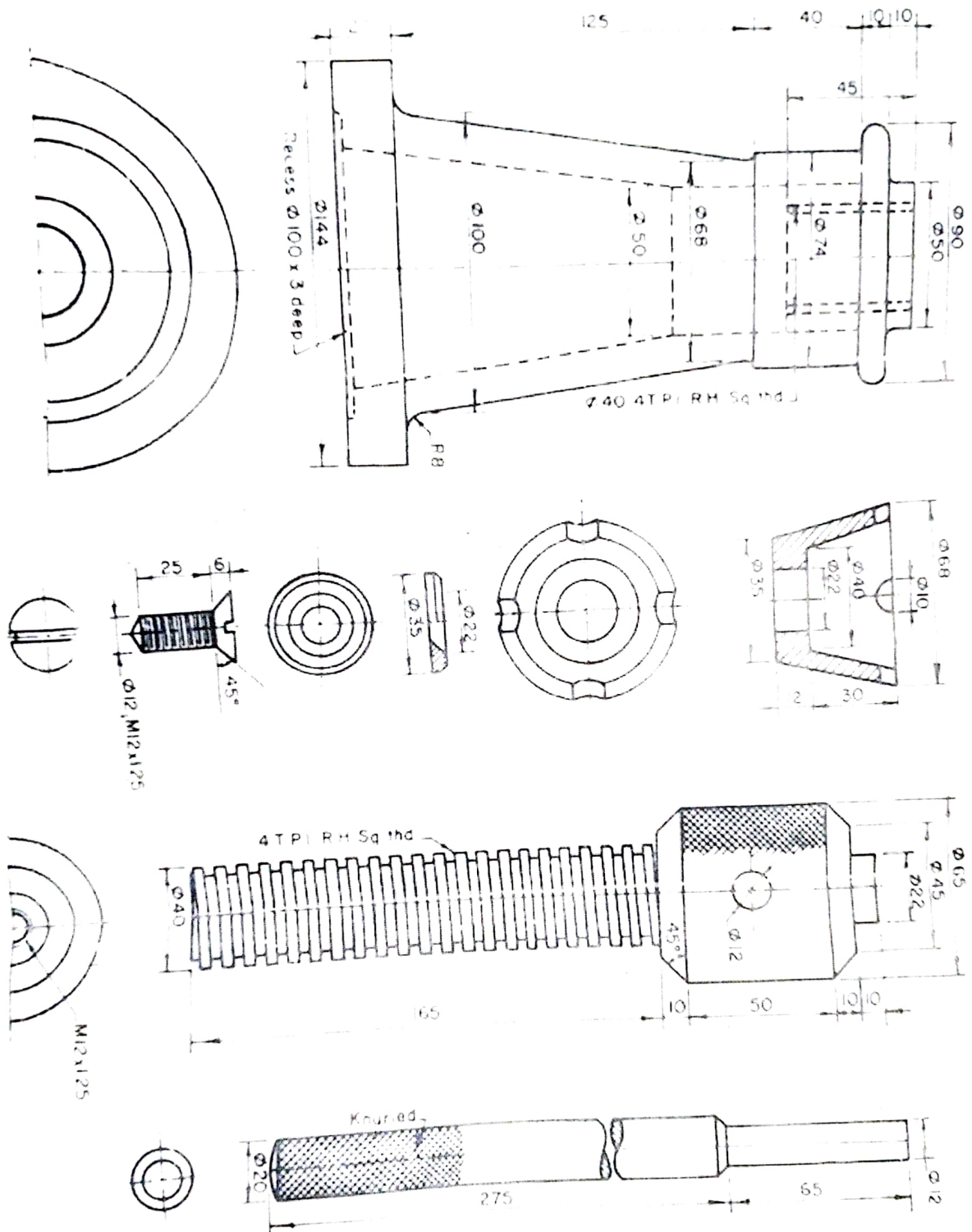
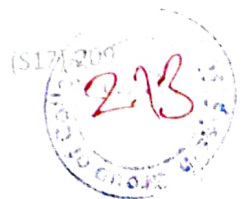


Fig.1



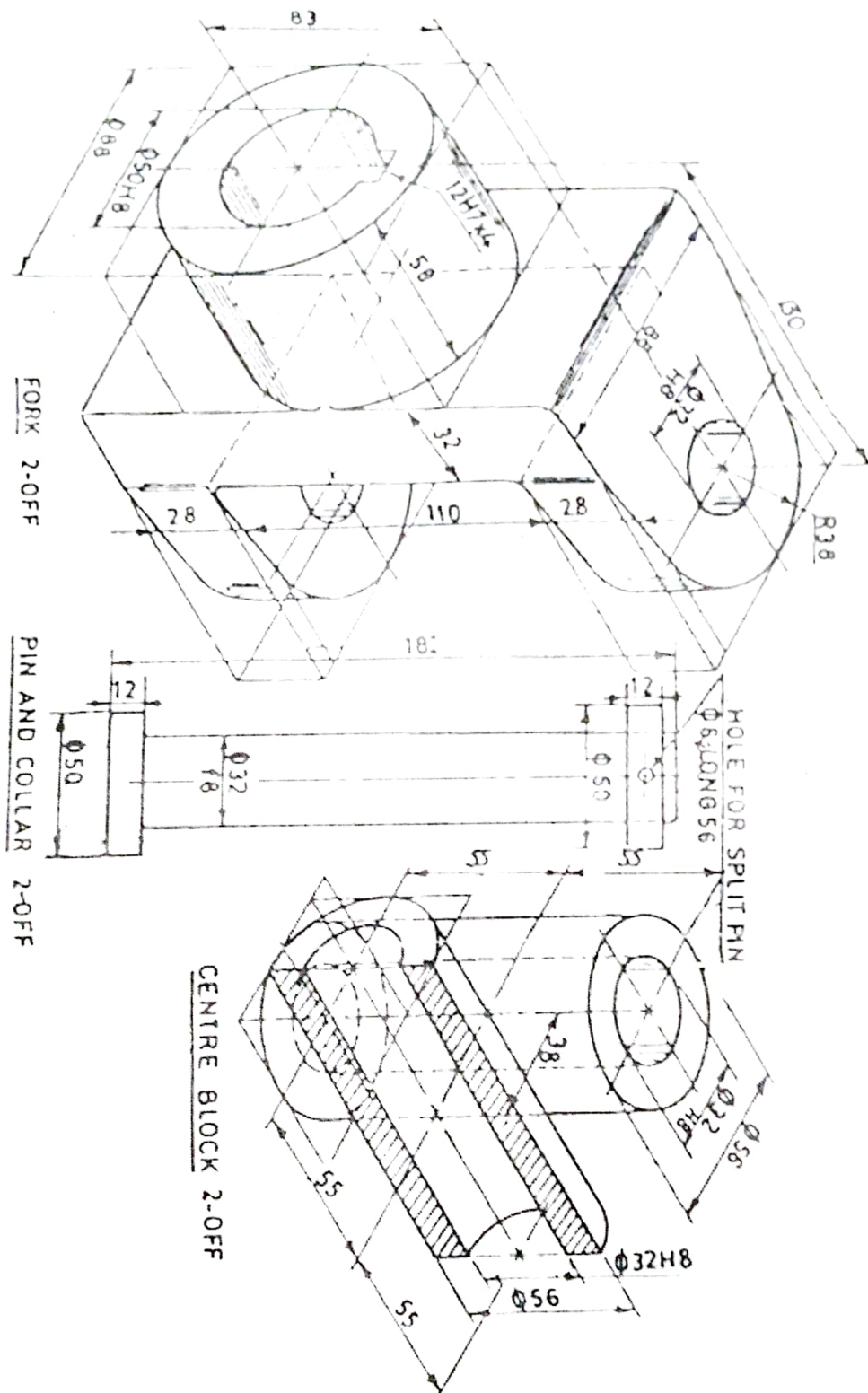


Fig.2

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-3)

ENGINEERING MATERIALS AND METALLURGY

Subject Code : BTME-306

M.Code : 59116

Date of Examination : 19-05-2023

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 primary and secondary bonding.
- b. Depict (111) plane in FCC unit cell.
- c. What do you mean by polymorphism?
- d. Discuss the signification of Burgers vector.
- e. Define steady-state diffusion.
- f. How microstructural and mechanical characteristics of a plastically deformed metal specimen may be restored to their pre-deformed states?
- g. List the applications of phase diagrams.
- h. Why Fe-Fe₃C diagram is called metastable equilibrium phase diagram?
- i. Define hardenability.
- j. What are austenite stabilizers?



SECTION-B

2. Using suitable sketch, explain the difference between edge and screw dislocations.
3. State and explain Fick's first law of diffusion. What is the influence of temperature on diffusion?
4. Draw and label Fe-Fe₃C diagram for plain carbon steel. Explain the phases present in this system.
5. List the applications of surface hardening treatment of steel components. Explain pack carburizing in brief.
6. Discuss the effects of adding alloying elements on iron-iron carbide equilibrium diagram.

SECTION-C

7.
 - a. Distinguish between recovery and recrystallization.
 - b. Differentiate between annealing and normalizing heat treatment processes.
8. What is the purpose of alloying of steels? Discuss the effects of adding Ni and Cr on the properties of steels.
9. Write brief notes on the following :
 - a. Flame hardening
 - b. Jominy end-quench hardenability test.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-3)
BASIC THERMODYNAMICS
Subject Code : BTME305-18
M.Code : 76422
Date of Examination : 19-05-2023

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 thermodynamics.
- b. Define the concept of continuum.
- c. Define the specific heats at constant volume and constant pressure.
- d. How does Celsius temperature scale differ from absolute Kelvin scale?
- e. What is an ideal gas? How does it differ from a perfect gas?
- f. What are the two requirements for a process to be isentropic?
- g. List the assumptions made in the analysis of air standard cycles.
- h. What is meant by intercooling?
- i. What do you understand by reheating?
- j. What is meant by low grade and high grade energy?

SECTION-B

2. What is the relationship between a system and its environment when the system is (a) adiabatic, (b) isolated?
3. Define and explain with the help of neat sketch the Zeroth Law of Thermodynamics. Why it is so called?
4. A reversible heat engine delivers 0.6 kW power and rejects heat energy to a reservoir at 300 K at the rate of 24 kJ/min. Make calculations for the engine efficiency and the temperature of the thermal reservoir supplying heat to the engine.
5. Show that COP of a heat pump is greater than COP of a refrigerator by unity.
6. Entropy is defined in terms of a reversible process. How can then it be evaluated for an irreversible process?

