

Dec-2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**NETWORK THEORY**

Subject Code : BTEC-304-18

M.Code : 76447

Date of Examination: 21-01-23

P.T.U. Question  
B.Tech CEC  
Sem-3

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

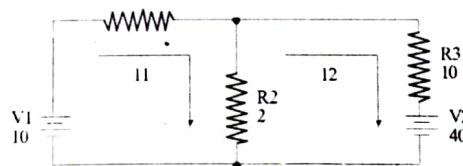
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) State Thevenin's Theorem.
- b) Define the terms: Voltage and Current.
- c) Is it possible to obtain transient free response in a RLC network? Why?
- d) Find current through  $R_2$  resistor, in the circuit given below:

$$R_1 = 5\Omega, R_2 = 2\Omega, R_3 = 10\Omega, V_1 = 10V, V_2 = 40V.$$



- e) Give the significance of singularity functions in circuit analysis.
- f) What are the various types of filters?
- g) What are impedance parameters in a two-port network?
- h) Define Steady state response of a circuit.
- i) What is the characteristic impedance of a two-port network?
- j) Give the importance of Laplace transforms in network analysis.

## SECTION-B

2. Explain the time-domain analysis of a RLC circuit using suitable circuit diagram.
3. How can you compare Node analysis and Mesh analysis? What are their significances?
4. State and prove Maximum Transfer theorem.
5. Discuss properties of Hurwitz polynomial.
6. Prove that the Laplace transform of any time function  $f(t)$  delay by time 'a' is  $e^{-as}$  times the transform of the function  $F(s)$ .

## SECTION-C

7. What are Filters? How can you design various types of filters? Explain using suitable circuit diagrams.
8. Define ABCD parameters. Prove that the ABCD parameters matrix for the overall network is simply the matrix product of transmission parameter matrices of each of the two-port networks in cascade.
9. Write short note on: Transient and Steady-state behaviour of networks.

(2)

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Dec 2022

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

Subject Code : BTEC-303-18

M.Code : 76446

Date of Examination : 19-01-23

Time : 3 Hrs.

Max. Marks : 60

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**SECTION-A**

**1. Write briefly :**

- a. Write the criteria for Conductors and Dielectrics from Electro magnetics point of view.
- b. What do you mean by Depth of penetration?
- c. What do you mean by Impedance matching?
- d. Give the mathematical expressions for Reflection co-efficient and Transmission co-efficient for a perfect dielectric with normal incidence.
- e. What are R, L, C, G from Transmission lines point of view?
- f. Define Surface Impedance.
- g. What are Phase velocity and Group velocity in waves?
- h. Give various types of wave polarization.
- i. How can you differ Low-Loss and Loss-Less transmission lines?
- j. Define the terms: Total Internal reflection, Propagation constant, Attenuation constant

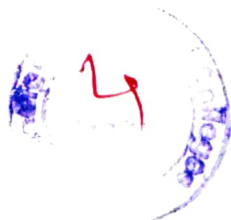


## SECTION-B

2. Write Maxwell's equation in free space for the time varying fields both in differential form and integral form. Why these equations are not completely symmetrical?
3. If  $H(z, t) = 40 \cos(10^8 t + 40z) a_y$  A/m, identify the amplitude, frequency, phase constant and the wavelength.
4. In a homogeneous non-conducting region, where  $\mu_r=1$ , it is given that  $E = 30\pi e^{j(\omega t - 4z)} a_y$  V/m and  $H = 1.0 e^{j(\omega t - (4/3)y)} a_x$  A/m. Calculate  $\epsilon_r$  and  $\omega$ .
5. How can the transmission lines sections be used as circuit elements? Elaborate.
6. Derive the relationship between various velocities of wave propagation:  $v_p, v_g, v_o$ ?

## SECTION-C

7. Derive the field (Electric as well as Magnetic field) equations for a Uniform Plane Wave.
8. Discuss the Rectangular Waveguide in details with the help of neat diagram(s).
9. Write short note on: S-parameters in Transmission lines.



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## SECTION-B

2. Implement EX-OR gate using only NAND gates.
3. What is half adder? Write its truth table and develop its logic circuit.
4. Implement the following function using all 4:1 multiplexers.  
$$f(A, B, C, D, E) = \sum m(0, 1, 2, 3, 6, 8, 9, 10, 13, 15, 17, 20, 24)$$
5. Explain the working of R-2R Ladder type DAC with a suitable circuit.
6. What do you mean by data types and objectives in VHDL?

## SECTION-C

7. Simplify  $F(W, X, Y, Z) = \Pi(1, 3, 7, 10, 13) + d(0, 2, 4, 5)$  using K-Map. Realize the simplified expression in SOP and POS.
8. Implement a BCD to seven segment decoder using a 4 line to 16 line decoder.
9. Design a Mod 6 up down counter.



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B.Tech.(ECE) (Sem.-3)  
**ELECTRONIC DEVICES**  
Subject Code : BTEC-301-18  
M.Code : 76444  
Date of Examination : 14-01-23

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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**SECTION-A**

1. Write briefly :

- a) Draw the energy band diagram of intrinsic and extrinsic semiconductors.
- b) Explain the difference between diffusion current and drift current.
- c) State the relation between resistivity and mobility.
- d) Give the V-I characteristics of PN diode.
- e) Define the terms : knee voltage and breakdown voltage.
- f) Differentiate Zener breakdown and Avalanche breakdown.
- g) Define transconductance of MOSFET.
- h) Draw equivalent circuit of an FET.
- i) Describe the equipment used for ion implantation.
- j) How implant damage is repaired by annealing?



## SECTION-B

2. What is biasing of diode? Explain the forward and reverse biasing of diode.
3. How PN junction diode work as rectifier? Compare half wave and full wave rectifier circuits.
4. Draw the small signal equivalent circuit for BJT amplifier in CE configuration.
5. What is the use of Ebers-Moll model?
6. Discuss the steps involved in fabrication of CMOS?



## SECTION-C

7. Write note on :
  - a) Continuity Equation of PN junction
  - b) Photovoltaic effect.
8. Draw the characteristics of n-channel MOSFET.
9. What is the process of ion-implantation? How it is different from diffusion process? Draw and explain the working of ion implanter.

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B.Tech. (ECE) (Sem. – 3)

**MATHEMATICS III**

Subject Code: BTAM-303-18

M Code: 76448

Date of Examination : 12-01-23

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

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**SECTION-A**

1. Answer the following:

a) Find  $L(t \sin t)$

b) Define unit step function and find its Laplace.

c) Find  $a_0$  if  $f(x) = x \cos x$ , where  $x \in (-1, 1)$ .

d) Discuss the behaviour of Fourier series near a point of discontinuity  
$$f(x) = \begin{cases} 1, & -\pi < x < 0 \\ -1, & 0 \leq x \leq \pi \end{cases}$$

e) Find  $Z\{\cos(n+1)\theta\}$

f) Find the relationship between Laplace and Fourier Transform.

g) A die is thrown twice and the sum of the numbers appearing is noted to be 8. What is the conditional probability that the number 5 has appeared at least once?

h) Mean and variance of binomial distribution are 4.5 and 1.125 respectively. Find the probability of success.

i) Define t-test.

j) Discuss method to fit Straight line.

### SECTION-B

2. State convolution theorem and find  $L^{-1}\left(\frac{s}{(s^2+4)^2}\right)$ .
3. Find the Fourier cosine series of the function  $f(x) = \cos 3x, 0 \leq x \leq \pi$ .
4. Solve difference equation  $y_{n+3} - 6y_{n+2} + 12y_{n+1} - 8y_n = 1, y_0 = 1, y_1 = 1, y_2 = 2$ .
5. In a distribution, 12% of the item are under 30 and 85% are under 60. Find the mean and standard deviation of the distribution.
6. A random sample of size 16 has 53 as mean. the sum of squares of deviation from the mean is 150. Can this sample be regarded as taken from the population having 56 as mean? Also, obtain 95% confidence limits for the mean? ( $t_{15} = 2.131, t_{16} = 2.602$ ).

### SECTION-C

7. Using Laplace transform to solve the initial value problem  $u_{tt} = u_{xx}, x > 0, t > 0$ , subject to  $u(x, 0) = 0, u_t(x, 0) = e^{-x}, u(0, t) = \sin t, u(x, t)$  is bounded as  $x \rightarrow \infty$ .
8. Using convolution  $F^{-1}\left(\frac{1}{12+7i\omega-\omega^2}\right)$ .
9. Find correlation coefficient of the following bivariate frequency distribution data:

	59 – 62	63 – 66	67 – 70	71 – 74	75 – 78
90 – 109	2	1			
110 – 129	7	8	4	2	
130 – 149	5	15	22	7	1
150 – 169	2	122	63	19	5
170 – 189		7	28	32	12
190 – 209		2	10	20	7
210 – 229			1	4	2

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

**ANALOG CIRCUITS**

Subject Code: BTEC-401-18

M Code: 77565

Date of Examination : 04-01-2023

P.P.U Question  
B.Tech ECE  
Sem-4

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

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**SECTION-A**

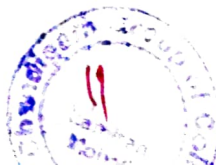
1. Write briefly:
  - a) Classify the amplifiers according to the method of coupling.
  - b) Define Gain bandwidth product.
  - c) What are the requirements for efficient coupling in multistage amplifiers?
  - d) Define harmonic distortion.
  - e) Describe the principle of operation of oscillators.
  - f) Why is positive feedback necessary to produce oscillations?
  - g) List the four basic feedback topologies.
  - h) What is meant by positive and negative feedback?
  - i) What is the function of transformer in power amplifiers?
  - j) What is the use of the heat sink in power amplifiers?

**SECTION-B**

2. Draw the circuit of two stage R-C coupled transistor amplifier and explain the working of it.
3. Show that for a current series feedback amplifier the input and output resistances are increased by a factor of  $(1+A\beta)$  with feedback.
4. Prove that the transformer coupled class A amplifier maximum efficiency is 50%.

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5. Describe the working of Hartley oscillator and derive the expression for its frequency operation.
6. Explain the principle of operation of class-AB power amplifier with a neat sketch.

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### SECTION-C

7. a) A transformer coupled class-A power amplifier draws a current of 250mA from a collector supply of 13V. When no signal is applied to it determine:
- Maximum output power
  - Power rating of the transistor
  - Maximum collector efficiency.
- b) Assume  $L_1 = 496.67\text{H}$  and  $L_2 = 9.93\text{H}$ . Calculate the following:
- $f_{osc}$
  - The feedback fraction  $B$
  - $X_{L_1}$ ,  $X_{L_2}$ , and  $X_{C_3}$

Time: 3

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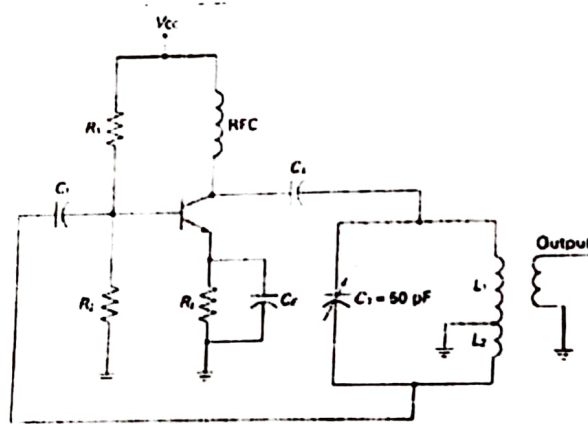
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8. Write short notes on the following:
- Gain margin and phase margin in feedback amplifiers
  - Single stage and multistage amplifiers
9. a) Explain the principle of operation of the wein bridge oscillator.
- b) Mention the features and advantages of the crystal oscillator.

1. Writ

a) V

b) V

c) V

d) V

(4,6)

e)

f)

g)

(5,5)

h)

i)

(5,5)

j)

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 09

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

**MICROPROCESSORS AND MICROCONTROLLERS**

Subject Code: BTEC-402-18

M Code: 77566

Date of Examination : 05-01-2023

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

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**SECTION-A**

1. Write briefly:

- a) What do you mean by data types and directives in 8051?
- b) What is the significance of DPTR?
- c) What is the function of ALE and EA / VPP pins of 8051?
- d) What is the significance of TCON register?
- e) Discuss the role of register banks and stack in 8051.
- f) Discuss the various flags for 8085.

(4,6)

g) What are the data types and assembler directives of 8051?

(5,5)

h) Show how to use Mode 2 in Timers to generate the time delay.

i) Give the rotate instructions.

(5,5)

j) What is the function of stack and subroutine?

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## SECTION-B

2. Draw and explain the 8085 microprocessor architecture
3. Write an 8051 assembly program to generate a square wave of 66% duty cycle on the P2.3 bit.
4. What is bit addressability feature? List various bit addressable registers of 8051.
5. State and explain the addressing modes of 8051 microcontrollers. Illustrate each mode with an example.
6. Write an assembly language program for 8051 to unpack the BCD number stored at external memory location 2500H. Store the results in internal memory locations 50H and 51H.

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Time: 3

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## SECTION-C

7. Discuss various arithmetic and logical instructions for 8085 microprocessor with examples.
8. Draw the architectural diagram of 8051 microcontroller. Discuss the roles of each block.
9. Using interrupts, write a program that continuously gets 8 bit data from P1 and sends it to P0 while simultaneously creating a square wave of 180 microsecond period on pin P2.2. Also Use timer 0 to create the square wave.