SECTION-C

7. An air standard Diesel cycle has compression ratio of 14. The pressure at the beginning of the compression stroke is 1 bar and temperature 27°C. The maximum temperature of the cycle is 2500°C. Determine the thermal efficiency of the engine.
8. What is meant by constant dryness fraction lines? How these are plotted on T-S diagram.
9. How we compare the gas turbines with steam turbines and internal combustion engines. Explain with neat and clean 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.-3)
STRENGTH OF MATERIALS – I

Subject Code : BTME-301

M.Code : 59111

Date of Examination : 24-05-2023

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 temperature stresses? Explain.
- b) What do you mean by principal planes and principal stresses?
- c) How Mohr's circle is useful in the stress analysis problems?
- d) What is the relation between shear force and loading function of a beam?
- e) What do you mean by the terms 'neutral axis' and 'neutral surface'?
- f) Enumerate assumption made in the theory of torsion.
- g) Define equivalent length of columns.
- h) State the limitations of Euler's formula.
- i) Define the terms strength criterion, stiffness criterion and elastic curve.
- j) Why a hollow shaft is preferred over a solid shaft?



SECTION-B

2. A 20 mm thick and 200 mm wide steel plate tapers uniformly to 10 mm thickness and 150 mm width over a length of 2 m. Determine the increase in length when a pull of 18 kN is applied. Take $E = 200 \text{ GPa}$.
3. A 250 mm deep and 150 mm wide rectangular beam is subjected to a maximum bending moment of 250 kN-m. Determine the maximum stress produced in the beam and the radius of curvature for the portion of the beam where bending is maximum.
4. A Simply supported beam of length L carries a uniformly distributed load of w per unit length over the whole span. Using the double integration method, find the slope and deflection at mid and end points.
5. A 4m long hollow alloy tube with the inside and outside diameters as 36 mm and 48 mm respectively elongates by 3 mm under a tensile force of 50 kN. Determine the buckling load for the tube when it is used as a column with both end pinned and with a factor of safety of 5.
6. Show that in a direct stress system, the maximum shear stress in a body is half the magnitude of applied stress.

SECTION-C

7. Determine the maximum shear stresses in compound stress systems and show that the planes of maximum shear stresses lie at 45° to the planes of principal stresses.
8. Compare the weights of equal lengths of a solid and hollow shaft to transmit a given torque for the same maximum stress if the inside diameter of the shaft is three fourth of the outside.
9. A simply supported beam of length 8 m rests on supports 6 m apart, the right hand end is overhanging by 2 m. The beam carries a uniformly distributed load of 1500 N/m over the entire length. Draw S.F. and B.M. diagram and find the point of contra flexure, if any.

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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: 24-05-2023

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 viscosity and derive its units and dimensions.
- b) How do you determine the fluid pressure and its location on a submerged horizontal surface?
- c) *"The liquid mass in a container subjected to constant horizontal acceleration is equivalent to a liquid mass at rest"*. Discuss
- d) What are the various methods of describing fluid flow pattern?
- e) What is kinetic energy correction factor and what is its significance?
- f) Explain Reynolds model law.
- g) What are the different types of similarities that must exist between model and prototype?
- h) What are minor head losses in pipes?
- i) Explain vortex motion.
- j) Differentiate venturimeter and orificemeter.



SECTION-B

2. Derive an expression for the force on a thin plate of given arbitrary shape immersed in a liquid at an angle θ to the free surface.
3. Describe an experimental method to determine the metacentric height of a boat.
4. The power P to drive a fan is found to depend on the diameter D , density of the gas ρ , volume flow rate Q , and the speed N . Using the method of dimensional analysis obtain a correlation in terms of dimensionless numbers.
5. Explain with a neat sketch the working of Rotameter.
6. A water pipe is laid on a slope of 1 in 40. The pipe is 50 m long. Water flows upwards at the rate of $0.06\text{m}^3/\text{s}$. The inlet diameter at the lower end is 200 mm. The diameter at the outlet is 400 mm. Determine the pressure at the lower end if the pressure at the higher end is 24.525 N/cm^2 .

SECTION-C

7. Derive two dimensional continuity equation in Cartesian coordinates.
8. Show from basics that in sudden contraction, the loss of head equals $(V_2 - V_1)^2/g$. In the case of formation of Vena-contracta, show that the loss equals $[(1/C_c) - 1]^2/2g$. where $C_c = A_c/A_2$. The terms have usual meaning.
9. Explain what is meant by forced vortex? Derive an expression for the radial pressure distribution in forced vortex.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.-3)
BASIC ELECTRONICS ENGINEERING

Subject Code : BTEC305-18

M.Code : 76420

Date of Examination: 26-05-2023

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 peak inverse voltage?
- b) What is breakdown voltage?
- c) What are filter circuits?
- d) What is center tap full wave rectifier?
- e) What is meant by LSB and MSB.
- f) What is photo diode? Which material is used for them?
- g) What is operating point?
- h) What is comparator?
- i) What is the truth table of NAND and NOR gate?
- j) Convert the hexadecimal number into octal:
 - i. 5B.34
 - ii. 3DE



SECTION-B

2. Explain the working of full wave rectifier with filtered output.
3. Draw and explain the three basic configurations of NPN transistor.
4. Explain with diagram how an op-amp can be used as phase shifter.
5. Explain JK flip flop with its truth table.
6. Solve the following :
 - a) $(5735.20)_8 = (?)_2 = (?)_{16}$
 - b) $(A152)_{16} = (?)_8 = (?)_2$
 - c) Add $(100000.001)_2 = (11110.111)_2$

SECTION-C

7. Explain the block diagram of an operational amplifier? Also draw the pin diagram of 741 op-amp.
8. Explain the working of an Emitter Follower and show how it performs the function of impedance transformation.
9. **Write short note on the following :**
 - a) SR Flip flop
 - b) Common mode rejection ratio and slew rate in op-amp

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.-3)
STRENGTH OF MATERIALS-I
Subject Code : BTME-304-18
M.Code : 76421
Date of Examination : 29-05-2023

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 Hook's law.
- (b) What happens to a material beyond its elastic limit?
- (c) What are the uses of bending moment and shear force diagrams?
- (d) Write the relation between rate of loading, shear force and bending moment.
- (e) What is the difference between pure bending and eccentric bending?
- (f) Define torsional rigidity.
- (g) What are the factors affecting the strength of a column or strut?
- (h) Define slenderness ratio.
- (i) How do you calculate the maximum deflection of a beam?
- (j) Name various methods used to find slope and deflection.

SECTION-B

2. A steel bar 340 mm long, 55 mm wide and 12 mm thick is subjected to an axial pull of 90kN. Find the change in length, width, thickness and volume of the bar. Given: $E = 210\text{GPa}$, Poisson's ratio = 0.33.
3. A rectangular beam 20 cm deep by 10 cm wide is subjected to maximum bending moment of 500 kNm. Determine the maximum stress in the beam. If the value of E for the material is 207GN/m^2 , find the radius of curvature for that portion of the beam where the bending moment is maximum.
4. How can Mohr's Circle be used to determine the stresses acting on a plane at a given orientation in a loaded material? Provide a step-by-step explanation.
5. Derive Euler's formula for a-column with both ends hinged.
6. A horizontal girder of steel having uniform section is 14 m long and is simply supported at its ends. It carries concentrated loads of 120 kN and 80 kN at two points 3 m and 4.5 m from the two ends respectively. For the section of the girder, $I = 16 \times 10^4\text{cm}^4$, and E for steel is 210 GPa. Calculate the deflection of the girder at points under the two loads.

SECTION-C

7. A horizontal beam AB of length 8 m is simply supported at A and B. It carries U.D.L. of 3 kN/m over the entire span and a clockwise moment of 12 kNm is applied in the plane of the beam at point C, 5 m from A. Draw the shearing force and bending moment diagrams and determine the position and magnitude of maximum bending moment.
8. A solid shaft of 200 mm diameter is to be replaced by a hollow steel shaft with internal diameter equal to 0.5 D where D is the external diameter. Design the hollow shaft and find the saving in material. The value of maximum shear stress may be assumed as same for both the shafts.
9. Write short notes on the following :
 - (a) Different types of end conditions for columns and struts and their effect on buckling behavior.
 - (b) Moment area method to find slope and 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. (Mechanical Engineering) (Sem-4)

STRENGTH OF MATERIALS-II

Subject Code : BTME-403-18

M.Code : 77548

Date of Examination : 21-06-2022

Time : 3 Hrs.

P.T.U Questions for
B.Tech ME Sem-

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 energy of distortion.
- b) What is significance of resilience?
- c) State and explain maximum principal stress theory.
- d) Write the applications of close coiled helical springs?
- e) What is significance of full-length leaves in a leaf spring?
- f) For what purpose compound cylinders are used?
- g) Name various types of stresses in crane or chain hooks.
- h) What is significance of rims of uniform thickness?
- i) What do you mean by shear centre?
- j) What do you mean by compound cylinders?

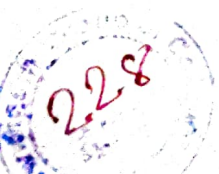
SECTION-B

2. A steel bar 5 cm by 5 cm in section, 6 m long is subjected to an axial pull of 150 kN. Taking $E = 200 \text{ GN/m}^2$ Calculate the change in the length of bar. Also find the amount of energy stored in bar during the extension.
3. A shaft is subjected to a maximum torque of 12 kNm and a maximum bending moment of 9 kNm at a particular section. If the allowable equivalent stress in simple tension is 180 MN/m^2 , find the diameter of the shaft according to the maximum shear stress theory.
4. Find the maximum safe air pressure in case of a cylindrical air drum having 3 m diameter with plates 1.2 cm thick. The efficiencies of the longitudinal and circumferential joints are respectively 70% and 45%, and maximum tensile stress in the plating is to be limited to 120 MN/m^2 .
5. A disc of 50 cm diameter and uniform thickness is rotating at 3000 r.p.m. Determine the maximum stress induced in the disc. If the hole of 10 cm diameter is drilled at the centre of the disc, determine the maximum intensities of radial and hoop stresses induced. Take Poisson's ratio = 0.33, density of disc = 7950 kg/m^3 .
6. Plot the shearing stress distribution and derive an expression for locating the shear centre for a rectangular section.