1. Write  
a) Re  
b) W  
c) Ho  
d) WH  
e) De  
f) Wr  
g) Sta  
h) Wri  
i) Wri  
j) Wh

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## SECTION-B

2. Write an algorithm to implement the stacks using Link List?
3. What are linear and non-linear data structures? Give one example of each.
4. Write an algorithm for deleting a specific element from an array?
5. Build a heap H from the following list of numbers:  
40,65,15,48,14,50,17,22
6. Explain the concept of circular queue and priority queue with suitable example.

## SECTION-C

7. Write the algorithms for the following:
  - a) Deleting an element from a doubly link list.
  - b) Inserting an element in a priority queue.
  - c) To reverse a string of characters using stack.
  - d) To search an element in a sorted array.
8. a) Explain application of stack in recursive functions with example.  
b) What is traversing? Write an algorithm for traversing a link list.
9. How a linear array is represented in memory? Explain the program which reads two matrixes.

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## SECTION-B

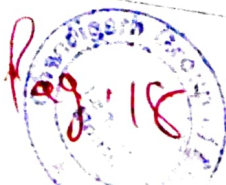
2. Write a short note on:
  - a) Conditional probability
  - b) Power Spectral Density
3. Define DTFT and Z-transform and also explain how DTFT is related with Z-transform?
4. Prove linearity property for Laplace transform and state how ROC of Laplace Transform is useful in defining stability of the system?
5. Find Fourier transform for the sequence,  $x(n) = 2^n \sin\left(\frac{\pi}{4}\right) nu(-n)$ .
6. Sketch the signal  $x(t) = A[u(t+a) - u(t-a)]$  for  $a > 0$ . Also, determine whether the given signal is energy signal or power signal or neither.

## SECTION-C

7. Show that spectrum of the sampled signal is the infinite sum of shifted replicas of the spectrum of original signal.
8. A system has input-output relation given by  $y(n) = nx(n)$ . Determine, whether the system is Memoryless, causal, linear, time-invariant or stable.
9. Compute and Sketch magnitude and phase spectrum of the signal:
  - a)  $x(t) = Ae^{-a|t|}$  ( $a > 0$ )
  - b)  $\cos^2(2\pi t + 5) + 2\sin(5\pi t)$

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTEC-501-18

M.Code : 78297

Date of Examination : 13-12-22

Time : 3 Hrs.

Max. Marks : 60

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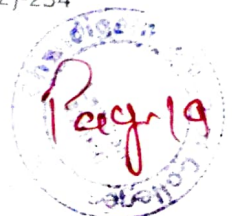
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**SECTION-A**

1. Write briefly :

- a) Define ramp signal.
- b) Explain white noise.
- c) Explain sampling process.
- d) What are the advantages of VSB modulation?
- e) Differentiate between delta and adaptive delta modulation.
- f) Explain Nyquist criterion.
- g) What do you mean by ISI?
- h) Define digital modulation.
- i) Enlist various modulation techniques.
- j) Explain pulse transmission.



**SECTION-B**

2. Draw and explain SSB modulation and demodulation.
3. Derive the expression for probability of error evaluations.
4. Explain digital multiplexers with block diagrams.
5. Draw and explain Quadrature amplitude modulation technique.
6. Describe pre-emphasis and de-emphasis.

Time : 3

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**SECTION-C**

7. Explain pulse code modulation technique block diagram of transmission and reception.
8. Give the representation of noise in amplitude modulation and angle modulation system.
9. With the help of waveforms, explain minimum shift keying modulation technique.

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Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTEC-502-18

M.Code : 78298

Date of Examination : 15-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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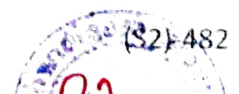
**SECTION-A**

1. Write briefly :

- a) List three advantages of digital signal processing.
- b) Define sine function.
- c) Where do we use z-transform?
- d) Relate Discrete-Time Fourier Transform and Discrete Fourier Transform
- e) What is the importance of twiddle factor in DFT?
- f) How convolution is helpful in determining system response?
- g) Give suitable example of an LTI system.
- h) State importance of stable-causal-LTI systems in real-world perspectives.
- i) Differentiate correlation and auto-correlation.
- j) State Sampling Theorem for low pass signals.

**SECTION-B**

2. Determine circular convolution of  $x(n) = [1 \ 2 \ 3 \ 1]$  and  $h(n) = [1 \ 2 \ 2 \ 1]$ .



3. Compare advantages and disadvantages of FIR and IIR Filters?
4. What is twiddle factor? Explain the Radix-2 FFT algorithm with example.
5. State and prove any four properties of z-transform.
6. Relate Fourier Series, Fourier Transform and Discrete Fourier Transforms.

### SECTION-C

7. a) Find z-transform of  $x(n) = \left(\frac{1}{2}\right)^n u(n)$  signal and discuss its ROCs  
b) Determine inverse z-transform of  $X(z) = \frac{1}{(1-z^{-1})(2-z^{-1})}$
8. Discuss various structures for realization of discrete systems with suitable examples.
9. Discuss architecture of ADSP with suitable diagram.

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## SECTION-B

2. Compare Current Mirror Circuit and Constant Current Bias Circuit.
3. Define differential and common mode gain of an Op-Amp. Find the common mode gain of Op-Amp having a differential voltage gain of  $2 \times 10^5$  and CMRR of 120 dBs.
4. Discuss the application of op-amp as an inverting and non-inverting adder.
5. The input to an op-amp integrator circuit is a sinusoidal voltage of peak value  $10 \mu\text{V}$  and frequency of 2KHz. If the values of integrating components are given as  $R=40 \text{ k}\Omega$  and  $C=5 \mu\text{F}$ , determine the output voltage.
6. What are the advantages of active filters over passive filters? Design a second order Butterworth high-pass filter with lower cut-off frequency of 2.5 KHz.

## SECTION-C

7.
  - a) Explain the circuit diagram of a differentiator circuit. Derive an expression for the output voltage.
  - b) Explain how 555 timer used as Schmitt trigger?
8. Explain principle and working of PLL. Also, write down its applications.
9. Write short notes on:
  - a) Fixed and Adjustable Voltage Regulator.
  - b) V to F and F to V converters.

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

**CONTROL SYSTEMS**

Subject Code : BTEC-504-18

M.Code : 78300

Date of Examination : 20-12-2022

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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**SECTION-A**

1) Write briefly :

- a) What do you mean by Industrial Control system?
- b) What do you mean by Transfer function?
- c) Define Closed loop systems with example.
- d) What are Techo generators?
- e) What is Transient accuracy?
- f) Explain the Routh Hurwitz criterion of stability.
- g) What do you mean by Lead comensation?
- h) What do you mean by Steady state errors?
- i) What are Eigen values and Eigen vectors?
- j) What is Gain margin?

## SECTION-B

- Using Routh Hurwitz stability criterion, determine whether the following system is stable or not  $S^4 + 2S^3 + 3S^2 + 4S + 5 = 0$
- Draw the polar plot for the following open loop transfer function of a closed loop system control system.

$$G(s)H(s) = \frac{5}{s(s+1)(s+2)}$$

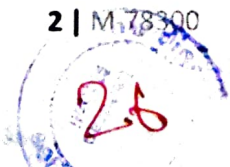
- What are Bode plots? Explain Magnitude plot and Phase plot.
- Derive the expressions for resonant peak and resonant frequency and hence establish the correlation between time response and frequency response.
- a) Define state and state variable.  
b) What is state equation?

## SECTION-C

- a) The transfer function relating the input  $x(t)$  to the output  $y(t)$  of a system is given by  $G(s) = \frac{1}{s+3}$ . A unit step input is applied to the system at time  $t = 0$ . Assuming that  $y(0) = 3$ , the value of  $y(t)$  at time  $t = 1$ .  
b) List the properties of signal flow graph.
- Define steady state error? Derive the static error components for Type 0, Type 1 and Type 2 systems.
- a) What is the characteristic equation? List the significance of characteristic equation.  
b) The system has  $G(s) = \frac{K}{1+ST}$  with unity feedback where  $K$  &  $T$  are constant.

Determine the factor by which gain 'K' should be multiplied to reduce the overshoot from 75% to 25%?

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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 : 20-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a)  $x(n) = (0.4)^n u(n)$ . State whether it is an energy or power signal.
- b) Give the relation between linear and circular convolution.
- c) What is aliasing effect?
- d) State the periodicity property of DFT?
- e) What is the requirement of ROC in z-transform?
- f) What is Gibbs Phenomenon?
- g) Give the advantages digital signal processing over analog signal processing.
- h) What is correlation?
- i) Write any two areas of applications of DSPs.
- j) What is the relation between Z- transform and Laplace transform?

## SECTION-B

2. What are the applications of digital signal processing? Explain the different types of discrete time systems.
3. Define convolution. Find the output  $y(n)$  of a system having  $h(n) = [1 \ 4 \ 3 \ 2 \ 1]$  and input  $x(n) = [0 \ 2 \ 5 \ 2 \ 1]$ .
4. State and prove the time reversal property of Z-transform.
5. State five properties of Discrete Fourier Transform (DFT).
6. What are the advantages of FIR filters over IIR filters?

## SECTION-C

7. With the help of a block diagram, explain the architecture of a TMS processor.
8. With the help of  $N=8$ , explain radix-2 Decimation-In-Time (DIT) FFT algorithm and computation of DFT.
9. Write short note on following :
  - a) Digital domain frequency transformation
  - b) Lattice structure of FIR systems.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (ECE) (Sem.-5)  
**PROJECT MANAGEMENT**  
Subject Code : BTMS-YYY-18  
M.Code : 78302

Date of Examination : 22-12-22

Time : 3 Hrs.

Max. Marks : 60

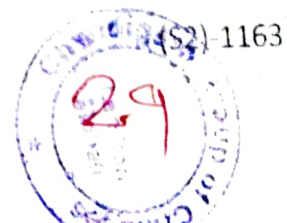
**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Discuss the basic concept of project management.
- b) Explain what do you mean by understanding of project planning plan.
- c) Give methods for preparing a request for good proposal.
- d) Discuss in brief LOB in project planning.
- e) Give various significances of using bar charts in project.
- f) Discuss the duties of the project manager.
- g) Give the benefits of computerized PMIS.
- h) How is the cost of the project is maintained and control?
- i) Explain various attributes of a project.
- j) List down various factors affecting project performance.



2. Discuss in detail the project life cycle taking suitable example.
3. Discuss in detail the design of project management system.
4. Write a short on project as part of functional organization.
5. Discuss in detail how planning, monitoring and control of a project can be done.
6. Discuss in brief about Global project management.

Roll N  
Total

Time

### SECTION-C

7. Discuss various differences between the matrix and the mixed organizational system
8. Discuss various methods of resource allocations under project planning and scheduling
9. Discuss the basic procedure and application of CPM network technique using an example.

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Total No. of Pages : 02

Total No. of Questions : 09

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

**ROUTING AND SWITCHING**

Subject Code : BTEC-905A-18

M.Code : 78707

Date of Examination : 03-01-23

Time : 3 Hrs.

Max. Marks : 60

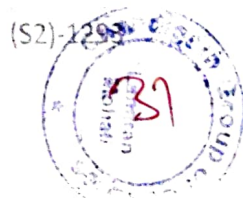
**INSTRUCTIONS TO CANDIDATES :**

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) Brief the protocols used at transport layer.
- b) Why do we use ethernet cabling?
- c) What is the difference between IPv4 and IPv6?
- d) Define File Transfer Protocol (FTP)
- e) Write the characteristics of VLAN.
- f) Why is DSL slow?
- g) What do you mean by IPSec?
- h) How Authentication is different from Authorization?
- i) How does RIP differ from IGRP?
- j) In how many ways, you can access the router?



## SECTION-B

2. Discuss about VLAN routing.
3. Explain in detail about Internet Control Message Protocol (ICMP) along with its format.
4. Discuss the various factors considered for expanding the enterprise network.
5. Explain the various fields of IPv6 address format.
6. Discuss the various fields of protocol data unit in frame relay.

## SECTION-C

7. Discuss in detail about the working of distance vector routing protocol with RIP.
8. What are the various services provided by the application layer? Explain SMTP application layer protocol in detail.
9. Write a note on the followings
  - a) System Navigation and Management.
  - b) Link Aggregation.

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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 : 10-01-2023

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) Method overriding
- b) Constructor
- c) Interface
- d) Packages
- e) Thread
- f) JDBC
- g) Synchronization
- h) Exception
- i) Scanner class
- j) I/O Streams



## SECTION-B

2. List the features of Java Programming Language.
3. Explain the need of Wrapper classes in Java.
4. Why multiple inheritance is not part of java and how we can achieve multiple inheritance java?
5. Discuss the concept of Exception Handling in detail.
6. Discuss various Stream Classes present in Java to manage I/O.

## SECTION-C

7. Write steps how we can create and use Package in Java.
8. Explain CORBA. Java Beans, RMI,
9. What is Java IDL? Explain in detail.