SECTION-C

7. An open-coiled helical spring of wire diameter 12 mm, mean coil radius 84 mm, helix angle 20° carries an axial load of 500 N. Find the shear stress and direct stress developed at inner radius of the coil.
8. Derive mathematically Lamé's equation.
9. **Write short notes on the following :**
 - a) Stress due to suddenly applied loads
 - b) Disc of uniform strength.

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (ME) Sem.- (4)
STRENGTH OF MATERIALS-II

Subject Code : BTME-401

M.Code : 59129

Date of Examination : 07-06-2023

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 proof resilience.
- b) Distinguish between energy of dilation and distortion.
- c) Why theories of failure play an important role in design of machine components?
- d) Give graphical representation of maximum principal strain theory.
- e) Why leaf spring is called spring of uniform strength?
- f) For what purpose compound cylinders are used?
- g) Name and define stresses developed in thick cylinders.
- h) What do you mean by discs of uniform strength?
- i) What is the importance of trapezoidal cross section of a crane hook, explain briefly.
- j) Explain the importance of shear centre.



SECITON-B

2. A bar 110 cm in length is subjected to an axial pull, such that the maximum stress is equal to 150 MN/m^2 . Its area of cross-section is 2 cm^2 over a length of 100 cm and for the middle 10 cm length it is only 1 cm^2 . If $E = 210 \text{ GN/m}^2$, calculate the strain energy stored in the bar.
3. A thin disc whose outer radius is 300 mm and inner radius is 150 mm rotates at 1509 rpm.

Compute :

- a) maximum radial stress and
 - b) maximum circumferential stress. Assume, Poisson's ratio = 0.3, and density = 7818 kg/m^3 of its material.
4. A cylindrical tank open at top and having vertical axis, is of 2.5 m inside diameter and 22 m high. The tank is filled with water and is made of structural steel with a yield point of 220 MN/m^2 . Determine the thickness of the tank if :
 - a) longitudinal joint is 100% efficient.
 - b) longitudinal joint is 75% efficient. Assume factor of safety as 3.
 5. A steel ring of 240 mm mean, diameter has a rectangular cross-section of 60 mm x 40 mm, the larger section being in the radial direction. Determine the tensile force which the ring can carry safely if the permissible stresses are 140 MPa.
 6. Derive the general formula for distribution of shear stress in beams.

SECTION-C

7. A compound cylinder, formed by shrinking one tube to another is subjected to an internal pressure of 90 MN/m^2 . Before the fluid is admitted, the internal and external diameters of the compound cylinder are 180 mm and 300 mm respectively and the diameter at the junction is 240 mm. If after shrinking on, the radial pressure at the common surface is 12 MN/m^2 , determine the final stresses developed in the compound cylinder.
8. A laminated steel spring 1 m long is to support central load of 6 kN. If the maximum deflection of spring is not to exceed 50 mm and maximum stress should not exceed 300 MN/m^2



Calculate :

- a) the thickness of the leaves,
 - b) their number if each plate is to be 80 mm wide. Take, $E = 200 \text{ GN/m}^2$.
9. A solid shaft transmits 970 kW at 290 rpm. Maximum torque is 2 times the mean. The shaft is subjected to a bending moment which is 1.5 times the mean torque. The shaft is made of a ductile material for which the permissible tensile and shear stresses are 110 MPa and 70 MPa respectively. Determine the shaft diameter using a suitable theory of failure. Give justification for the theory used.

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ME) (Sem-4)
THEORY OF MACHINES – II
Subject Code : BTME-402
M.Code : 59130
Date of Examination : 08-06-2023

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 compound pendulum?
- b) Derive an expression for balancing a single rotating mass.
- c) What is the meaning of partial balancing?
- d) What do you know about an addendum of a gear?
- e) In reference with kinematic synthesis, write least square techniques
- f) What do you mean by velocity ratio in context of gear train?
- g) What are the considerations of frictional forces?
- h) Explain backlash in gears.
- i) What are power transmission elements?
- j) Write, a short note on gyroscope.



SECTION-B

2. For the static equilibrium of a mechanism as shown in the Figure (a), determine the input torque T to be applied on the link AB.

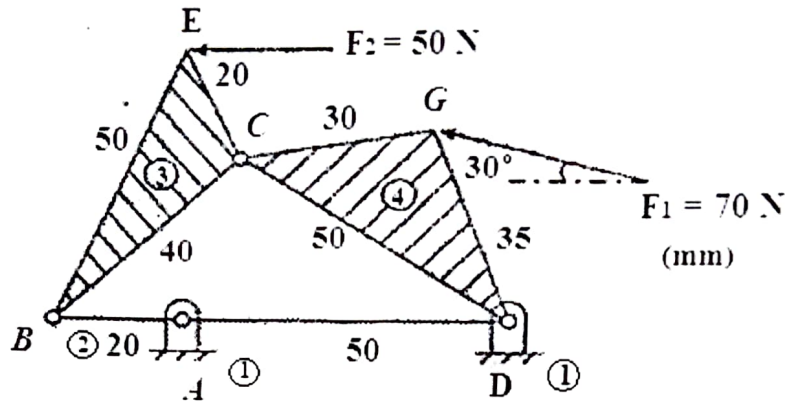


Fig. a

3. Prove that the resultant unbalanced force is minimum when half of the reciprocating Masses are balanced by rotating masses.
4. Describe the graphical method of considering the inertia of connecting rod of a reciprocating engine.
5. The following data is related to two meshing gears: Velocity Ratio= $1/3$, Module = 4mm, Pressure angle 20° and center distance = 200mm. Determine the number of teeth and base circle radius of gear wheel.
6. A compound- gear train shown in Figure (b) consist of compound gear B-C and D-Es. Alb gears are mounted on parallel shafts. The motor shaft rotating at 800 rpm is connected to gear A and the output shaft to the gear F. The number of teeth on gear A, B, C, D, E and F are 24, 56, 30, 80, 32 and 72 respectively. Determine the speed of gear F.

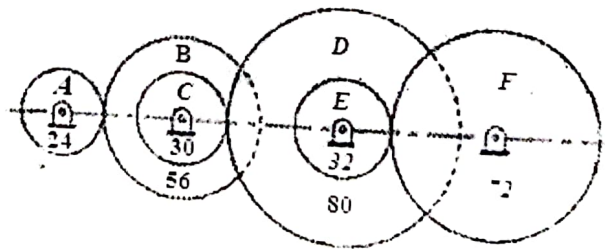


Fig. b



SECTION-C

7. The turbine rotor of a ship has a mass of 2.2 tonnes and rotates at 1800 rpm clockwise when viewed from the aft. The radius of gyration of the rotor is 320 mm. Determine the gyroscopic couple and its effect when the.
- a) Ship turns right at a radius of 250 m with a speed of 20 km/h
 - b) ship pitches with the bow rising at an angular velocity of 0.85 rad/s
 - c) Ship rolls at an angular velocity of 0.1 rad/s
8. Describe in detail the two positions synthesis of a four bar mechanism.
9. Three masses of 8 kg, 12 kg and 15 kg attached at radial distance of 80 mm, 100 mm and 60 mm respectively to a disc on a shaft in complete balance. Determine the angular positions of 12 kg and 15 kg relative to 8-kg mass.

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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 : 13-06-2023

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 machinability? Enlist the variable affecting machinability.
 - b) What is the dressing of grinding wheels?
 - c) Differentiate between drilling and boring.
 - d) What is broaching? Write two advantages of broaching.
 - e) What is the difference between press forging and drop forging?
 - f) Write the various products of rolling.
 - g) What is lathe dog? For what it is used?
 - h) With suitable diagram, define deep drawing process.
 - i) Enlist the common rolling defects.
 - j) State the advantages of use of coolant in machining.



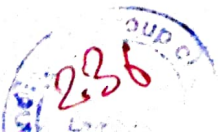
SECTION-B

2. Differentiate between up milling and down milling.
3. With neat sketches, explain various operations performed on presses.
4. What is indexing? Explain method of simple indexing by means of diagram showing the index head.
5. In a tapered component, let $d = 70$ mm, length (L) = 200 mm and the amount of taper is $1/20$, find the large diameter of taper (D).
6. Explain various types of forging defects with their causes and remedies.

SECTION-C

7. What is shear zone, shear plane and shear angle? Derive the relation for the shear angle (ϕ).
8. What are high energy rate forming processes? With suitable diagrams explain explosive forming, magnetic pulse forming and electro-hydraulic forming.
9. Write short note on :
 - a) Cutting tool material
 - b) Extrusion process.

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SECTION-B

2. What is steady-state diffusion? Discuss important factors affecting diffusion.
3. Show that the atomic packing factor for Face Centered Cubic (FCC) crystal structure is 0.74.
4. Explain equilibrium diagram of binary system with example.
5. What do you mean by heat treatment of steel? Explain tempering process.
6. Discuss the effect of important alloying elements on properties of steel.

SECTION-C

7.
 - a) Explain edge and screw dislocations.
 - b) Explain Jominy end-quench test to determine harden ability of steel.
8. Draw Iron carbon (Fe-C) equilibrium diagram. Label all the phases and temperatures properly. Also describe the possible phase reactions.
9. **Write short note on any two of the following :**
 - a) Time temperature transformation (TTT) curves
 - b) Theories of plastic deformation
 - c) Nitriding and cyaniding



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SECTION-B

2. A stream function is given by $\psi = 5x - 6y$. Calculate the velocity components and also magnitude and direction of the resultant velocity at any point.
3. State Buckingham's π - theorem. Why this theorem is considered superior over Rayleigh's method for dimensional analysis?
4. Explain the terms: geometric, kinematic and dynamic similarity.
5. Explain the difference between free and forced vortex motions.
6. Find an expression for the action of fluid pressure on a vertical submerged surface.