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





Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (2012 to 2017) (Sem.-6)  
**MICROWAVE AND RADAR ENGINEERING**

Subject Code : BTEC-601

M.Code : 71121

Date of Examination : 14-12-22

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Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

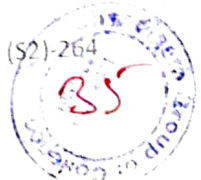
**SECTION-A**

1. Answer briefly :

- a) What is transit time effect?
- b) What is velocity modulation?
- c) What is Gunn effect?
- d) Differentiate between IMPATT and TRAPATT.
- e) What are different types of ferrite devices used in microwave?
- f) Define PRF.
- g) How frequency can be measured?
- h) What is RADAR?
- i) Name different angle tracking systems used in RADAR.
- j) Draw the block diagram of microwave bench.

1 | M-71121

(S2)-1296



## SECTION-B

2. Explain working and construction of two cavity klystron tube.
3. Explain the working of circulator in detail.
4. Explain tunneling effect and working of tunnel diode .
5. How power can be measured using calorimeter and bolometer?
6. Explain the principle and operation of moving target indicator radar.

Roll

Total

Time

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## SECTION-C

7. Write note on:

- a) Gyator
- b) Blind speed and staggered PRFs
- c) TWT
- d) Velocity tracking system.

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8. a) Explain delay line canceller in detail.

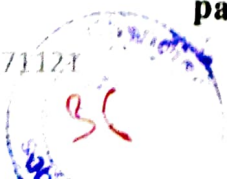
b) Explain various scanning techniques used in radar.

9. a) What is scattering matrix? Why it is required in microwave? Name the properties of s-matrix.

b) Explain the working of Hybrid tee with the help of suitable diagram.

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

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## SECTION-B

2. Why do need concept of layering in computer networks? How protocols and interfaces are used for smooth communication?
3. Explain the sliding window protocol for data transmission.
4. What is logical addressing of networks and discuss the difference between IPV4 and IPV6?
5. Explain the functionality of transport layer. Which parameters are used to measure the quality of service?
6. Discuss the different types of firewalls with the help of examples.

## SECTION-C

7. Explain the functions of data link layer in detail. How data link layer helps in controlling the flow?
8. What is congestion control? Explain the token bucket algorithm with the help of a suitable example.
9. Write a short note on :
  - a) CSMA/CD
  - b) Concept of DNS protocol.

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







## SECTION-B

2. What are the factors influencing small scale fading?
3. Explain in detail the different techniques used to improve coverage & capacity of cell system.
4. Explain the Multiple Access methods with neat diagrams.
5. What you meant by security in GSM? Explain about that in detail.
6. Briefly explain Diversity combining techniques.

## SECTION-C

7. Explain in detail about Zig Bee and Bluetooth.
8. Draw the block diagram of a cellular system and explain how a cellular telephone call is made between the landline and the mobile user and when the call is initiated by the landline customer. Draw suitable timing diagrams.
9. Explain in detail about reverse CDMA channel.

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## SECTION-B

2. Write a detailed note on generations of Operating Systems.
3. Explain in brief about Threads? Write the difference between user level thread and kernel level thread?
4. Explain in detail about Reader's & Writer Problem.
5. What do you mean by page fault? Write various steps required to service a page fault.
6. Write a detailed note on following:
  - (a) Free Space Management Techniques
  - (b) Directory Implementation.

## SECTION-C

7. Explain the following CPU scheduling Algorithms with an example:
  - (a) FCFS
  - (b) Round Robin
  - (c) Shortest Job First.
8. Write a detailed note on various disk scheduling algorithms with an example.
9. Write a detailed note on Deadlock Detection and Recovery.

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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 : 21-12-2022

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 primary and secondary radiator?
- b) Define reflection coefficient.
- c) Write the properties of S- Matrix.
- d) Define unconditional stability with regard to microwave transistor amplifier.
- e) What do you mean by O type tube?
- f) What is the need of loop antenna?
- g) Write the applications of Aperture Antenna.
- h) Define induction field.
- i) Define IMP ATT.
- j) What are bends and corners?



## SECTION-B

2. Write a detailed note on travelling wave tube amplifier.
3. Discuss the measurement of power at microwave frequency in detail.
4. Design a circular using Magic Tees.
5. Explain the concept of radiation in single wire.
6. Write a short note on Horn antenna.

## SECTION-C

7. A helix travelling wave tube operates at 4GHz under a beam voltage 10KV and beam current 500mA. If helix impedance is 25ohm and interaction length is 20cm. find the output power gain in decibels.
8. Explain Hansen-woodyard end fire array in detail.
9. Derive an expression for near field and far field equation of short electric dipole

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

Subject Code : BTEC-906D-18

M.Code : 79380

Date of Examination : 04-01-2023

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) String Literal
- b) Error
- c) Reflection
- d) Memory Management
- e) SDI
- f) Threading
- g) Net Security
- h) WPF
- i) Debugging
- j) Data Adapter.



## SECTION-B

2. Define Operator Overloading. Explain with help of example.
3. What is an Event? Explain event publisher and event listener.
4. Explain the concept of constructors and its types.
5. Write a note on manipulating files and registry.
6. Discuss how custom hosting is done with CLR objects.

## SECTION-C

7. Define Testing. How it is different from debugging? Explain how both are performed in .Net?
8. Explain indexers. How are they overloaded? Also write a note on delegates.
9. Explain the .Net compact framework. How XAML is used in reading and writing the files?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.-6)

**OPTICAL FIBERS & COMMUNICATION**

Subject Code : BTEC-602-18

M.Code : 79375

Date of Examination : 07-01-2023

Time : 3 Hrs.

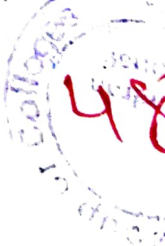
Max. Marks : 60

**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 are steps index and graded index fibers?
  - b) Calculate the length of DCF having dispersion coefficient of  $-46$  ps/km, if length of SMF is 40 km with dispersion coefficient of 18.75 ps/km.
  - c) Explain the phenomenon of material dispersion in optical fiber.
  - d) An optical signal has lost 55% of its power after travelling 8.5 km of fiber. What is the loss in dB/km of the fiber?
  - e) Give the expression for numerical aperture in graded index fibers.
  - f) Describe the two methods of fiber coupling.
  - g) Define macroscopic bending.
  - h) Differentiate between Splices and Connectors.
  - i) What width of depletion region of an *InGaAs* photo detector do we need to make its quantum efficiency 70%?
  - j) What are conditions for total internal reflection?



## SECTION-B

2. A p-i-n diode has a transit time of 2 nanoseconds and junction capacitance of 3 pF. If the load resistor is 50 ohms, find out whether the bandwidth is limited by transit time or capacitance.
3. Discuss the requirement for population inversion in order that stimulated emission may dominate over spontaneous emission in LED. Also give the working principle of edge emitting-LED with structural diagram. What is meant by Hetero-junction lasers? How this is different from single heterostructure lasers. Discuss their performance characteristics.
4. What are various types of attenuation factors in optical fibers? Suggest various measures to overcome attenuation.
5. Derive the expression for calculating the power budget.
6. Explain the fiber optic receiver operation using a simple model and equivalent circuit.

## SECTION-C

7. Discuss the sources of errors in optical receivers.
8. A multimode optical fiber has the specifications: core refractive index = 1.52, cladding refractive index = 1.48; core diameter = 90 $\mu$ m wavelength of operation = 0.85 $\mu$ m. Calculate :
  - i) Relative refractive index difference;
  - ii) Critical angle at core-cladding interface;
  - iii) Acceptance angle,
  - iv) Solid acceptance angle
  - v) Numerical aperture of fiber
  - vi) Normalized V-number
  - vii) Number of guided modes.
9. A 6 Km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive index difference of 1 %. Estimate:
  - i) the delay difference between the slowest and fastest modes at fiber output.
  - ii) the rms pulse broadening due to intermodal dispersion on the link.
  - iii) the maximum bit rate that may be obtained without substantial error on the link assuming only intermodal dispersion.
  - iv) the bandwidth-length product corresponding to iii.

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

## SECTION-B

2. A p-i-n diode has a transit time of 2 nanoseconds and junction capacitance of 3 pF. If the load resistor is 50 ohms, find out whether the bandwidth is limited by transit time or capacitance.
3. Discuss the requirement for population inversion in order that stimulated emission may dominate over spontaneous emission in LED. Also give the working principle of edge emitting-LED with structural diagram. What is meant by Hetero-junction lasers? How this is different from single heterostructure lasers. Discuss their performance characteristics.
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  - ii) Critical angle at core-cladding interface;
  - iii) Acceptance angle,
  - iv) Solid acceptance angle
  - v) Numerical aperture of fiber
  - vi) Normalized V-number
  - vii) Number of guided modes.
9. A 6 Km optical link consists of multimode step index fiber with a core refractive index of 1.5 and a relative refractive index difference of 1 %. Estimate:
  - i) the delay difference between the slowest and fastest modes at fiber output.
  - ii) the rms pulse broadening due to intermodal dispersion on the link.
  - iii) the maximum bit rate that may be obtained without substantial error on the link assuming only intermodal dispersion.
  - iv) the bandwidth-length product corresponding to iii.

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Total No. of Pages : 02

Total No. of Questions : 09

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

**WIRELESS COMMUNICATION**

Subject Code : BTEC-601-18

M.Code : 79373

Date of Examination : 10-01-2023

Time : 3 Hrs.

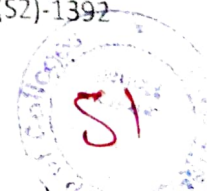
Max. Marks : 60

**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 the indoor propagation models?
  - b) Define cell.
  - c) Write full form of AMPS.
  - d) What are the advantages of RAKE receiver?
  - e) What is carrier to interference ratio?
  - f) What is frequency hopped multiple access?
  - g) Write full form of GPRS.
  - h) Write about forward and reverse channel.
  - i) Write full form of HLR.
  - j) Briefly explain architecture of Bluetooth.





## SECTION-B

2. Write about frequency reuse concept.
3. Explain the principle of cellular network and various types of handoff techniques.
4. Explain spread spectrum multiple access technique.
5. State the difference between small scale fading and large scale fading.
6. Write a note on '*wireless cable television*'.

## SECTION-C

7. Write a note on :
  - a) Maximum ration combining
  - b) Selective diversity.
8. Write a note on third generation wireless networks and standards.
9. State advantages, disadvantages of various multiple access techniques.

**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.(CE/EE/ECE) (Sem.-6)

**COMPUTER NETWORKS**

Subject Code : BTCS-504-18

M.Code : 79264

Date of Examination : 23-01-2023

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 advantages of Optic fiber as a transmission media?
- b) What are protocols and standards?
- c) What do you mean by Hamming Distance? Explain.
- d) Define the term "Piggybacking".
- e) Why IPv6 is required.
- f) Explain in brief about the term BOOTP.
- g) Differentiate between TCP and UDP Protocols.
- h) What do you mean by QoS (Quality of Service)?
- i) Explain in brief about the term WWW.
- j) What is Cryptography? Explain in brief.



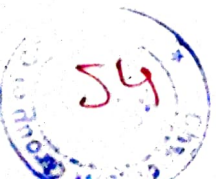
## SECTION-B

2. Write a detailed note on following transmission media :
  - (a) Twisted pair
  - (b) Co-axial cable.
3. Write a detailed note on the following sliding window protocols :
  - (a) Stop & Wait
  - (b) Go-back-N ARQ
4. What is IP addressing? How it is classified? Also briefly explain about subnets.
5. Explain the Leaky Bucket Algorithm in detail.
6. Write a brief note on Domain Name Space and DDNS.

## SECTION-C

7. What is OSI Model? Explain the functions and protocols and services of each layer.
8. Write a detailed note on following terms :
  - (a) Pure ALOHA
  - (b) Slotted ALOHA.
9. Explain the following terms in detail :
  - (a) TELNET
  - (b) FTP
  - (c) HTTP.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.-7)

**ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

Subject Code : BTEC-909D-18

M.Code : 90686

Date of Examination : 03-01-23

Time : 3 Hrs.

Max. Marks : 60

P.T.U Question  
B.Tech ECE  
Sem 7

**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 non-parametric models.
  - b. What is ontological engineering?
  - c. What is the meaning of regression?
  - d. What is Boolean Decision Tree?
  - e. Explain the classification with learner model.
  - f. What do you mean by SVM?
  - g. What is ensemble learning?
  - h. What is rationality?
  - i. Difference between deep learning and machine learning.
  - j. What is fuzzy logic?





## SECTION-B

2. What is Decision Tree Learning? Why it is useful in AI applications?
3. Explain Maximum Likelihood technique under Parameter Estimation of Classification.
4. Explain Goal Based Agent and Utility based Agent architecture with proper diagram.
5. Discuss various types of Reinforcement Learning Techniques.
6. Explain block world problem using heuristic function in Hill Climbing search strategy.

## SECTION-C

7. Explain the function of clustering.
8. Explain Support Vector Machines in detail. What are advantages and disadvantages?
9. What is Fuzzy Set? Explain graphic interpretation of Fuzzy Sets for Universal Space and empty sets.

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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 : 14-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) What are the essential components or modules in embedded hardware?
- b) Compare USB and UART.
- c) Differentiate between timers and counters.
- d) What is a watchdog timer?
- e) What is Semaphore? Explain.
- f) Discuss the primary functions of a Kernel.
- g) Explain the importance of the CAN bus.
- h) Explain the ZIGBEE protocol.
- i) How is the function called in C programming? Explain it with a suitable example.
- j) What are the advantages of using structure in C programming?