SECTION-C

7. A rectangular pontoon 10.0 m long, 7 m broad and 2.5 m deep weighs 686.7 KN. It carries on its upper deck an empty boiler of 5.0 m diameter weighing 588.6 KN. The center of gravity of the boiler and the pontoon are at their respective centers along a vertical line. Find the Meta centric height. Weight density of sea water is 10.104 KN/m^3 .
8. A horizontal pipe line 40 m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 25 m of its length from the tank, the pipe is 150 mm-diameter and its diameter is suddenly enlarged to 300 mm. The height of water level in the tank is 8 m above the centre of the pipe. Considering all losses of head which occur, determine the rate of flow. Take $f = 0.1$ for both sections of the pipe.
9. **Explain the following :**
 - a) Dimensionless numbers and their significance.
 - b) Explain any five fluid properties.

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Roll No.

Total No. of Pages: 02

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B.Tech. (ME) (Sem-4)
THEORY OF MACHINES-II

Subject Code : BTME-405-18

M.Code : 77550

Date of Examination: 30-05-2023

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) State the conditions for equilibrium.
- b) Define inertia force and inertia torque.
- c) Define module.
- d) State fundamental law of gearing.
- e) What do you mean by arc of contact?
- f) Explain the term point of concurrency.
- g) Why is balancing of machines necessary?
- h) Define the term related to worm and worm gears: axial pitch and lead.
- i) Define velocity ratio.
- j) What is gyroscopic couple?



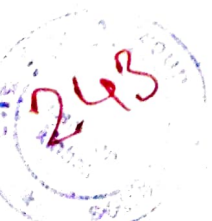
SECTION-B

2. Explain the terms static balancing and dynamic balancing. State the necessary condition to achieve them.
3. State and prove the law of gearing.
4. Explain briefly the differences between simple, compound, and epicyclic gear trains. What are the special advantages of epicyclic gear trains?
5. A pinion of 20 involute teeth and 12.5 cm pitch circle diameter drives a rack. The addendum of both pinion and rack is 6.25 mm. What is the least pressure angle which can be used to avoid interference?
6. Write the derivation to obtain the expression for variation in tractive effort of an engine.

SECTION-C

7. Discuss how a single revolving mass is balanced by two masses revolving in different planes?
8. In an epicyclic gear train, an arm carries two gears A and B having 36 and 45 teeth respectively. If the arm rotates at 150 r.p.m in the anticlockwise direction about the centre of the gear A which is fixed, determine the speed of gear B. If the gear A instead of being fixed, makes 300 r.p.m in the clockwise direction, what will be the speed of gear B?
9. Explain Freudenstein's method of three point synthesis of mechanisms.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem-4)
APPLIED THERMODYNAMICS-II

Subject Code : BTME-404

M.Code : 59132

Date of Examination : 01-06-2023

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 the classification of air compressors.
- b) What do you understand by term 'slip factor'.
- c) State principle of jet propulsion.
- d) List the different types of rocket motors.
- e) Name the common fuels used in rocket motors.
- f) Define cycle air rate.
- g) Define blade efficiency.
- h) Write the advantages of multistage compressor.
- i) Define volumetric efficiency.
- j) What is the function of pre-guide vanes?



SECTION-B

2. Explain the effect of prewhirl on the impeller of centrifugal pump.
3. Differentiate between centrifugal and axial flow compressors.
4. Describe 'thermodynamic cycle' for a rotary air compressor.
5. List the methods of improving the efficiency and specific output of a simple gas turbine.
6. Discuss the performance characteristics of different propulsion system.

SECTION-C

7. Describe with a neat sketch the working of a Vane blower compressor and show its p-v diagram. Also mention its-applications.
8. Explain with a neat sketch the working of an axial flow compressor.
9. Discuss the effect of clearance volume on the volumetric efficiency of a reciprocating air-compressor.

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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 : 02-06-23

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 isentropic and adiabatic process.
- b. What is adiabatic flame temperature?
- c. What is the function of nozzle?
- d. List the various types of compressors.
- e. What is dryness fraction?
- f. How does Turbine differs from a Steam Turbine?
- g. When is multistage compression used for air?
- h. Write the classification of condensers.
- i. Define reheat factor.
- j. Define the term co-generation.

SECTION-B

2. Explain with the help of neat sketch the formation of steam at constant pressure. Also, write down the various steam properties.
3. What are the different stages of combustion in internal combustion engines?
4. A Single-stage double-acting air compressor is required to deliver 14m^3 of air per minute measured at 1.013 bar and 15°C . The delivery pressure is 7 bar and the speed 300 r.p.m. Take the clearance volume as 5% of the swept volume with the compression and expansion index of $n=1.3$.

Calculate :

- a) Swept volume of the cylinder
 - b) The delivery temperature and
 - c) Indicated power.
5. Derive an expression for flow of steam through nozzle when the steam is supersaturated (or metastable).
 6. Explain the working of combined reheat-regenerative cycle.

SECTION-C

7. A simple closed cycle gas turbine plant receives air at 1 bar and 15°C , and compresses it to 5 bar and then heats it to 800°C in the heating chamber. The hot air expands in a turbine back to 1 bar. Calculate the power developed per kg of air supplied per second. Take C_p for air is 1 KJ/Kg K.
8. Derive an expression for combined velocity diagram/triangles for reaction turbine. Calculate the force, axial thrust, power, blade efficiency, stage efficiency, relative efficiency and maximum efficiency.
9. **Write a short note on the following :**
 - a) Effect of intercooling in a multistage reciprocating compressor.
 - b) Effect of air leakage in condensers.

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Total No. of Pages : 02

Total No. of Questions : 09

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

FLUID MACHINES

Subject Code : BTME-402-18

M.Code : 77547

Date of Examination : 05-06-2023

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 turbine and pump.
- b) Define the term suction head and delivery head with diagram
- c) Define the term slip in reciprocating pump.
- d) Name the different types of draft tubes used in the turbines?
- e) Define specific speed of turbine.
- f) Differentiate between impulse and reaction turbine.
- g) Write the formula for efficiency when the vanes are curved radial.
- h) What is the difference between net head and gross head in turbines?
- i) What is the significance of Thomas cavitation number?
- j) What is gear wheel pump?



SECTION-B

2. A jet of water of diameter 75mm moving with a velocity of 30m/s strikes a curved fixed vane at one end at an angle of 30 degree to horizontal. The jet leaves the plate at an angle of 20 degree to the horizontal. Find the force exerted by the jet on the plate in the horizontal and vertical directions.
3. Derive the equation of force on the curved plate when the plate is moving in the direction of jet.
4. Discuss the general layout of hydraulic power plant.
5. Discuss the working of axial flow reaction turbine.
6. With diagram explain the working of hydraulic press.

SECTION-C

7. A centrifugal pump rotating at 1000 rpm delivers 160 litres/s of water against a head of 30m. The pump is installed at a place where atmospheric pressure is 1×10^5 Pascal and vapour pressure of water is 3 kPa. The head loss in suction pipe is equivalent to 0.2m of water. Calculate (a) Minimum NPSH (b) Maximum allowable height of the pump from free surface of water in sump.
8. Derive the equation of work-done by double-acting reciprocating pump.
9. Discuss in detail the working of torque converter.

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Total No. of Questions : 09

B.Tech. (ME) (Sem-5)
MANAGEMENT AND ENGINEERING ECONOMICS

Subject Code : BTME-504-18

M.Code : 78250

Date of Examination : 06-06-2023

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 Briefly :

- a) Levels of Management
- b) Importance of Planning Process
- c) Centralization vs. Decentralization of Authority
- d) MBO and MBE
- e) Steps in controlling
- f) Laws of demand and supply
- g) Elasticity of demand
- h) EMI payment calculation with flexible interest rates
- i) Minimum acceptable rate of return
- j) Types of overheads.

SECTION-B

2. Management is regarded as an art by some, science by others and in exact science by many more. The truth seems to be, somewhere in between. In the light of this statement, explain the exact nature of management.
3. Enlist the essential characteristics of the principles of management?
4. One can delegate authority but not responsibility. Explain the three terms in this statement and examine how far this statement is true.
5. Compare and contrast Maslow's theory with Herzberg's two factor theory and Alderfer's ERG theory.
6. 'Management is a two - way traffic; it is based upon the effective machinery of communication', Discuss this statement.

SECTION-C

7. "Directing involves basically the understanding of human behaviour and guiding the behaviour in specific direction". Elaborate this statement and show how the understanding of human behaviour makes directing function of management more effective.
8. Write short notes on :
 - a) Difference between macroeconomics and microeconomics
 - b) Price elasticity and Income elasticity.
9. Write short notes on :
 - a) Production costing
 - b) Net Present value method

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Total No. of Pages : 02

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

MECHANICAL MEASUREMENT AND METROLOGY

Subject Code : BTME-503

M.Code : 70604

Date of Examination : 08-06-2023

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 first order and second order system.
- b) What do you know about calibration and why is this done in measurement system?
- c) Distinguish between systematic and random error.
- d) What is clinometer and give its applications?
- e) What is the difference between bounded and unbounded type of strain gauges?
- f) Draw a neat sketch of Mcleod Gauge for the measurement of vacuum.
- g) List the various methods of flow measurement.
- h) What is a proving ring and how is it used to measure force?
- i) List any five physical properties of matter which are used to measure temperature.
- j) Draw a neat and clean sketch of pneumatic load cell.



SECTION-B

2. Write the classification of measurement and instruments.
3. Explain the causes of interference errors giving at least two examples of instrument interference and also give two examples of environment interference.
4. Explain the working of a vernier caliper used for internal and external length measurements by using neat sketch. What arrangement is provided therein to measure the depth of a vessel?
5. Define gauge factor for a strain gauge. How temperature compensation is done in strain gauges to measure axial load. Explain with neat sketch.
6. Explain the working of Bourden gauge by drawing a neat sketch. How the sensitivity of this gauge is increased

SECTION-C

7. A single-column manometer is using mercury of specific gravity 13.6 as the manometric liquid. To what height will the mercury rise in the narrow limb if a differential pressure of 75 kN/m^2 is applied. -The wide and the narrow limb diameters are 160 mm and 6 mm respectively.
8. Explain the working of a hydraulic load cell for the measurement of force.
9. A thermopile arrangement of copper constantan thermocouples consists of three junction pairs, and has the reference junction at 200°C . If the output voltage is 3.3 mV, determine the temperature of the measuring junction. Assume the following temperature emf values which are based on reference junction at 0°C :

Temp, $^\circ\text{C}$	=	100	200	250
Voltage, mV	=	4.22	9.23	11.95

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3. Derive an expression for temperature distribution and heat transfer from rectangular fin when the tip of the fin is insulated.
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 :

$$Nu_x = 0.04 Re^{0.9} Pr^{0.33}$$

Where Nu_x is the local value of the 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. Explain the Pool boiling curve based on Nukiyama experiment in details.
6. Derive the expression of LMTD for a parallel flow heat exchanger.