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## SECTION-B

2. What are the challenges in embedded system design? Explain in detail.
3. What is the I2C protocol? Explain the frame structure of the I2C bus.
4. What is the significance of the device driver and Interrupt servicing Mechanism in an embedded device? Explain in detail.
5. Draw and explain the SPI communication and interfacing circuit.
6. What is the importance of the DAC module? Draw and explain the interfacing circuit of DAC in an ARM processor.

## SECTION-C

7. With a suitable diagram, explain the design process of an embedded system for the washing machine application.
8. Elucidate the selection of processor and memory for a robotic arm movement using a stepper motor.
9. Draw and explain the complete architecture of an ARM processor in detail.

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## SECTION-B

2. Comparing between local and global variable.
3. Write a python program to print Fibonacci series up to n terms.
4. Explain different loops available in python with suitable examples.
5. Describe various modes of file object. Explain any two in detail.
6. Illustrate the use of method overriding. Explain with example.

## SECTION-C

7. Write a python program to read contents of first.txt file and write same content in second.txt file.
8. Generate prime number upto 1000 with the help of Sieve of Eratosthenes method.
9. a) Design a python program which will throw exception if the value entered by user is less than zero.  
b) Explain concepts of object oriented programming.

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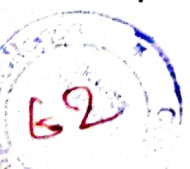
## SECTION-B

2. Write a detailed note on Instruction Execution cycle.
3. Explain in detail about Semiconductor memory technologies.
4. Write a detailed note on Direct Memory Access (DMA).
5. Explain about arithmetic pipelining with an example.
6. Explain in detail about write policies.

## SECTION-C

7. Write a detailed note on Addressing Modes.
8. Explain in detail about micro-programmed based CPU control unit design. Also differentiate between hardwired and micro-programmed CPU control unit design.
9. State and explain the different types of hazards that can occur in a pipeline.

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June 2023

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (ME) (Sem.-3)**  
**BASIC THERMODYNAMICS**

Subject Code : BTME-305-18

M.Code : 76422

Date of Examination : 24-01-2023

P.T.U Questions  
B.Tech (ME)  
Sem - 3

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 understand by thermodynamic property and thermodynamic substance?
- b) Define heat energy and specific heat.
- c) What is thermal energy reservoir? Define in terms of heat source and heat sink.
- d) What do you understand by entropy generation?
- e) What are the effects of irreversibility on work output of a system?
- f) What is mean effective pressure and what is its significance?
- g) What is an internal combustion engine?
- h) Define pure substance.
- i) What do you understand by zeroth law of thermodynamics?
- j) Draw a gas turbine cycle with reheat.





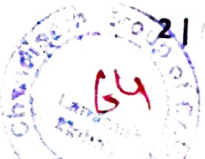
## SECTION - B

2. A system of 1 kg of gas expands from an initial state at pressure  $p_1$  bar and a volume  $v_1$  m<sup>3</sup> to a volume of  $v_2$  m<sup>3</sup>/kg. Calculate the work done by the gas, when expansion is (a) isobaric, (b) isothermal, (c) polytropic with the law  $pv^n = \text{constant}$ .
3. In a steady flow system, a substance flows at a rate of 5 kg/s. It enters the system at a pressure of 6 bar, velocity 300 m/s, internal energy 2000 kJ/kg and specific volume 0.38 m<sup>3</sup>/kg. It leaves the system at a pressure of 1.5 bar, velocity 150 m/s, internal energy 1600 kJ/kg and specific volume of 1.26 m<sup>3</sup>/kg. During its passage through the system, the substance loses 80 kJ/kg of heat to the surroundings. Determine the power of the system, stating whether it is from or to the system. Neglect any changes in potential energy.
4. Prove that the violation of Kelvin-Planck statement leads to the violation of Clausius statement.
5. A thermal energy source at 800 K loses 2000 kJ of heat to a sink at (a) 500 K, and (b) 750 K. Determine which heat transfer process is more irreversible.
6. Calculate volume, density, enthalpy, and entropy of 2 kg of steam at 80°C and having a dryness fraction of 0.85.

## SECTION-C

7. The pressure and temperature of air at the beginning of compression in an Otto cycle is 10<sup>3</sup> kPa 27°C respectively. The heat added per kg of air is 1850 kJ. The compression ratio is 8. Determine maximum temperature, maximum pressure, and thermal efficiency.
8. A Steam power plant works between pressures 40 bar and 0.05 bar. If the steam supplied is saturated and the cycle of operation is Rankine cycle, find
  - a) Cycle efficiency,
  - b) Specific steam consumption.
9. Explain the working of a four stroke Petrol engine. Why are four stroke engines are preferred over TWO stroke engines?

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## SECTION-B

2. Explain the differences between recovery and recrystallization processes.
3. What are various surface and grain boundary imperfections in crystalline materials? Explain any one of these in detail.
4. What is Gibb's phase rule? Discuss its application using binary isomorphous phase diagram.
5. Distinguish between full annealing and process annealing.
6. Discuss briefly various mechanisms of diffusion.

## SECTION-C

7. a) Write various invariant reactions observed in Fe-FeC<sub>3</sub> diagram.  
b) Differentiate between full hardening and case hardening.
8. Discuss the effects of Ni, Cr, Mn and Mo alloying elements on the properties of steels.
9. **Write brief notes on the following:**
  - a) Nitriding heat treatment
  - b) Jominy end-quench hardenability

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Dec 2022

Roll No. 

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Total No. of Pages: 02

Total No. of Questions: 09

**B.Tech. (Mechanical Engineering)(Sem. – 3)**

**MANUFACTURING PROCESSES – I**

**Subject Code: BTME-305**

**M Code: 59115**

**Date of Examination : 21-01-23**

**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) Give broad classification of manufacturing processes.
  - b) Enumerate the properties of green moulding sand.
  - c) How melting furnaces can be classified?
  - d) Differentiate between AC & DC welding equipment.
  - e) Describe the working principle of thermit welding process.
  - f) Differentiate between forward and backward welding processes.
  - g) Explain the effect of HAZ on welding.
  - h) Differentiate between destructive and non-destructive testing techniques.
  - i) Explain principles of micro hardness testing.
  - j) Explain the principle of soldering process.





## SECTION-B

2. Explain various types of materials used for preparation of patterns giving their characteristic features, advantages and limitations.
3. Describe the working principle, applications and advantages of permanent mould casting process giving neat sketch.
4. Describe the working principle, applications and advantages of MIG welding process giving neat sketch.
5. Describe the working principle and instrumentation used in plasma arc welding process giving a neat sketch and also explain its applications.
6. Discuss the steps for ultrasonic inspection technique with the help of a neat sketch.

## SECTION-C

7. a) Name the various defects that occur in sand casting and state their probable causes and remedies.  
b) Describe the design considerations of welding process.
8. a) Explain the working principle, applications, advantages and limitations of oxy acetylene welding process giving a neat sketch.  
b) Write short note on cleaning and finishing of castings.
9. a) Explain the elements of gating system giving a neat sketch and explain the significance of various elements.  
b) Briefly describe the process of eddy current testing giving its applications in industry.

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M-59115

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Dec 2022

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 : 21-01-2023

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) How is the position of principal plane related to position of plane of maximum shear stress?
- b) What is limit of elasticity of a material? Also discuss its importance.
- c) Define point of contraflexure.
- d) Drive expression for section modulus for rectangular section.
- e) Give the polar modulus for solid circular shaft and a hollow shaft.
- f) Enlist various modes of failure of columns.
- g) Discuss limitation of Euler's formula for Buckling of columns.
- h) Enlist various methods to find slope and deflection for beams.
- i) Enlist various assumptions made for development of a torsion formula.
- j) Name different elastic constants.

**SECTION-B**

2. Derive expression for extension of a bar due to self weight.



3. The maximum allowable shear stress in a hollow shaft of external diameter equal to twice the internal diameter is  $70 \text{ N/mm}^2$ . Determine the diameter of the shaft if it is subjected to a torque of  $4 \times 10^6 \text{ N-mm}$  and a bending moment of  $3 \times 10^6 \text{ N-mm}$ .
4. Calculate the maximum stress in a piece of rectangular steel strip  $2.5 \text{ mm}$  wide and  $3 \text{ mm}$  thick when it is bent round a drum of  $3.0 \text{ m}$  diameter.  $E = 2 \times 10^5 \text{ N/mm}^2$ .
5. It is intended to replace a solid aluminium shaft to  $80 \text{ cm}$  long and  $4 \text{ cm}$  diameter by a tabular steel shaft of same length and outside diameter so that either shaft could carry the same magnitude of torque and have the same angle of twist over the entire length. Find the diameter of the bore of the tabular steel shaft. Modulus of rigidity of steel and aluminium are  $8.0 \times 10^4 \text{ N/mm}^2$  and  $2.8 \times 10^4 \text{ N/mm}^2$ , respectively.
6. Derive expression for critical load as per Euler's theory for column with both ends hinged.

### SECTION - C

7. A Shear Force (S.F.) diagram for a simply supported beam AB is given in Figure 1. Find the loading condition and draw the bending moment diagram for the same.

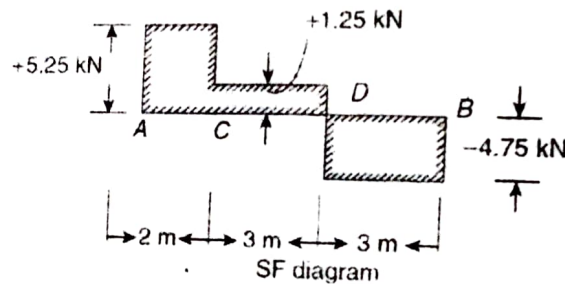


Figure 1

8. Find the principal stresses and their positions for the strained material as shown in Figure 2. Use Mohr's circle method.

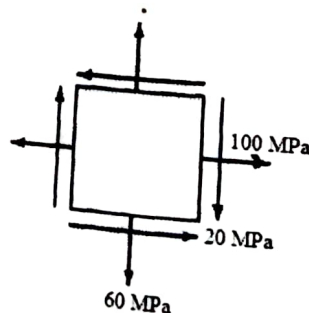


Figure-2

9. A cantilever of length ' $2a$ ' is carrying a load of  $W$  at the free end and another load  $W$  at its centre. Determine slope and deflection of the cantilever beam at the free end by using Moment-area method.

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## SECTION-B

2. Draw and explain Zener Diode characteristics, operation and applications.
3. Derive the expression for bridge full wave rectifier with various parameters.
4. Draw and explain Common Emitter configuration.
5. Explain Op-Amp as Voltage follower and comparator.
6. Convert decimal numbers 89 and 56 in other number systems.

## SECTION-C

7. Design the function  $F = A'B + AB + A'B'C$  using NAND and NOR gates.
8. Explain Voltage divider Bias configuration in detail.
9. With the help of diagrams, explain the working of Op-Amp as Differentiator and Integrator.

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Dec 2022

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

B.Tech.(ME) / (Marine Engineering) (Sem.-3)

APPLIED THERMODYNAMICS-I

Subject Code : BTME-304

M.Code : 59114

Date of Examination : 19-01-2023

Time : 3 Hrs.

Max. Marks : 60

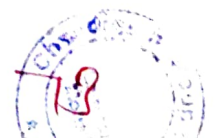
**INSTRUCTIONS TO CANDIDATES :**

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.
4. Use of steam tables is allowed.

**SECTION-A**

1. Answer briefly :

- a. Define adiabatic flame temperature.
- b. What is scavenging in two stroke engines?
- c. Define critical point.
- d. What is fusible plug and state where it is located in a boiler?
- e. Why ideal regenerative cycle is not practicable?
- f. Define nozzle efficiency through (h-s) diagram.
- g. Define stage efficiency of an impulse turbine.
- h. Define pressure compounding of steam turbine.
- i. Define degree of reaction.
- j. State various components of a condensing plant.



## SECTION-B

2. Explain with the help of (temperature-heat) diagram the formation of steam and the connected terms.
3. Explain the working of Loeffler boiler with the help of a neat sketch. State its merits.
4. The velocity of steam at inlet to a simple impulse turbine is 1000 m/s and the nozzle angle is  $20^\circ$ . The mean blade speed is 400 m/s and the blades are symmetrical. The mass flow rate of steam is 0.75 kg/s. The friction effects on the blades are negligible. Estimate: (a) the blade angles; (b) the tangential force on the blades; (c) the axial thrust; (d) the diagram power; and (e) the diagram efficiency.
5. Derive an expression for maximum discharge through convergent divergent nozzle for steam.
6. A surface condenser is designed to handle 10000 kg of steam per hour. The steam enters at 0.08 bar and 0.9 dryness and the condensate leaves at the corresponding saturation temperature. The pressure is constant throughout the condenser. Estimate the cooling water flow rate per hour, if the cooling water temperature rise is limited to  $10^\circ\text{C}$ .