SECTION-C

7. a) Show that

$$F_{12} = \frac{1}{1/\epsilon_1 + 1/\epsilon_2 + 1}$$

- b) What do you mean by radiation shield? Where it is used Show that

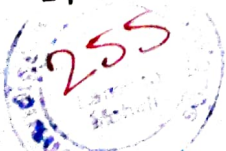
$$\left(\frac{Q}{A}\right)_{\text{with } N \text{ shields}} = \frac{1}{N+1} \left(\frac{Q}{A}\right)_{\text{with shields}}$$

8. Water is heated while flowing through a 1.5×3.5 cm rectangular cross-section tube at a velocity of 1.2 m/s. The water enters at 40°C and tube is maintained at 85°C . Determine the length of the tube required to raise the temperature of the water by 30°C . Take the following properties of water : $\rho = 985.5 \text{ kg/m}^3$, $k = 0.653 \text{ W/m-K}$, $\nu = 0.517 \times 10^{-6} \text{ m}^2/\text{s}$, $C_p = 4.19 \text{ kJ/kg-K}$

9. Write short notes on the followings :

- a) Critical thickness of insulation
- b) Mechanism of bubble formation & collapse in pool boiling.
- c) Wien's displacement law of radiation and its significance
- d) NTU

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 : 10-06-2023

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) Discuss the basic traditional CAD design process.
- b) Explain STEP graphic standard in CAD.
- c) Give the benefits of Geometric Modeling.
- d) Discuss the concept of analytical and synthetic surfaces.
- e) What are applications of FEM?
- f) Explain the concept of combined DNC/CNC system.
- g) Give the benefits of GT.
- h) What is CAPP and give its benefits.
- i) Why CIMs is said to be more flexible than other production systems.
- j) What is computer assisted part programming.

SECTION-B

2. Discuss in detail the functions of a graphics package.
3. Discuss in detail the applications of various geometric transformations.
4. Write a short note on hidden line removal method in wire frame model.
5. Discuss in brief the basic principle and general procedure of FEA software.
6. Discuss the CNC machine using block diagram and explain salient features of NC machine tools.

SECTION-C

7. Discuss the various NC motion control systems and explain fixed/floating zero.
8. Discuss the various part classification and coding systems in GT.
9. Discuss the benefits of FMS and explain the various physical components of an FMS.

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (ME) (Sem-5)
DESIGN OF MACHINE ELEMENTS

Subject Code : BTME-502-18

M.Code : 78248

Date of Examination : 12-06-2023

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 term shearing.
- b) Define the term endurance limit.
- c) Define the terms bearing - characteristic number and bearing modulus for journal bearing.
- d) What is rated life of a ball bearing?
- e) What are the advantages of worm gear drive?
- f) What is creep in belts?
- g) What is the objective of nipping of leaf spring?
- h) Why is heat dissipation necessary in clutches?
- i) What are the advantages of disk brakes over drum brakes?
- j) What is leg and throat thickness of a fillet weld?



SECTION-B

2. Explain the procedure used to design a machine element.
3. 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.

4. Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameters is 0.5.
5. Explain the procedure used to design a chain drive.
6. 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 N/mm². Also, determine the axial thrust to be provided by springs. Assume the theory of uniform wear.

SECTION-C

7. Design a journal bearing for a centrifugal pump from the following data : Load on the journal = 20,000 N; Speed of the journal = 900 r.p.m.; Type of oil is SAE 10, for which the absolute viscosity at 55°C = 0.017 kg/m-s; Ambient temperature of oil = 15.5°C ; Maximum bearing pressure for the pump = 1.5 N/ mm². Calculate also mass of the lubricating oil required for artificial cooling, if rise of temperature of oil be limited to 10°C. Heat dissipation coefficient = 1232 W/m²/°C.
8. A spur gear drive is required to transmit a maximum power of 22.5 kW. The velocity ratio is 1:2 and r.p.m. of the pinion is 200. The approximate centre distance between the shafts may be taken as 600 mm. The teeth has 20° stub involute profiles. The static stress for the gear material (which is cast iron) may be taken as 60 MPa and face width as 10 times the module. Find the module, face width and number of teeth on each gear.



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9. Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 32 kW at 960 r.p.m. The overall torque is 20 percent more than mean torque. The material properties are as follows :
- The allowable shear and crushing stress for shaft and key material is 40 MPa and 80 MPa respectively.
 - The allowable shear stress for cast iron is 15 MPa.
 - The allowable bearing pressure for rubber bush is 0.8 N/mm^2 .
 - The material of the pin is same as that of shaft and key.

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Total No. of Pages : 02

Total No. of Questions : 07

B.Tech. (ME) (Sem-5)
DESIGN OF MACHINE ELEMENTS-I

Subject Code : BTME-501

M.Code : 70602

Date of Examination : 16-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. Attempt FOUR questions from SECTION-B, Each question carries 10 marks

SECTION-A

1. Answer briefly :

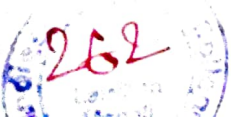
- a) What is the difference between product design and machine design?
- b) Discuss the importance of safety in machine design.
- c) Define endurance strength.
- d) What is the significance of fatigue strength?
- e) Write the key objectives of concurrent engineering.
- f) What is the role of rivet spacing in joint design?
- g) How does lubrication impact shaft and axle performance?
- h) What is the role of keys in power transmission?
- i) Distinguish between lever and link.
- j) What is the role of gaskets and seals in pipe joint design?

SECTION-B

2. Discuss the role of creativity and innovation in the design process for machine elements. How can designers think outside the box to create unique and effective solutions?

3. A low carbon steel plate of 0.7 m width welded to a structure of similar material by means of two parallel fillet welds of 0.112 m length (each) is subjected to an eccentric load of 4000 N, the line of action of which has a distance of 1.5 m from the centre of gravity of the weld group. Design the required thickness of the plate when the allowable stress of the weld metal is 62 MPa and that of the plate is 42 MPa.
4. Define factor of safety and its importance in engineering design. Discuss, how can designers determine the appropriate factor of safety for different loading conditions, such as static, dynamic and impact loads?
5. Determine the diameter of hollow shaft having inside diameter 0.5 times the outside diameter. The permissible shear stress is limited to 200 MPa. The shaft carries a 900 mm diameter cast iron pulley. This pulley is driven by another pulley mounted on the shaft placed below it. The belt ends are parallel and vertical. The ratio of tensions in the belt is 3. The pulley on the hollow shaft weighs 800 N and overhangs the nearest bearing by 250 mm. The pulley is to transmit 35 kW at 400 r.p.m.
6. Design a compression coupling for a shaft to transmit 1300 N-m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are 4. The permissible tensile stress for the bolt's material is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3.
7. A foot lever is 1 m from the centre of shaft to the point of application of 910 N load. Find: (a) Diameter of the shaft, (b) Dimensions of the key, and (c) Dimensions of rectangular arm of the foot lever at 60 mm from the centre of shaft assuming width of the arm as 3 times thickness. The allowable tensile stress may be taken as 77 MPa and allowable shear stress as 68 MPa.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.-5)
AUTOMOBILE ENGINEERING

Subject Code : BTME-505

M.Code : 70606

Date of Examination : 03-06-23

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) Differentiate between Frameless and unitary construction.
- b) List down major tools used for Automobile maintenance shop.
- c) What is the function of shackle in conventional suspension system?
- d) What is the function of clutch in transmission system?
- e) Briefly explain the advantages of Transistorized ignition system.
- f) What's the function of "servo" in Braking system?
- g) What is the function of cut out in battery charging system?
- h) Differentiate between MPFI and Gasoline Direct Injection systems.
- i) What is the function of Thermostat in Engine cooling system?
- j) What is the need and advantages of Wheel Alignment?



SECTION -B

2. Describe Viscosity and Service Ratings for Lube oil. What are multi-grade oils?
3. Draft preventive maintenance schedule for a passenger car.
4. Explain the construction and working of a telescopic type shock absorber with the help of a neat diagram.
5. Differentiate between :
 - a) Individual pump and nozzle system,
 - b) Unit injector system
 - c) Common rail system
 - d) Distributor system
6. Enlist the different Starting motor drives in automobiles. Describe with neat sketch the most widely used drive for diesel engines.

SECTION-C

7. Briefly explain : (a) Weight transfer during Braking and stopping distance (b) merit; demerits of AT, AMT, CVT, DCT/DSG automatic transmission systems.
8. Write short note on:
 - a) Tractive effort and Vehicle performance curves
 - b) Working of Differential with neat sketches.
9. Explain the following terms :

Camber, castor, King pin inclination and Included angle. Discuss their impact of steering characteristics of vehicle.

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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 : 29-05-2023

P.T.U QUES
B-Tech 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) Define Thermal diffusivity.
- b) What is meant by overall heat transfer coefficient? How it is calculated?
- c) Define radiation shape factor, what is its use?
- d) Why thin fins are preferred over a thick fin?
- e) Define the term NTU. What does it interpret?
- f) Define monochromatic emissive power.
- g) What are the different theories of nucleation?
- h) What are the different phases of flow boiling?
- i) What is Newtonian heating of solids?
- j) Briefly explain the concept of dimensional analysis.

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SECTION-B

2. Derive conduction equation in cylindrical coordinate system.
3. Derive the relation of temperature distribution and heat transfer for rectangular fin losing heat at the tip.
4. Prove by dimensional analysis for natural convection that Nusselt no. is a function of Grashoff no. and Prandtle no.
5. The air at 40°C flows with a velocity of 8 m/s along a flat plate 3m long, maintained at 100°C . Calculate local heat transfer coefficient at the end of the plate. Assume critical Reynold no. ($\text{Re}_{\text{cr}} = 2 \times 10^5$).
6. State and explain the concept of Lambert's cosine law and intensity of radiation diagrammatically.