## SECTION-C

7. What is the significance of controlling delay period in C.I. engines? Explain any five factors which cause reduction in delay period.
8. The following observations were made on a boiler plant during one hour test: Steam pressure = 20 bar; Steam generated = 37500 Kg; Temperature of water entering the economiser =  $15^\circ\text{C}$ ; Temperature of water leaving the economiser =  $90^\circ\text{C}$ ; Fuel used = 4400 Kg; Energy of combustion of fuel = 30000 KJ/Kg. Calculate: a) The equivalent evaporation per kg of fuel; b) The thermal efficiency of the plant; and c) The percentage heat energy of the fuel energy utilized by the economiser.
9. A steam power plant uses the following cycle: Steam at boiler = 150 bar,  $550^\circ\text{C}$ ; Reheat at 40 bar to  $550^\circ\text{C}$ ; Condenser pressure = 0.1 bar. Using Mollier chart and assuming ideal processes, find: (a) Quality of steam at turbine exhaust; (b) Cycle efficiency; and (c) Steam rate.

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

**B.Tech.(ME) (Sem.-3)  
MACHINE DRAWING**

**Subject Code : BTME-303-18**

**M.Code : 76419**

**Date of Examination : 17-01-2023**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. There are three sections in this question paper. Attempt ALL the questions from SECTION-A.
2. Attempt any TWO questions from SECTION-B and any ONE question from SECTION-C.
3. First angle projection to be used. You may assume any missing dimension.

**SECTION-A**

**1. Write briefly :**

- a) Mention any two means for prevention of rotation of brasses in a Plummer Block.
- b) What is the function of blow off cock?
- c) Draw a symbol of Spot and Seam Weld.
- d) What are the functions of connecting rod in IC engines?
- e) Draw conventions for (i) internal threads (ii) external threads.
- f) Mention different types of bolts.
- g) Write two common materials which are being used for making bushes.
- h) Sketch the convention of a round section.
- i) What is difference between allowance and tolerance?
- j) What are the disadvantages of Riveted Joints?



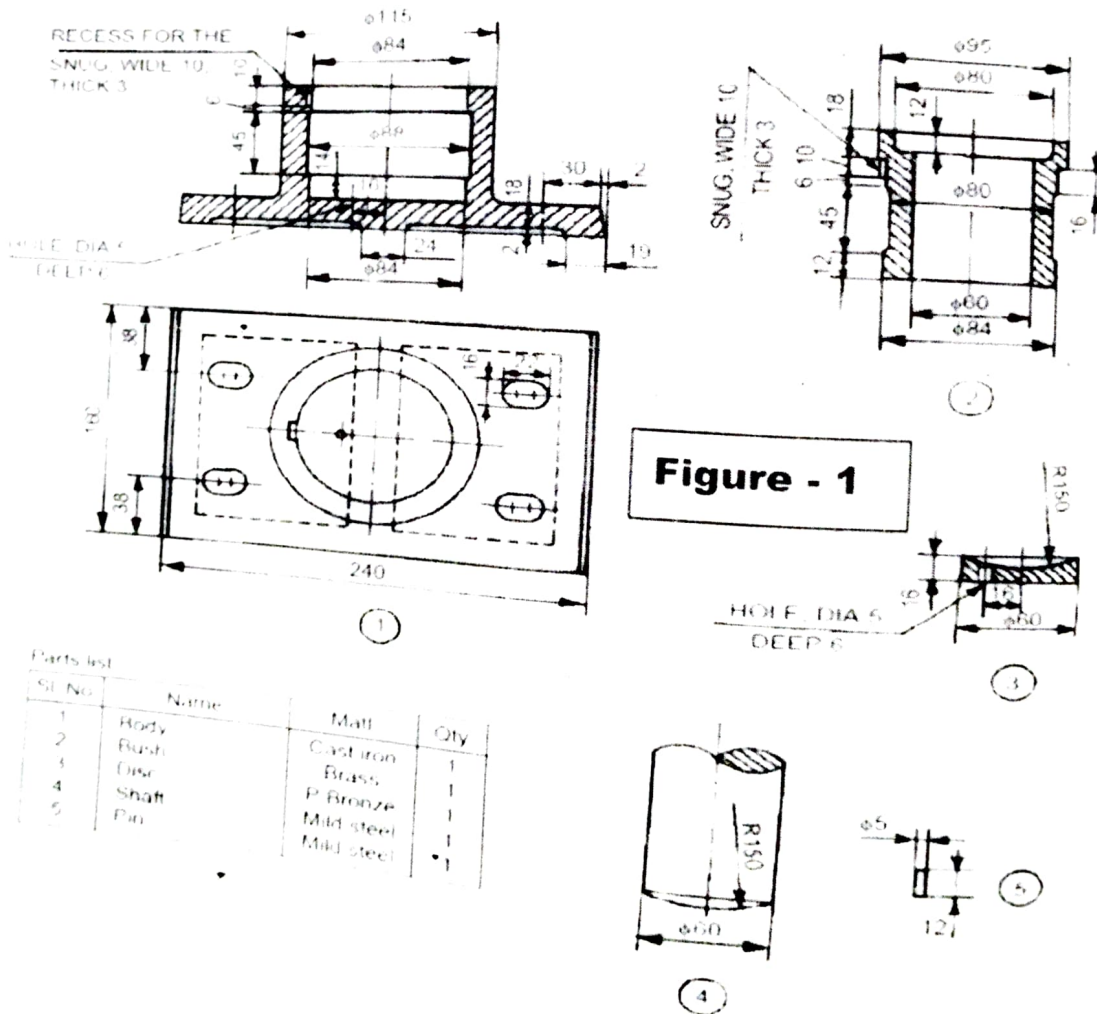


## SECTION-B

2. Draw free hand the sectional front view and right-side view of the pin type flexible coupling.
3. Draw free hand the sectional front view and side view of Union Joint.
4. Draw free hand the full sectional front view and top view of Cotter Joint.

## SECTION-C

5. The part drawings of a Foot-step Bearing are shown in Figure 1. Assemble the parts and draw full sectional front view and top view. Also show the Bill of Materials.



6. The draw

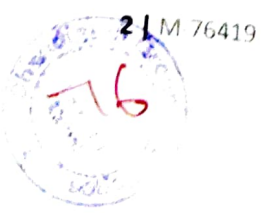


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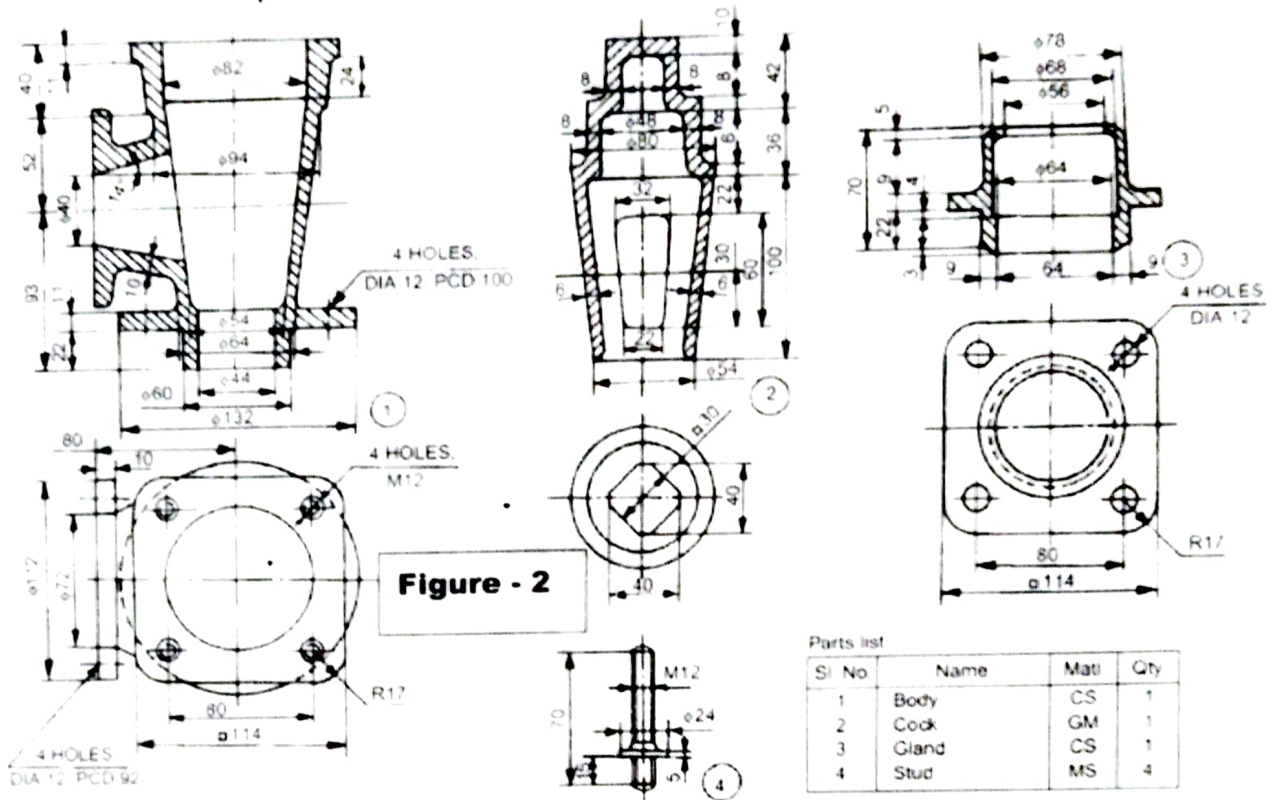
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6. The part drawings of a Blow-off Cock are shown in Figure 2. Assemble the parts and draw full sectional view from the front and top view. Also show the Bill of Materials.



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Roll No.

Total No. of Pages : 04

Total No. of Questions : 07

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

**MACHINE DRAWING**

Subject Code : BTME-303

M.Code : 59113

Date of Examination : 17-01-23

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS 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.

**SECTION-A**

1. Answer briefly :

- a) Draw symbols for :
  - i) Square butt weld
  - ii) Single V butt weld.
- b) Draw two different types of rivet heads.
- c) What is the purpose of caulking and fullering of riveted joints?
- d) What are the advantages of welded joints over riveted joints?
- e) What are multi start threads?
- f) What is difference between chain dimensioning and datum dimensioning?
- g) What is a stud or stud bolt?
- h) What is function of a feed check valve?
- i) What is expansion joint?



## SECTION-B

2. Draw free hand front view of a Gib and cotter joint.
3. Draw profile of metric threads by taking pitch of 20 mm. Represent angle and height of thread on the drawing.
4. Draw free hand sketch of IC engine piston.
5. Draw free hand front view (upper half in section) of a pin type flexible coupling.

## SECTION-C

6. Fig. 1 represents the parts of a **Blow off cock**. Assemble the parts and draw the following views :
  - a) Full section elevation
  - b) Top view





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following

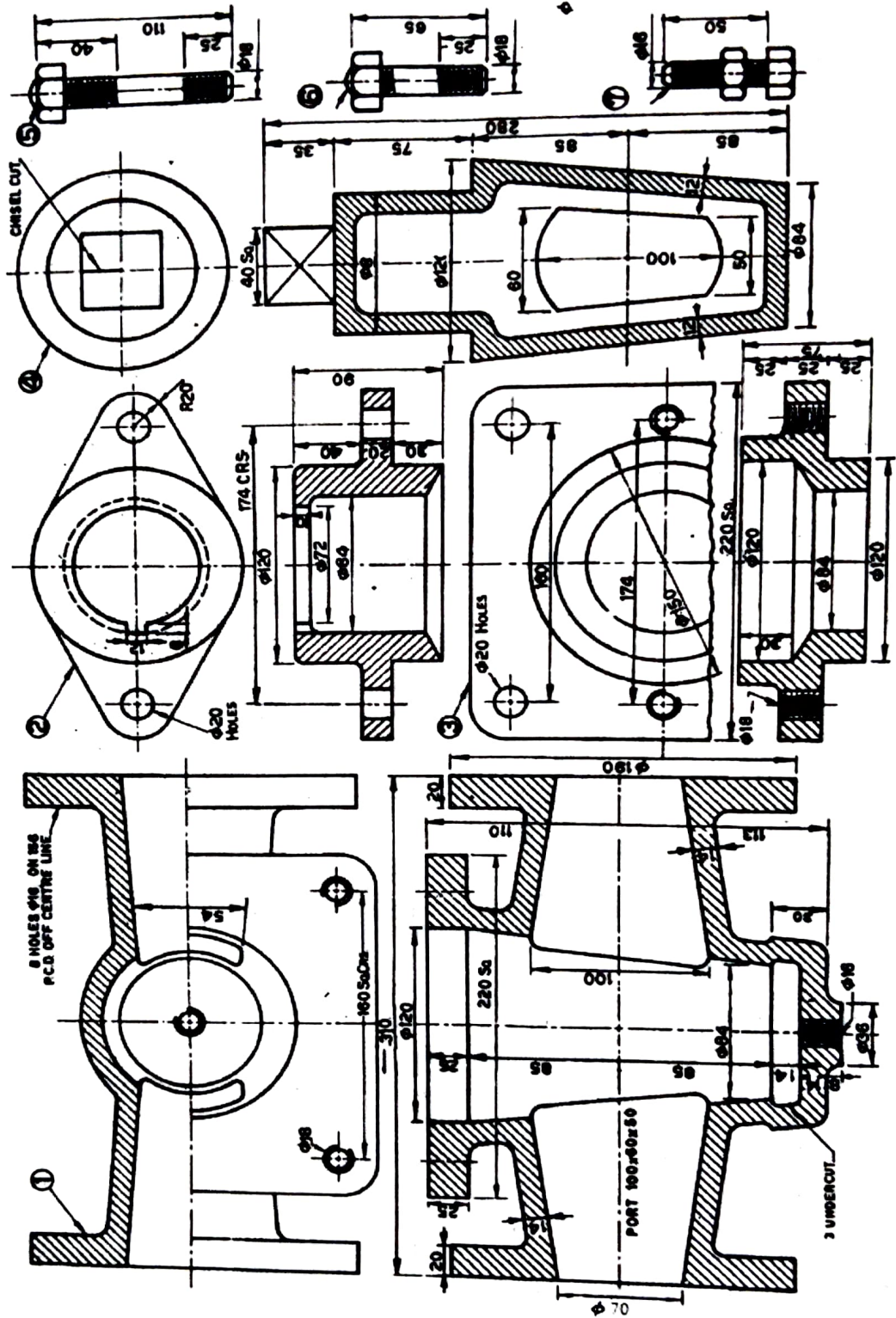
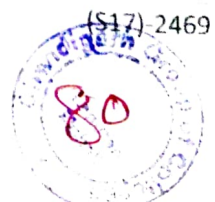