SECTION-C

7. A pipe of 4cm diameter is maintained at temperature T_1 and is covered with an insulation of $k = 0.3\text{ W/mK}$ to reduce the heat loss. The heat is dissipated from the outer surface of insulation in to an ambience at T_2 with $h = 10\text{W/m}^2\text{K}$. Calculate the thickness of insulation at which the heat dissipation rate would be maximum. Also calculate the ratio of heat loss from the outer surface of insulated pipe and that of the bare pipe for :
 - a) Thickness of insulation equal to critical thickness
 - b) The thickness of insulation is 2 cm thicker than the critical thickness
8. A fluid with $C_p = 3.5\text{ kJ/kg }^{\circ}\text{C}$ at 100°C and at the rate of $30 \times 10^3\text{ kg/h}$ enters in to a heat exchanger. For heat exchange water enters the heat exchanger from the same direction at 10°C at a rate of $50 \times 10^3\text{ kg/h}$. If the heat transfer area is 9 m^2 and $U = 990\text{ W/m}^2\text{C}$. Calculate the outlet temperatures of both the fluids.
9. Derive the models for film wise condensation on a vertical plate.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

INTRODUCTION TO INDUSTRIAL MANAGEMENT

Subject Code : BTME604-18

M.Code : 79653

Date of Examination: 29-05-2023

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) Enlist any four objectives of an industrial engineering.
- b) What are the elements of TQM?
- c) What are the dimensions of service quality?
- d) What conditions would you keep in mind while empowering people in the context of TQM?
- e) Explain the effect of product design on cost of the product.
- f) What is meant by maintenance planning?
- g) Explain the objectives of purchasing.
- h) Define direct, indirect and overhead costs.
- i) What are the benefits of Benchmarking?
- j) Define predictive maintenance and state its benefits.



SECTION-B

2. What is the role of Industrial Engineering in the context of manufacturing / service organizations? Discuss.
3. Enumerate the various factors that are required in an effective and good product design.
4. Explain breakeven analysis with neat chart. What are assumptions made in breakeven analysis? What are different applications of breakeven analysis?
5. Explain the objectives and principals of preventive maintenance.
6. What is meant by benchmark process? Explain the steps involved in conducting a benchmarking study in an organization.

SECTION-C

7.
 - a) What do you understand by Just-in-time manufacturing? How does JIT manufacturing system lead to waste reduction and worker involvement?
 - b) What is Product Life Cycle? Elaborate the phases of life cycle with suitable example.
8.
 - a) Discuss the activities, duties and functions of purchasing department.
 - b) Discuss the customer complaint redressal mechanism adopted in the organizations.
9.
 - a) Explain the common customer feedback collection tools giving their advantages.
 - b) Write a short note on ABC analysis with the help of an illustrative example.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-6)
AUTOMOBILE ENGINEERING

Subject Code : BTME603-18

M.Code : 79652

Date of Examination : 18-05-2023

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 Chassis and superstructure
- b) Why CNG is preferred over LPG as Automobile fuel?
- c) What is the function of shackle in conventional suspension system?
- d) What is the function of clutch in transmission system?
- e) What is a Turbo Charger?
- f) What is Adaptive cruise control and Braking system?
- g) What is the function of cut out in battery charging system?
- h) Differentiate between MPFI and Gasoline Direct Injection systems.
- i) What is the function of Thermostat in Engine cooling system?
- j) What are the functional requirements of a Diesel fuel injection system?



SECTION-B

2. Describe Viscosity and Service Ratings for Lube oil. What are multi-grade oils?
3. State various Alternative Fuel / Energy Source option for future Automobile. Explain the use of Hydrogen in Future Automobile.
4. Explain the construction and working of a telescopic type shock absorber with the help of a neat diagram.
5. Differentiate between :
 - a) Individual pump and nozzle system
 - b) Unit injector system
 - c) Common rail system
 - d) Distributor system.
6. Enlist the different Starting motor drives in automobiles. Describe with neat sketch the most widely used drive for diesel engines.

SECTION-C

7. Differentiate briefly, stating merits and demerits of AT, AMT, CVT, DCT / DSG automatic Transmission systems.
8. Explain briefly, the following terms in the context of Vehicle safety in Modern Automobiles : ABS, EBD, ESP and Driver Alert System.
9. Explain the following terms :
Camber, castor, King pin inclination and Included angle. Discuss their impact of steering characteristics of vehicle.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 07

B.Tech (ME) (Sem-6)
DESIGN OF MACHINE ELEMENTS-II

Subject Code : BTME-601

M.Code : 71185

Date of Examination : 30-05-2023

Time : 3 Hrs.

Max. Marks : 60

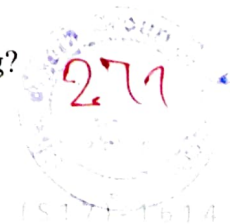
INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.
3. Select suitable design data from the data book wherever applicable.

SECTION-A

1. Write briefly :

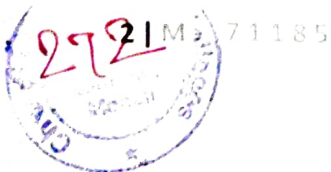
- a) How are ends of belts joined? For horizontal belts which side (tight or slack) of the belt should run on the top and why?
- b) When a split pulley is used and how it is tightened on a shaft?
- c) What are the advantages of a wire rope over fibre rope?
- d) Distinguish between simplex, duplex and triplex chains.
- e) What is a heiringbone gear? Where they are used?
- f) Define hydrodynamic lubrication.
- g) What do you understand by 'fluctuation of energy' and 'maximum fluctuation of energy'?
- h) What is the function of a spring? In which type of spring the behaviour is non-linear?
- i) Why a positive clutch is used?
- j) What is a self-energizing brake? When a brake becomes self-locking?



SECTION-B

2. A rope drive is required to transmit 750 kW from a pulley of 1 m diameter running at 450 r.p.m. The safe pull in each rope is 2250 N and the mass of the rope is 1 kg / m length. The angle of lap and the groove angle is 150° and 45° respectively. Find the number of ropes required for the drive if the coefficient of friction between the rope and the pulley is 0.3.
3. A pair of helical gears with 30° helix angle is used to transmit 15 kW at 10000 r.p.m. of the pinion. The velocity ratio is 4 : 1. Both the gears are to be made of hardened steel of static strength 100 N/mm^2 . The gears are 20° stub and the pinion is to have 24 teeth. The face width may be taken as 14 times the module. Find the module and face width from the standpoint of strength and check the gears for wear.
4. Design a journal bearing for a centrifugal pump. The load on the bearing is 4 kN and the journal diameter is 75mm. The shaft runs at 950 r.p.m. and the heat of friction is to be dissipated from the bearing housing. The ambient temperature may be taken as 27°C .
5. A single cylinder internal combustion engine working on the four stroke cycle develops 75 kW at 360 r.p.m. The fluctuation of energy can be assumed to be 0.9 times the energy developed per cycle. If the fluctuation of speed is not to exceed 1 per cent and the maximum centrifugal stress in the flywheel is to be 5.5 MPa, estimate the mean diameter and the cross-sectional area of the rim. The material of the rim has a density of 7200 kg/m^3 .
6. A single plate clutch with-berth sides of the plate effective is required to Transmit 25 kW at 1600 r.p.m. The outer diameter of the plate is limited to 300 mm and the intensity of pressure between the plates not to exceed 0.07 N/mm^2 . Assuming uniform wear and coefficient of friction 0.3, find the inner diameter of the plates and the axial force necessary to engage the clutch.
7. Design a helical compression spring for a maximum load of 1000 N and deflection of 25mm taking Wahl's factor into consideration. Assume spring index as 5, maximum permissible shear stress for spring wire as 420 MPa and modulus of rigidity as 84 kN/mm^2 .

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem-6)
MANUFACTURING PROCESSES

Subject Code : BTME-503-18

M.Code : 78249

Date of Examination : 16-06-2023

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 up-milling and down milling process.
- b) Explain the basic principle of arc welding processes.
- c) Outline the various post sintering operations adopted in powder metallurgy.
- d) Differentiate between forward and backward extrusion processes.
- e) Distinguish between brazing and soldering operations.
- f) Briefly explain the need for rapid prototyping.
- g) What is meant by rapid tooling?
- h) Classify the unconventional machining process on the basis of type of energy employed.
- i) Make a comparison of solid state lasers with gas lasers.
- j) Enumerate the different applications for jigs and fixtures.



SECTION-B

2. Discuss the heat transfer of sand casting. Explain the parameters on which solidification time depends in metal casting.
3. List out applications of rapid prototyping. Discuss the steps followed in rapid prototyping process.
4. Write a short note on different theories associated with Adhesive Bonding.
5. What is the principle of Electro Chemical Machining (ECM)? Describe the chemistry involved in the ECM process. Enlist the elements of ECM process with a suitable sketch.
6. Describe- the principles of forging die design giving a neat sketch.

SECTION-C

7.
 - a) Explain some defects that can be present in casting products.
 - b) How do you define the tool life? Explain the parameters that control the tool life of a single point cutting tool.
8.
 - a) Explain various elements of geometry of twist drill giving a neat sketch.
 - b) With the help of neat sketch, explain the principle of USM. Discuss the effects of different process parameters on the metal removal rate in USM.
9.
 - a) Explain the methods of obtaining metal powders used in powder metallurgy process with the help of neat sketches.
 - b) What is rapid tooling and explain the applications of RPT in manufacturing and tooling.

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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 : 15-06-2023

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 know about Impulse momentum principle?
- b) List different components of Pelton turbine.
- c) What is the function of draft tube?
- d) What do you mean by priming of centrifugal pumps?
- e) What is the significance of model relationships?
- f) What is Net positive Suction Head?
- g) What are the functions of air vessels?
- h) What is the difference between simple and differential accumulator?
- i) How the efficiency of hydraulic ram is calculated?
- j) What is the function of surge tank?



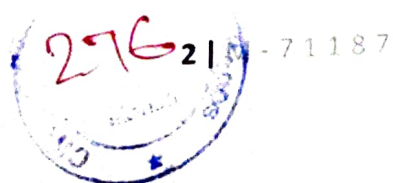
SECTION-B

2. A nozzle of 5 cm diameter delivers a stream of water 20 m/s perpendicular to a plate that moves away from the jet at m/s. Find the force on the plate, the work done and efficiency of jet.
3. A turbine develops 9000KW when running at 10 r.p.m. The head on the turbine is 30 m. If the head on turbine is reduced to 18 m, determine the speed and power developed by the turbine.
4. The diameters of an impeller of a centrifugal pump at inlet and outlet are 20 cm and 40 cm respectively. Determine the minimum speed for starting the pump if it works against a head of 25 m.
5. A single acting reciprocating pump running at 30 r.p.m., delivers $0.012 \text{ m}^3/\text{s}$ of water. The diameter of the piston is 25 cm and stroke length is 50 cm. Determine its theoretical discharge of the pump.
6. The diameter of the fixed ram and fixed cylinder of an intensifier are 100 mm and 250 mm respectively. If the pressure of the water supplied to the fixed cylinder is 25 N/cm^2 , find the pressure of the water flowing through the fixed ram.

SECTION-C

7. What is the difference between fluid coupling and torque converter? Explain the torque converter with a neat sketch.
8. Find the rise in pressure in the impeller of centrifugal pump through which water is flowing at the rate of 15 liters/s. The internal and external diameters of the impeller are 20 cm and 40 cm respectively. The widths of impeller at inlet and outlet are 1.6 cm and 0.8 cm. The pump is running at 1200 r.p.m. The water enters the impeller radially at inlet and impeller vane angle at outlet is 30° . Neglect losses through the impeller.
9. A Pelton wheel is supplied with water under a head of 35 m at the rate of 40.5 kilo liter/min. The bucket deflects the jet through an angle of 160° and the mean bucket speed is 13 m/s. Calculate the power and hydraulic efficiency of the turbine.

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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 : 12-06-2023

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 CIM production process?
- b) Enumerate the limitations of conventional machining processes that necessitate the evolution of non-traditional machining processes.
- c) Classify the non-traditional machining processes based on energy sources.
- d) Name some of the tool materials used in EDM?
- e) Discuss the various functions of tool cone in ultrasonic machining process.
- f) What are the gases commonly used in LASER?
- g) Explain the effect of the concentration of electrolyte on the process efficiency of electrochemical machining.
- h) What is dielectric fluid? What are its functions in EDM process?
- i) Make a comparison of solid state lasers with gas lasers.
- j) Explain why EBM process is performed usually in a vacuum chamber?



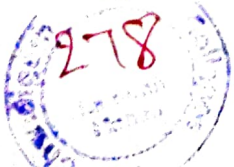
SECTION-B

2. Explain the difference between Conventional & Non-Traditional manufacturing processes.
3. Explain briefly principle and working of Abrasive flow machining giving a neat sketch and explain the key elements of AFM setup.
4. With a neat sketch, explain the working principle of Plasma Arc Machining.
5. Sketch a schematic diagram of electrochemical machining process set-up. Explain the mechanism of material removal.
6. Describe with sketch the working of a hybrid non-conventional machining process in which two mechanical non-conventional machining processes are combined.

SECTION-C

7.
 - a) Describe the working and principle of water jet machining with the help of a neat sketch. State the advantages, limitations and applications of water jet machining.
 - b) With the help of neat sketch, explain the principle of USM. Discuss the effects of different process parameters on the metal removal rate in USM.
8.
 - a) With the help of suitable sketches describe the process of photo-chemical machining. Give specific applications of this process.
 - b) Discuss the effects of various parameters on metal removal in ECM process.
9.
 - a) Why is effective flushing of dielectric so important in EDM process? Give details of various dielectric flushing techniques.
 - b) Provide a schematic illustration of the laser-beam machining process and explain its working principal with material removal mechanism. Give the advantages & limitations of the process.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE/CSE/ECE/ME/EE) (Sem-6)
NON-CONVENTIONAL ENERGY RESOURCES

Subject Code : BTME615-18

M.Code : 79660

Date of Examination : 24-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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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 sun tracking systems?
- b) What are solar green houses?
- c) What is the suitable range of wind speed for proper working of a wind turbine?
- d) What is the meaning of cut-out speed in a wind turbine?
- e) What is a solar pond?
- f) What is a bio digester?
- g) What is a fuel cell?
- h) What do you understand by biomass gasification?
- i) What is wave energy?
- j) What are the advantages of tidal energy?



SECTION-B

2. Explain construction and working of a solar PV system.
3. What are the different applications of solar energy?
4. Explain the effects of alcohol fuels on engine performance and exhaust emissions.
5. Explain construction and working of a fuel cell.
6. Explain vertical axis wind turbines.

SECTION-C

7. Explain different methods of obtaining energy from biomass.
8. Explain different methods to store solar energy.
9. Explain working of double basin tidal power plant with the help of a diagram.

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Roll No. _____

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (ME) (Sem-6)
REFRIGERATION AND AIR CONDITIONING

Subject Code : BTME601-18

M.Code : 79650

Date of Examination : 23-06-2023

Time : 3 Hrs.

Max. Marks : 60

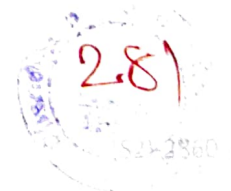
INSTRUCTIONS TO CANDIDATES :

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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 understand by COP of a refrigeration system?
- b) Define energy performance ratio.
- c) Explain the effect of sub-cooling on COP of vapour compression refrigeration system. Would you desire large sub-cooling and why?
- d) What do you understand by multistage compression and why it is required in a system when the difference between the evaporator and condenser pressures is large?
- e) Why CFC refrigerants needs to be phased out?
- f) Differentiate between Azeotropes and Zeotropes.
- g) What do you understand by hermetically sealed compressors and what are its main advantages over ordinary coupled units?



- h) What is air conditioning and what is the basic difference between refrigeration and air conditioning?
- i) What is the difference between wet bulb temperature and thermodynamic wet bulb temperature?
- j) Enumerate the factors which affect effective temperature.

SECTION-B

- 2. What is the importance of refrigeration and which are the different methods of producing refrigeration? Also, define the terms and units of refrigeration.
- 3. In a simple vapour compression refrigeration system using R-12 as refrigerant, the evaporator and condenser temperatures are -10°C and 35°C respectively. If the capacity of the system is 15 tons and the compression is isentropic, calculate the following with the help of P-H chart for R-12:
 - a) Mass of refrigerant to be circulated
 - b) Power required in the compressor
 - c) Total heat rejected in the condenser
 - d) C.O.P. of the cycle. Also calculate the Carnot C.O.P. and show the percentage difference between the two. Draw the cycle on P-H chart for R-12.
- 4. Draw a neat diagram of lithium bromide water absorption system and explain its working in major field of applications of this system.
- 5. List the commonly used refrigerants in practice and explain in detail, desirable chemical properties of refrigerants.
- 6. The atmospheric air at 30°C dry bulb temperature and 75 % relative humidity enters a cooling coil at the rate of $200\text{m}^3/\text{min}$. The coil dew point temperature is 14°C and the by-pass factor of the coil is 0.1. Determine: The temperature of air leaving the cooling coil; The capacity of the cooling coil in tonnes of refrigeration; and The sensible heat factor for the process.



SECTION-C

7. a) Explain the working principal and construction of Shell and Tube evaporator with the help of a neat sketch.
- b) A Two stage ammonia refrigeration system operates between overall pressure limits of 15 bar and 2 bar respectively. The liquid is sub-cooled to 30°C . The temperature of desuper-heated vapour leaving the water intercooler is also 30°C . The flash chamber separates the dry vapour at 5 bar pressure. The liquid refrigerant then expands to 2 bar, the evaporator pressure. The load on the evaporator is 50 kW. Calculate i) Mass flow rate in different lines; ii) Power.
8. Following data is available for an air conditioning system comprising of filter, cooling coil, fan and distribution system using only fresh air for the purpose of maintaining comfort conditions in summer. RSH = 11.63 KW, RLH = 2.33 KW. Outside design condition: 28°C DBT, 20°C WBT. Inside design condition: 21°C DBT, 50% RH. Temperature of air entering the room = 11°C . Calculate RSHF, Coil bypass factor, Rate of flow of air kg/hr., Load on cooling coil, Coil ADP.
9. a) Explain the process of leak detection and charging of refrigeration of refrigeration systems.
- b) Explain in brief, the concept of thermal analysis of human body, being used for comfort air conditioning. Also give the concept of effective temperature & comfort chart, in brief.



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

MECHANICAL MEASUREMENTS AND METROLOGY

Subject Code : BTME-602-18

M.Code : 79651

Date of Examination : 26-06-2023

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) Distinguish between accuracy and precision.
- b) Explain clearly the terms: Hysteresis, Dead Zone, Sensitivity and Linearity.
- c) Enlist the various types of sensors.
- d) Explain the procedure of wringing of slip gauges.
- e) Why are dummy gauges used? In what way do they affect the output of a strain gauge bridge?
- f) What is Seismic Accelerometer?
- g) Explain the measurement of temperature with a Bimetallic strip.
- h) Discuss the function of a Tool Maker's microscope.
- i) Enlist the sources of errors in manufacturing of gears.
- j) Explain "Lay" and "Sampling Length" in connection with surface texture assessment.



SECTION-B

2. Explain with the help of a flow diagram the various elements of a generalized measurement system.
3. Differentiate in detail, with the help of examples between photoemission, photovoltaic and photo conductive cells.
4. Explain the working of a mechanical comparator.
5. Investigate the working principle of Resistive Potentiometer.
6. State the principle of vernier instrument. Briefly, explain the construction and use of vernier caliper with a neat sketch.

SECTION-C

7. Explain the principle, general construction and observation of stylus type surface texture measuring instrument.
8. Describe the construction and working of optical and total radiation pyrometer for the measurement of temperature.
9. **Write a note on the following :**
 - a) Proving Ring
 - b) Servo Controlled Dynamometer.