Fig.-1



7. Assemble the parts of a Connecting rod given in Fig.2 and draw the following views:

a) Elevation

b) Top view (full section)

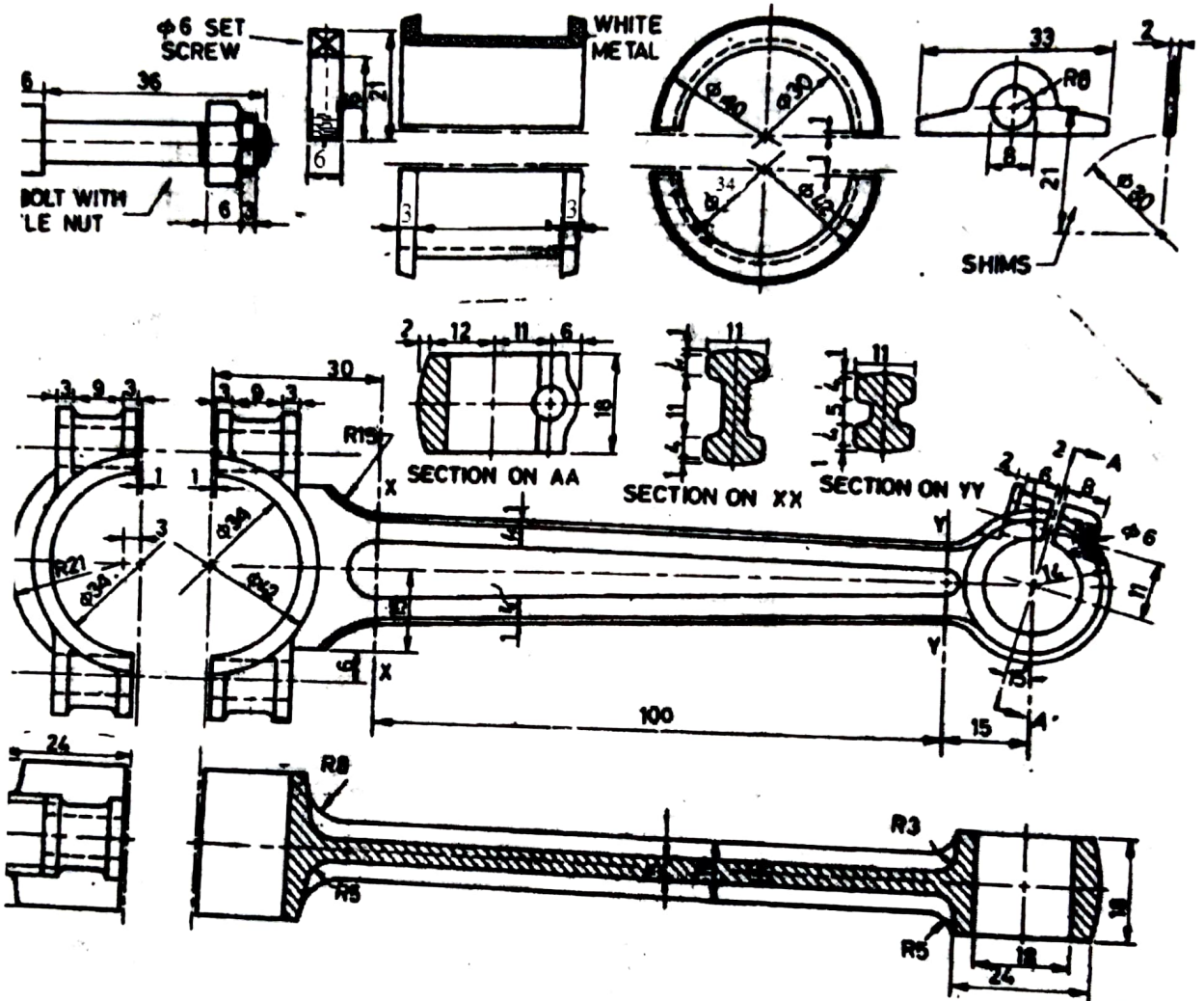


Fig.-2 Petrol Engine connecting rod

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







## SECTION-B

2. Draw a neat sketch and explain working of pantograph.
3. A leather belt is required to transmit 7.5 k/w from a pulley 1.2 m in diameter, running at 250 r.p.m. The angle embraced is  $165^\circ$  and the coefficient of friction between the belt and pulley is 0.3. If the safe working stress for the leather belt is 1.5 MPa. density of leather  $Mg/m^3$  and thickness of belt is 10 mm. Determine the width of the belt taking centrifugal tension into account.
4. What is the difference between a shoe brake and band brake? Describe them and state their applications.
5. A horizontal cross compound steam engine develops 300 KW at 90 r.p.m. The coefficient of fluctuation of energy as found from the turning moment diagram is to be 0.1 and the fluctuation of speed is to be kept within  $\pm 0.5\%$  of the mean speed. Find the weight of the flywheel required, if the radius of gyration is 2 meters.
6. Name various inversions of single slider crank chain. Explain **any one** with diagram.

## SECTION-C

7. State the condition under which two shafts connected together by a double Hooke's joint shall have the same angular velocities. Discuss the advantage and give practical application for the same.
8. A cam operates a roller, in line reciprocating follower, while rotating at 300 r.p.m. The further specifications are: Minimum radius of cam = 25 mm. Lift of follower = 30 mm. Diameter of roller = 15 mm. Angle of lift =  $120^\circ$ . Nature of lift is S.H.M. Outer dwell angle =  $30^\circ$ . Angle of return =  $150^\circ$ . Nature of return is uniform acceleration and retardation where acceleration is equal to retardation in magnitude. Draw the cam profile. Find the maximum velocity and acceleration of the follower during lift as well as return.
9. a) Explain the following terms as applied to flywheel:
  - (i) Fluctuation of energy
  - (ii) Coefficient of fluctuation of energy
  - (iii) Fluctuation of speed
  - (iv) Coefficient of Fluctuation of speed
- b) Explain the importance and use of Turning Moment Diagram of reciprocating engines.

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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-302-18

M.Code : 76418

Date of Examination : 14-01-2023

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 Kinematic pair? Name different types of Kinematic pairs according to the type of relative motion between the elements.
- b) In what way a mechanism differs from a machine?
- c) State the 'Aronhold Kennedy's Theorem' of three instantaneous centres.
- d) Explain the phenomena of 'slip' and 'creep' in a belt drive.
- e) Define the following terms as applied to cam with a neat sketch :
  - i) Pitch circle and
  - ii) Pressure angle.
- f) What are the different types of motion with which a follower can move?
- g) What is the difference between centrifugal and inertia type governors?
- h) Define and explain the following terms relating to governors:
  - i) Isochronism



- ii) Huntin
- i) What is the function of a flywheel?
- j) What is the difference between absorption and transmission dynamometers?

### SECTION-B

2. Sketch and describe the working of Whitworth quick return motion mechanism.
3. What are straight line mechanisms? Describe one type of exact straight line motion mechanism with the help of a sketch.
4. A pulley is driven by a flat belt, the angle of lap being  $120^\circ$ . The belt is 100 mm wide by 6 mm thick and density  $1000 \text{ kg/m}^3$ . If the coefficient of friction is 0.3 and the maximum stress in the belt is not to exceed 2MPa, find the greatest power which the belt can transmit and the corresponding speed of the belt.
5. A single dry plate clutch transmits 7.5 kW at 900 r.p.m. The axial pressure is limited to  $0.07 \text{ N/mm}^2$ . If the coefficient of friction is 0.25, find 1. Mean radius and face width of the friction lining assuming the ratio of the mean radius to the face width as 4, and 2. Outer and inner radii of the clutch plate.
6. A riveting machine is driven by a constant torque 3 kW motor. The moving parts including the flywheel are equivalent to 150 kg at 0.6 m radius. One riveting operation takes 1 second and absorbs 10,000 N-m of energy. The speed of the flywheel is 300 r.p.m. before riveting. Find the speed immediately after riveting. How many rivets can be closed per minute?

### SECTION-C

7. A symmetrical circular cam operating a flat-faced follower has the following particulars: Minimum radius of the cam = 30 mm ; Total lift = 20 mm ; Angle of lift =  $75^\circ$  ; Nose radius - 5 mm ; Speed = 600 r.p.m. Find : a) the principal dimensions of the cam, and b) the acceleration of the follower at the beginning of the lift, at the end of contact with the circular flank, at the beginning of contact with nose and at the apex of the nose.
8. a) A car moving on a level road at a speed 50 km/h has a wheel base 2.8 metres. distance of C.G. from ground level 600 mm, and the distance of C.G. from rear wheels 1.2 metres. Find die distance travelled by the car before coming to rest when brakes are applied, a) to the rear wheels, b) to the front wheels, and c) to all the four wheels. The coefficient of friction between the tyres and the road may be taken as 0.6.
- b) Describe the construction and operation of a rope brake absorption dynamometer.

9. A spring loaded governor of the Hartnell type has arms of equal length. The masses rotate in a circle of 130 mm diameter when the sleeve is in the mid position and the ball arms are vertical. The equilibrium speed for this position is 450 *r.p.m.*, neglecting friction. The maximum sleeve movement is to be 25 mm and the maximum variation of speed taking in account the friction to be 5 per cent of the mid position speed. The mass of the sleeve is 4kg and the friction may be considered equivalent to 30 N at the sleeve. The power of the governor must be sufficient to overcome the friction by one per cent change of speed either way at mid-position. Determine, neglecting obliquity effect of arms :

- a) The value of each rotating mass
- b) The spring stiffness in N/mm
- c) The initial compression of spring.

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Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (2018 Batch) (Sem.-3)

**FLUID MECHANICS**

Subject Code : BTME-301-18

M.Code : 76417

Date of Examination : 12-01-2023

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 and distinguish between compressibility and bulk modulus of elasticity.
- b) What do you understand by hydrostatic paradox?
- c) Define vorticity.
- d) What is relationship between stream function and velocity potential function?
- e) State the assumptions for Bernoulli's energy equation?
- f) What is potential energy correction factor.
- g) What is the need of dimensional analysis?
- h) How major losses are calculated in flow through pipes?
- i) What do you understand by hydraulic coefficients?
- j) What is advantage of mouthpiece?

**SECTION-B**

2. The gap between a horizontal shaft and a concentric sleeve is filled with viscous oil. The sleeve moves with a constant velocity of 1.5 m/s when a force of 1250 N is applied





parallel to the axis of the shaft. If it was required to move the sleeve at a velocity of 1.8 m/s, what should have been the force? The temperature can be assumed to be constant throughout.

3. A circular disc of diameter  $D$  is immersed vertically in a liquid of density  $\rho$ . The top most point of the disc just touches the liquid surface. Derive an expression for the depth of center of pressure.

4. An unsteady velocity field is given by

$$u = t^2 + 3y, v = 4t + 5x$$

Calculate the acceleration at the point (5,3) at time  $t = 2$  units.

5. A 25 cm diameter pipe carries oil specific gravity 0.8 at the rate of 150 lit/s. At a point A, which is 3.5 m above the datum, the pressure is  $19.62 \text{ kN/m}^2$ . Calculate the total energy at section A in meters of oil.
6. In a process, a liquid with dynamic viscosity of  $2 \text{ N.m/s}$  flows in the gap between two horizontal parallel plates having a gap of 100 mm between them. If a maximum velocity of  $1.5 \text{ m/s}$  is desired, find the (a) discharge per unit width of the plates, (b) boundary shear stress, and (c) the pressure gradient.

### SECTION - C

7. An open tank contains water to a depth of 1.5 I. The tank is put in an elevator which accelerates at  $2.5 \text{ m/s}^2$ . Calculate the pressure force per meter length on one of the sides of the tank when the (a) acceleration is upwards and (b) acceleration is vertically downwards.
8. A venturimeter of throat diameter 5 cm is fitted into 12.5 cm diameter pipeline. The coefficient of discharge is 0.96. Calculate the flow in the pipeline when the reading on a mercury-water differential U-tube manometer connected to the upstream and throat sections shows a reading of 20 cm. If the energy loss in the downstream divergent cone of the meter is 10 times the velocity head in the pipe, calculate the head loss of the meter.
9. Using Buckingham's  $\pi$  theorem, show that the velocity  $V$  of flow of a fluid of mass density  $\rho$  and dynamic viscosity  $\mu$ , through a circular orifice of diameter  $D$  under a head  $H$  is given by

$$V = \sqrt{2gH} \phi \left[ \frac{D}{H}, \frac{\mu}{\rho V H} \right]$$

Where  $g$  is acceleration due to gravity.

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Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech. (Marine Engineering) / (Mechanical Engineering) (Sem.-3)

**STRENGTH OF MATERIALS – I**

Subject Code : BTME-301

M.Code : 59111

Date of Examination: 12-01-2023

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 engineering stress.
- b) Define and explain the significance of Young's modulus.
- c) What do you mean by plane stress condition?
- d) A freely supported beam at its ends carries a central concentrated load, and maximum bending moment is 'M'. If the same load be uniformly distributed over the beam length, then what will be the maximum bending moment?
- e) What do you mean by theory of pure bending?
- f) What is section modulus of a beam?
- g) Differentiate between a shaft and a beam.
- h) The diameter of a shaft is increased from 30 mm to 60 mm, all other conditions remaining unchanged. By how many times its torque carrying capacity will be increased?
- i) What is crippling load for a column?
- j) A cantilever beam of rectangular cross-section is subjected to a load 'W' at its free end. If the depth of the beam is doubled and the load is halved, then what will be the deflection of the free end as compared to original deflection?

## SECTION-B

2. With the help of stress-strain diagram differentiate between ductile and brittle materials.
3. A concrete column (300mm × 300mm in section) is reinforced by 10 longitudinal 20mm diameter round steel bars. The column carries a compressive load of 450kN. Find the stresses produced in the steel bars and concrete. Take  $E_{\text{steel}} = 200\text{GPa}$  and  $E_{\text{concrete}} = 15\text{GPa}$ .
4. A beam having rectangular cross-section is freely supported on supports as shown in Fig. 1. It carries a UDL of 12 kN/m and a concentrated load of 9kN. If the stress in beam is not to exceed 8MPa. Design a suitable cross-section by assuming the depth of beam as twice of its width.

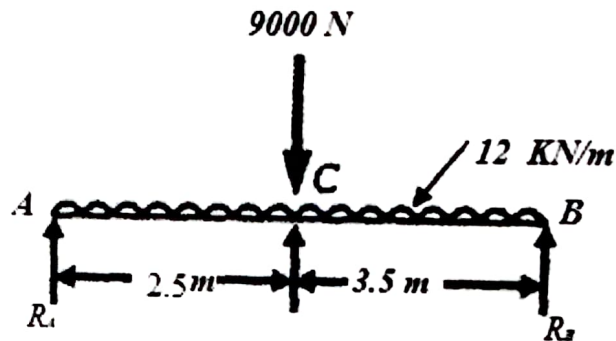


Fig. 1

5. Calculate the safe compressive load on a hollow cast iron column (one end rigidly fixed and other end hinged) of 150 mm external diameter, 100 mm internal diameter and 10 m in length. Use Euler's formula with a factor of safety of 5 and  $E = 95\text{GPa}$ .
6. Obtain the general equations to find the slope and deflection in a cantilever beam having length 'L' and carrying a UDL of intensity 'w', over its entire length and hence calculate the maximum deflection.

## SECTION-C

7. The state of stress on an element is shown in Fig. 2. Determine: (a) Principal stresses and their orientations (b) Maximum/minimum shear stresses, their orientations along with the associated normal stresses (c) Values of normal and shear stresses on the indicated plane. Show all the results on properly oriented planes.

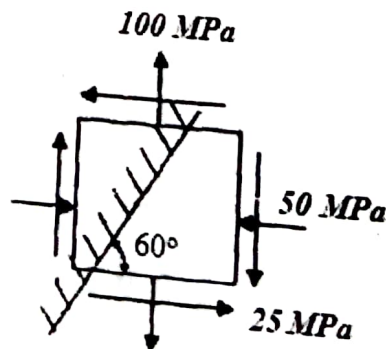


Fig.2

8. Draw shear force and bending moment diagrams for the beam loaded in Fig. 3. Label the salient points.

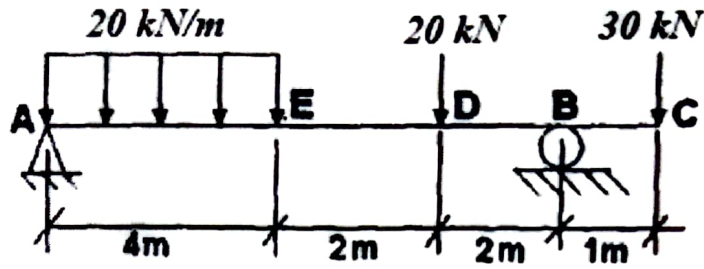


Fig.3

9. Stating the assumptions made, derive the torsion formula,  $\frac{T}{I_p} = \frac{\tau}{P} = \frac{C\theta}{L}$ . The symbols have their usual meaning.

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## SECTION-B

2. State and explain Castigliano's theorem.
3. A mild steel shaft 100 mm diameter is subjected to a maximum torque of 15 kNm and a maximum bending moment of 10 kNm at a particular section. Find the factor of safety according to the maximum shear stress theory if the elastic limit in simple tension is  $240 \text{ MN/m}^2$ .
4. A cylindrical air drum is 2.25 m in diameter with plates 1.2 cm thick. The efficiencies of the longitudinal and circumferential joints are respectively 75% and 40%. If the tensile stress in the plating is to be limited to  $120 \text{ MN/m}^2$ , find the maximum safe air pressure.
5. A disc of 50 cm diameter and uniform thickness is rotating at 2750 r.p.m. Determine the maximum stress induced in the disc. If the hole of 11 cm diameter is drilled at the centre of the disc, determine the maximum intensities of radial and hoop stresses induced. Take Poisson's ratio = 0.3, density of disc =  $7800 \text{ kg/m}^3$ .
6. Derive the general formula for distribution of shear stress in beams.

## SECTION-C

7. An open coil helical spring is axially loaded and is having 10 coils. The bending and twisting stresses are 95 MPa and 110 MPa respectively. Find the maximum permissible load and diameter of wire for a maximum extension of 2 cm assuming that the mean diameter of coils is 8 times the diameter of wire.  $E = 210 \text{ GPa}$  and  $G = 82 \text{ GPa}$ .
8. Find the ratio of thickness to internal diameter for a tube subjected to internal pressure when the pressure is  $5/8$  of the value of the maximum permissible circumferential stress. Find the increase in internal diameter of such a tube 100 mm internal diameter when the internal pressure is  $80 \text{ MN/m}^2$ . Also find the change in wall thickness.  $E = 210 \text{ GN/m}^2$ , and Poisson's ratio = 0.3.
9. Write short notes on any two of the following with suitable examples and applications:
  - (a) Stress due to suddenly applied loads
  - (b) Built up beams

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## SECTION-B

2. Draw and explain the working of single stage reciprocating air compressor.
3. Discuss the various stages of combustion in IC engine.
4. Derive a relation to find the condition for maximum discharge through a nozzle.
5. Differentiate between impulse and reaction turbine.
6. Describe with a neat sketch the working of a surface condenser.

## SECTION-C

7. Explain the process of steam formation at constant pressure and show it on temperature and total heat graph.
8. Draw and explain the Rankine steam power cycle.
9. A steam jet enters the row of blades with velocity of 375m/s at an angle of  $20^\circ$  with the direction of moving blades. If the blade speed is 165m/s, find the suitable inlet and outlet blade angles assuming that there is no thrust blades. The velocity of steam passing over the blades is reduced by 15%. Also determine power developed by the turbine per kg of steam flowing over the blades per second.

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M-77546

S-1454





Roll No.

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (ME) (Sem. – 4)

**FLUID MACHINES**

Subject Code: BTME402-18

M Code: 77547

Date of Examination : 05-01-2023

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 understand by governing of a reaction turbine?
- b) What is function of surge tank?
- c) What are multistage pumps?
- d) What is air lift?
- e) What do you understand by net positive suction head?
- f) Explain torque convertor.
- g) What is intensifier? Where is it used?
- h) Define slip in reciprocating pump.
- i) What is differential accumulator?
- j) What is hydraulic press?



## SECTION-B

2. A Pelton wheel having a mean bucket diameter of 1.2m is running at 1000 r.p.m. The net head on the Pelton wheel is 840m. If the side clearance angle is  $15^\circ$  and discharge through the nozzle is  $0.12\text{m}^3/\text{s}$ . Determine:
  - a) Power available at the nozzle
  - b) Hydraulic efficiency of the turbine.
3. What is cavitation? On what factors does the cavitation in water turbines depend?
4. The diameter and width of a centrifugal pump impeller are 50cm and 2.5cm. The pump runs at 1200rpm. The suction head is 6m and the delivery head is 40m. The frictional drop in suction is 2m and in the delivery 8m. The blade angle at out let is  $30^\circ$ . The manometric efficiency is 80% and the overall efficiency is 75%. Determine the power required to drive the pump. Also calculate the pressures at the suction and delivery side of the pump.
5. Explain why priming is essential before starting a centrifugal pump.
6. What are main components of a reaction turbine? Describe their functions. Compare a Francis Turbine with Kaplan Turbine.

## SECTION-C

7. Derive Euler's momentum equation for hydraulic machines.
8. Explain the following:
  - a) Suction head
  - b) Delivery head
  - c) Static head
  - d) Manometric head
  - e) Total head
  - f) Net positive suction head
  - g) Euler's head
9. Determine the power available and number of turbines required for a hydroelectric station with following data:

Head available = 60m

Water available =  $33\text{m}^3/\text{s}$

Specific speed of turbines to be installed = 190

Rpm of turbines = 500

Overall efficiency = 82%

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M-77547





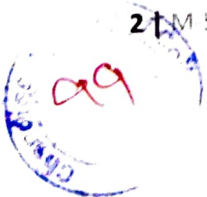
## SECTION-B

2. How is the friction effect taken into account at the turning and sliding pairs of a mechanism? Explain in detail.
3. Four masses  $m_1$ ,  $m_2$ ,  $m_3$  and  $m_4$  are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are  $45^\circ$ ,  $75^\circ$ , and  $135^\circ$ . Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.
4. Explain, how are the gear train classified? Give atleast one distinguished feature of each type.
5. A pinion of 20 involute teeth and 125 mm 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? With this pressure angle, find the length of the arc of contact and the minimum number of teeth in contact at a time.
6. Prove that the resultant unbalanced force is minimum when half of the reciprocating masses are balanced by rotating masses

## SECTION-C

7. In a 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?
8. A pair of locomotive driving wheels with the axle, have a moment of inertia of  $180\text{kg}\cdot\text{m}^2$ . The diameter of the wheel treads is 1.8m and the distance between wheel centers is 1.5 m. When the locomotive is travelling on a level track at 95 km/h, defective ballasting causes one wheel to fall 6mm and to rise again in a total time of 0.1s. If the displacement of the wheel takes place with simple harmonic motion, find:  
(a) the gyroscopic couple set up and (b) the reaction between the wheel and the rail due to this couple.
9. Explain the following:
  - a) Two and Three point synthesis.
  - b) Simple and Compound gear trains.

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## SECTION-B

2. Derive an expression for the force exerted on a submerged vertical plane surface by the static liquid and locate the position of centre of pressure.
3. In a two dimensional fluid flow, the fluid velocity components are given by  $u = x - 4y$  and  $v = -y - 4x$   
Find velocity potential function.
4. Explain the three similarities exist between model and prototype.
5. Describe stability of submerged and floating bodies.
6. Calculate the density, specific weight and weight of one litre of petrol of specific gravity 0.7.

## SECTION-C

7. A solid cylinder of 10 cm diameter and 40 cm long, consists of two parts made of different materials. The first part at the base is 1 cm long and specific gravity 6. The other part of the cylinder is made of the material having specific gravity 0.6. Find meta-centric height.
8. Derive an expression for major hydraulic losses in pipes.
9. Explain with neat sketch four flow measurement devices.

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## SECTION-B

2. How are the principal stresses and principal strain useful in predicting materials failure?
3. Calculate:
  - a) the change in diameter
  - b) the change in length
  - c) the change in volume of thin cylindrical shell 100cm diameter, 1cm thick and 5m long when subjected to internal pressure of  $3\text{N/mm}^2$ . Take value of  $E = 2 \times 10^5 \text{N/mm}^2$  and  $\mu = 0.3$ .
4. Derive the relation for the strain energy resulting from the bending of a beam (neglecting shear).
5. An I section beam  $350\text{mm} \times 150\text{mm}$  has a web thickness of 10mm and flange thickness of 20mm. If the shear force acting on the beam is 40kN find the maximum shear stress developed in the I section.
6. The minimum thickness of a turbine rotor is 9mm at a radius of 300mm if the rotor is to be designed for a uniform stress of  $200\text{MN/m}^2$ , find the thickness of the rotor at a radius of 25mm when it is running at 9000RPM. Take  $\rho = 8000\text{kg/m}^3$

## SECTION-C

7. Derive an expression to find resultant stress in circular ring when subjected to tensile load along the longitudinal axis.
8. An open coiled helical spring consists of 12 coils, each of mean diameter 60mm, the wire forming the coil being 6mm in diameter, each coil makes an angle of  $30^\circ$  with the plane perpendicular to the axis of the spring.
  - a) Determine the load required to elongate the spring by 25mm and the bending and shear stress caused by that load.
  - b) Calculate the axial twist that would cause a bending stress of  $50\text{MN/mm}^2$  in the coils. Take  $E = 200\text{GN/m}^2$  and  $C = 82\text{GN/m}^2$ .
9. Write short note on
  - a) Leaf spring
  - b) Maximum distortion energy theory

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M-77548

S-1546



Roll No.