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B.Tech.(ME) (Sem-7,8)
MECHANICAL VIBRATIONS

Subject Code : BTME-701-18

M.Code : 90474

Date of Examination : 05-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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P.T.U Questions Pad
B.Tech ME 718

SECTION-A

1. Write briefly :

- a) What is harmonic motion?
- b) What do you know about 'beat phenomenon'?
- c) What is the significance of critical damping?
- d) A single degree freedom system consists of a mass and two springs K_1 and K_2 attached to it on two opposite sides. What will be its effective spring constant?
- e) In a forced vibration system with damping, where the external excitation is the harmonic base excitation, at which condition the maximum amplitude will occur?
- f) What is principle of Mode of vibration?
- g) What do you know about double pendulum?
- h) What is influence coefficient?
- i) What is secondary critical speed?
- j) What is the range of natural frequency of an accelerometer?



SECTION-B

2. An accelerometer fixed on a machine shows a maximum acceleration of 62 g . A stroboscope shows its frequency as 5 Hz . Assuming a simple harmonic motion, determine the amplitude of vibration and maximum velocity.
3. A car having a mass of 1000 kg deflects its springs 4 cm under its load. Determine the natural frequency of the car in vertical direction.
4. The support of a spring-mass system is vibrating with amplitude of 5 mm and a frequency of 1150 cycle/min . If the mass is 0.9 kg and the spring has a stiffness of 1960 N/m , determine the amplitude of vibration of the mass. What amplitude will result if damping factor of 0.2 is included in the system?
5. Explain about reciprocal theorem, in detail.
6. Write a short note on Dunkerely's method

SECTION-C

7. Three rail bogies are connected by springs of stiffness $40 \times 10^5 \text{ N/m}$ each. The mass of each $20 \times 10^3 \text{ kg}$. Determine the frequencies of vibration. Neglect friction between the wheels and rails.
8. Use Stodola's method to find the natural frequency of the system shown in figure.

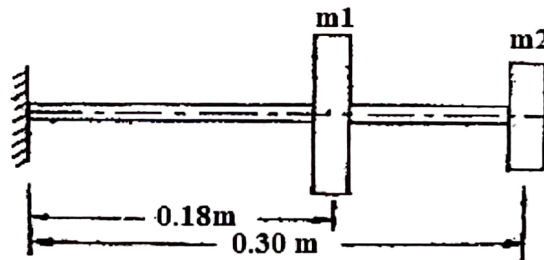


Fig.

9. Two bodies having equal masses as 60 kg each and radius of gyration 0.3 m are keyed to both ends of a shaft of 0.80 m long. The shaft is 0.08 m in diameter for 0.30 m length, 0.10 m diameter for 0.20 m length and 0.09 m diameter for rest of the length. Find the frequency of the torsional vibrations. Take $G = 9 \times 10^{11} \text{ N/m}^2$.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-7, 8)
INDUSTRIAL ENGINEERING AND MANAGEMENT
Subject Code : BTME-801
M. Code : 71994
Date of Examination : 18-05-2023

Time : 3 Hrs.

Max. Marks : 60

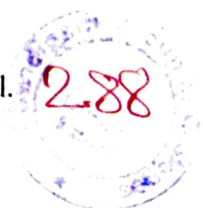
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2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.

SECTION-A

1. Answer briefly :

- a) What do Industrial Engineers do?
- b) What are Maslow's 5 hierarchy of human needs?
- c) Enumerate the importance and characteristics of an organization.
- d) Enumerate the dimensions of planning function in an organization.
- e) Explain systems approach to management.
- f) Define group technology.
- g) What is Just-in-Time (JIT)? Enumerate the principles of JIT.
- h) State the importance of micro motion study.
- i) Define span of control. Enumerate the factors impacting Span of Control.
- j) Define value engineering.



SECTION-B

2. Discuss the qualities of a good Industrial Engineer.
3. Write short note on Mc-Gregor's theory X and Y.
4. Differentiate between product layout and process layouts by showing appropriate examples.
5. Explain in brief various charts and diagrams utilized in method study.
6. What are various types of values? Discuss various phases of value engineering.

SECTION-C

7.
 - a) Discuss the salient characteristics, advantages, disadvantages and applications of Matrix organization.
 - b) What is standard time for completing a job? Discuss various allowances given to operators/workers.
8.
 - a) Discuss the factors affecting the productivity of the manufacturing organization.
 - b) Differentiate between cumulative timing and fly back timing.
9.
 - a) Explain the factors to be considered for selection of location for the plant.
 - b) Discuss the approaches to effective decision making in an organization.

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B.Tech. (Mechanical Engineering) (Sem.-7, 8)

AUTOMATION IN MANUFACTURING

Subject Code : BTME702-18

M.Code : 90475

Date of Examination : 19-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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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 out the advantages of Adaptive control.
- b. Explain about flexible automation.
- c. Name three reasons for including a storage buffer in an automated production line.
- d. Name various types material handling equipment.
- e. Define adaptive control constraints.
- f. Differentiate between Fixed automation and Programmable automation.
- g. State the principal difference between adaptive control system and conventional closed loop control system.
- h. List out the components in Pneumatic system.
- i. What are the four basic components of nearly all automated storage/retrieval systems?
- j. What is a production system?



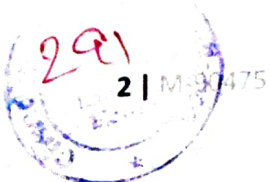
SECTION-B

2. What is automation? Discuss various types of automation.
3. How does the cutting forces and temperature parameters are considered in adaptive control system?
4. What are the various situations where automation is preferred over manual labor?
5. List six basic components required in a hydraulic fluid system and state their essential functions.
6. Differentiate between ACO and ACC types of adaptive control.

SECTION-C

7.
 - a. What are the different types automation? Discuss them briefly.
 - b. Discuss the reasons for implementation of automated systems in the manufacturing industries.
8. What do you mean by adaptive control? Explain its types with neat diagrams.
9. Elaborate the following in detail :
 - a. Rigid automation
 - b. Flexible automation
 - c. Plant capacity
 - d. Production rate.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-7,8)

FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS

Subject Code : BTME 703-18

M.Code : 90476

Date of Examination : 24-05-2023

Time : 3 Hrs.

Max. Marks : 60

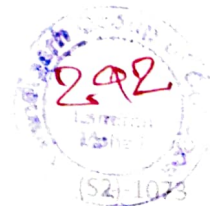
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly:

- a) Define Management.
- b) Write the functions of Management.
- c) List the different levels of Management.
- d) State the benefits of Total Quality Management (TQM).
- e) What is Lean Manufacturing?
- f) List the types of marketing.
- g) What is the function of Supply Chain Management (SCM)?
- h) State the reasons of Low productivity.
- i) What is Safety Engineering?
- j) Define Work Analysis.



SECTION-B

2. State and explain the managerial roles.
3. Explain Six Sigma citing an appropriate example.
4. State and explain the concept of Product Life Cycle.
5. State and explain Principle of Motion Economy.
6. Explain the Principles of a Good Personnel Policy.

SECTION-C

7. Define Total Quality Management (TQM) and explain the TQM Models using suitable example.
8. State and explain the phases and applications of value engineering.
9. Discuss the need of operator rating and explain the methods of rating.

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Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (ME)(Sem.-7,8)
MECHANICAL VIBRATIONS
Subject Code : BTME-803
M.Code : 71996
Date of Examination : 27-05-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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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 following :

- a) What is the importance of the study of vibrations in engineering?
- b) Explain the concept of resonance.
- c) What are the three elementary parts of vibrating system?
- d) What is torsional vibration absorber?
- e) What is principal co-ordinate?
- f) What do you know about Lagrange's equation of motion for beam vibration?
- g) Differentiate between vibration absorber and vibration isolator.
- h) What do you know about critically damping system?
- i) What are longitudinal vibrations of bars?
- j) What is influence coefficient?



SECTION-B

- The rectilinear motion of a point is given by $\alpha = -9x$ where α and x are the acceleration and displacement of simple harmonic motion and the amplitude is 2 inches. Find (i) the period and frequency (ii) Displacement, velocity and acceleration after 21.5 seconds.
- Find the natural frequency of the system shown in the following figure.

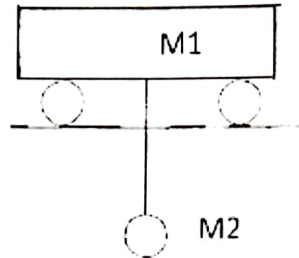


Fig.1

- Explain the working of torsional vibration absorber with neat sketch.
- Explain Dunkerley's method with suitable example used in multi-degree of freedom system.
- A bar of length L is fixed at one end and connected at the other end by a spring of stiffness ' K ' as shown in fig. Derive suitable expression of motion for longitudinal vibration.

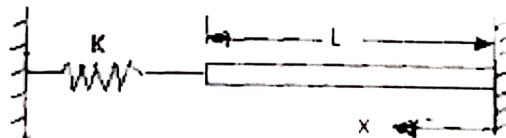


Fig.2

SECTION-C

- The exhaust from a single cylinder four stroke diesel engine is connected to a silencer and the pressure there in is to be measured with a simple U tube manometer. Calculate the minimum length of a manometer tube so that the natural frequency of the oscillation of the liquid column will be 3.5 times slower than the frequency of the pressure fluctuations in the silencer for an engine speed of 600 r.p.m.



8. A machine runs at 5000 rpm. Its forcing frequency is very near to its natural frequency. If the nearest frequency of the machine is to be at least 20% from the forced frequency, design a suitable vibration absorber for the system. Assume the mass of the machine as 30 kg.
9. Use Rayleigh's method to determine the natural frequency of spring mass system as shown in figure.

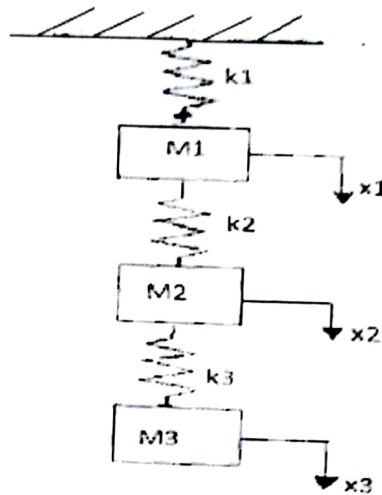


Fig.3

Assume $m_1 = m_2 = m_3 = m$ and $k_1 = k_2 = k_3 = k$

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