Total No. of Pages: 02

Total No. of Questions: 09

**B.Tech. (Mechanical Engineering) (Sem. – 4)**

**MATERIALS ENGINEERING**

**Subject Code: BTME404-18**

**M Code: 77549**

**Date of Examination : 07-01-2023**

**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 valence electrons? List certain properties that are affected by them.
- b) Differentiate between Primary, and Secondary bonds.
- c) What are Miller Indices? Explain their significance.
- d) What is Burger's vector? What does it signify?
- e) What do you mean by non steady-state diffusion process?
- f) Explain Gibb's phase rule.
- g) What is solvus line? Explain using suitable sketch.
- h) Differentiate between peritectic and peritectoid reactions.
- i) Represent hardening process on TTT diagram for eutectoid steel.
- j) What do you mean by ferrite stabilizers?

M-77549

S-1590



## SECTION-B

2. What are various kinds of defects in solids? Write a brief note on Twin boundaries.
3. Discuss various diffusion mechanisms.
4. Draw and label phase diagram for binary Eutectic system. Explain the difference between eutectic and eutectoid reactions.
5. Distinguish between annealing and normalizing treatments.
6. Write brief note on induction hardening treatment.

## SECTION-C

7. Draw and level Fe-FeC<sub>3</sub> diagram. Write various invariant reactions observed in this system. Discuss the cooling of eutectoid steel from liquid range to room temperature.
8. Discuss the purpose of alloying plain carbon steels. Explain the effects of adding Cr, Ni and W on the properties of steels.
9. Write brief notes on the following:
  - a) Recovery vs Recrystallization
  - b) Jominy end-quench hardenability test

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M-77549

S-1590



## SECTION-B

2. Write the classification of gas turbines? Differentiate between closed and open cycle gas turbines, with neat sketches of gas flow and P-V diagram.
3. Explain the function of impeller and diffuser used in a centrifugal compressor.
4. Show that axial flow compressor with 50% reaction has symmetrical bladings.
5. Derive the equation for work per kg of air compressed by reciprocating compressor without clearance.
6. Explain the fundamental difference between the Jet propulsion and Rocket propulsion.

## SECTION-C

7. A single-stage double-acting air compressor is required to deliver  $14 \text{ m}^3$  of air per minute measured at 1.013 bar and  $15^\circ\text{C}$ . 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.
8. Determine the size of the cylinder for double acting air compressor of 50 indicated horse power, in which air is drawn at  $1 \text{ kgf/cm}^2$  and  $15^\circ\text{C}$  and compressed according to the law  $pV^{1.2}=C$  to  $6 \text{ kgf/cm}^2$  the compressor runs at 100 rpm with average piston speed of 152.5 m/min. Neglect clearance.
9. Explain working difference between propeller jet, turbo-jet and turbo-prop.

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## SECTION-B

2. What are the free body diagrams of a mechanism? Explain the implementation of this concept for a slider-crank mechanism.
3. In an epicyclic gear train, as shown in Fig.1, the number of teeth on wheels A, B and C are 48, 24 and 50 respectively. If the arm rotates at 400 r.p.m., clockwise, find:
- Speed of wheel C when A is fixed
  - Speed of wheel A when C is fixed

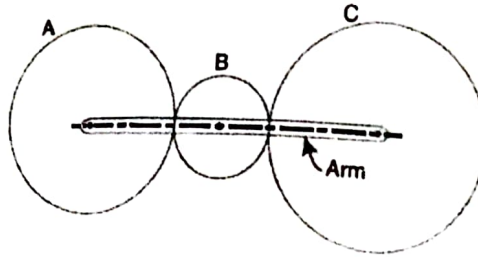


Fig-1

4. The following data refer to a steam engine : Diameter of piston = 240mm; stroke = 600mm; length of connecting rod = 1.5m; mass of reciprocating parts = 300kg; speed = 125 r.p.m. Determine the magnitude and direction of the inertia force on the crankshaft when the crank has turned through  $30^\circ$  from inner dead centre.
5. Explain the 'direct and reverse crank' method for determining unbalanced forces in radial engines.
6. Discuss the least square technique. How is it useful in designing a four link mechanism when three positions of the input and output link are known?

## SECTION-C

7. A four crank engine has the two outer cranks set at  $120^\circ$  to each other, and their reciprocating masses are each 400kg. The distance between the planes of rotation of adjacent cranks are 450mm, 750mm and 600mm. If the engine is to be in complete primary balance, find the reciprocating mass and the relative angular position for each of the inner cranks. If the length of each crank is 300mm, the length of each connecting rod is 1.2m and the speed of rotation is 240 r.p.m., what is the maximum secondary unbalanced force?
8. Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve with neat and clean diagram.
9. a) Derive an expression for minimum number of teeth required on a pinion to avoid interference when it gears with a rack.

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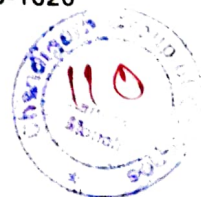
S-1626



b) Two gear wheels mesh externally and are to give a velocity ratio of 3. The teeth are of involute form of module 6. The standard addendum is 1 module. If the pressure angle is  $18^\circ$  and pinion rotates at 90 r.p.m., find:

- i) The number of teeth on each wheel, so that the interference is just avoided
- ii) The length of the path of contact
- iii) The maximum velocity of sliding between the teeth.

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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 : 09-01-2023

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 the term "*rolling process*".
- b) Distinguish between open die forging and closed die forging.
- c) List any two extrusion defects and their remedies.
- d) Distinguish between coining and squeezing.
- e) List the advantages of powder metallurgy process.
- f) List any four ceramics materials.
- g) Distinguish between coolant and lubricant.
- h) What is the significance of abrasives on grinding wheel?
- i) Distinguish between shaper and planer.
- j) What is the purpose of indexing in milling operation?

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## SECTION-B

2. Classify rolling processes. Explain any two rolling processes with suitable sketches.
3. Describe various forging defects, their causes and remedies.
4. Write the advantages of high velocity forming of metals, and explain any one high velocity forming process with a neat sketch.
5. Draw a neat sketch of twist drill by showing various parts and explain its nomenclature.
6. With a neat sketch, explain any one of the driving mechanisms used in shaping machine.

## SECTION-C

7. Explain various drawing operations with neat sketches.
8. a) Describe the composition, limitations and applications of following cutting tool materials: (i) high carbon steels, and (ii) high speed steels  
b) What is the purpose of using coolant in a manufacturing operation? List various types of coolant. How do coolants influence the machining processes?
9. a) Sketch a centre type cylindrical grinding machine indicating various parts and briefly explain its working.  
b) Distinguish between capstan and turret lathes with sketches.

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (ME) (Sem. – 5)

**MATHEMATICS-III**

Subject Code: BTAM-500

M Code: 70601

Date of Examination: 13-12-2022

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

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

**SECTION-A**

1. Answer the following:

- a) Determine half-range sine series for the function  $f$  defined by  $f(t) = t^2 + t$ , over the interval  $(0, \pi)$ .
- b) Find Laplace transform of  $e^{-3t}(2\cos 5t + 3\sin 5t)$ .
- c) Find Laplace transform of  $\int_0^t \frac{\sin u}{u} du$ .
- d) Find inverse Laplace transform of  $\frac{s+2}{s^2-4s'+13}$
- e) Express sum of Legendre polynomials  $3P_3(x) + 2P_2(x) + 4P_1(x) + 5P_0(x)$  in terms of  $x$ .
- f) Show that for Legendre polynomial  $P_n(x)$ , show that  $P_n(1) = 1$ .
- g) Form a partial differential equation from the relation  $2z = \frac{x^2}{a^2} + \frac{y^2}{b^2}$
- h) Solve  $(z - y)p + (x - z)q = y - x$
- i) If  $f(z)$  is analytic in a domain  $D$  and  $|f(z)|$  is a non-zero constant in  $D$  then show that  $f(z)$  is constant in  $D$ .
- j) State Cauchy Integral Formula for derivatives.



## SECTION-B

2. Find the Fourier series expansion of the function:

$$f(x) = x - x^2, -\pi < x < \pi. \text{ Deduce that } \frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} \dots$$

3. State and prove Convolution Theorem for Laplace transform.
4. For Bessel's function  $J_n(x)$ , show that

$$J_{\frac{5}{2}}(x) = \sqrt{\frac{2}{\pi x}} \left[ \frac{1}{x^2} (3 - x^2) \sin x - \frac{3}{x} \cos x \right]$$

5. Solve by Charpit's method  $(p^2 + q^2)y = qz$ .
6. Evaluate  $\oint_C \frac{e^z}{z^2(z+1)^3} dz, C: |z| = 2$ .

## SECTION-C

7. a) Using Laplace transform, solve  $y'' - 6y' + 9y = t^2 e^{3t}, y(0) = 2, y'(0) = 6$ .
- b) Find inverse Laplace transform of  $\log\left(\frac{s+a}{s+b}\right)$ .
8. a) State and prove Rodrigue's formula.
- b) A tightly stretched flexible string has its ends fixed at  $x = 0$  and  $x = l$ . At time  $t = 0$ , the string is given a shape defined by  $f(x) = \mu x(l - x)$  where  $\mu$  is a constant and then released. Find the displacement of any point  $x$  of the string at any time  $t > 0$ .
9. a) Find all Taylor and Laurent series expansions of  $f(z) = \frac{1}{z^2 - 1}$  about the point  $z = 1$ .
- b) Compute the residues at all singular points of  $f(z) = \frac{z^2}{z^{n-1}}$ ,  $n$  is any positive integer.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engg.) (Sem.-5)

**HEAT TRANSFER**

Subject Code : BTME-501-18

M.Code : 78247

Date of Examination : 13-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Which aspect makes the thermal conductivity of insulating materials lower than that of metals?
- b) Define thermal resistance of a spherical shell.
- c) Why there is a negative sign in Fourier law of heat conduction?
- d) Write the boundary condition for a fin losing heat at the tip.
- e) What do you understand by local and average heat transfer coefficients?
- f) Define bulk mean temperature.
- g) Define total hemi spherical emissivity.
- h) Define velocity and thermal boundary layers.
- i) What is burnout point in a pool boiling curve?
- j) What is lumped capacity analysis?





## SECTION - B

2. Write the three dimensional heat conduction equation in cylindrical coordinates and simplify it to obtain 1 — D temperature distribution (radial direction) in a solid cylinder with heat generation and specified temperature of surface.
3. The 4 mm thick fins of mild steel are used to transfer heat from water to air. Decide the utility of fin on either side. The heat transfer coefficient of air is  $80 \text{ W/m}^2 \cdot \text{K}$ , while that for water is  $5600 \text{ W/m}^2 \cdot \text{K}$ . Take thermal conductivity of mild steel as  $45 \text{ W/m} \cdot \text{K}$ .
4. Experimental results for local heat transfer coefficient  $h_x$  for flow over a flat plate with an extremely rough surface were found as

$$h_x = ax^{-0.1}$$

where  $a$  is a constant and  $x$  is a distance from the leading edge of the plate. Develop an expression for ratio of average heat transfer coefficient  $h$  for a plate of length  $x$  to the local heat transfer coefficient  $h_x$  at  $x$ .

5. Discuss the conditions under which the dropwise condensation can take place. Why the rate of heat transfer in dropwise condensation is many times that of film condensation?
6. A thermocouple is used to measure the temperature of a hot gas flowing in a tube maintained at  $100^\circ\text{C}$ . The thermocouple indicates a temperature of  $500^\circ\text{C}$ . If the emissivity of thermocouple junction is  $0.5$  and the convective heat transfer coefficient is  $250 \text{ W/m}^2 \cdot \text{K}$ , determine the actual temperature of the gas.

## SECTION - C

7. A solid steel ball 5 cm in diameter and initially at  $450^\circ\text{C}$  is quenched in a controlled environment at  $90^\circ\text{C}$  with convection coefficient of  $115 \text{ W/m}^2 \cdot \text{K}$ . Determine the time taken by center to reach a temperature of  $150^\circ\text{C}$ . Take thermo-physical properties as  $C = 420 \text{ J/kg} \cdot \text{K}$ ,  $\rho = 8000 \text{ kg/m}^3$ ,  $k = 46 \text{ W/m} \cdot \text{K}$ .
8. 91 kg of water is to be heated from  $10^\circ\text{C}$  to  $77^\circ\text{C}$  with hot gases at  $166^\circ\text{C}$  flowing at  $364 \text{ kg/hr}$ . Taking specific heat of gases =  $1.05 \text{ kJ/kg} \cdot \text{K}$ , of water =  $4.187 \text{ kJ/kg} \cdot \text{K}$  and the overall heat transfer coefficient =  $114 \text{ W/m}^2 \cdot \text{K}$ , calculate the area of heat exchange surface required for i) parallel flow, ii) counter flow.
9. Write short notes on the following:
  - a) Critical thickness of insulation
  - b) NTU method.

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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: 15-12-2022

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.

**SECTION-A**

1. Answer briefly :

- a) Write the possible ways of failure of rivet joints.
- b) What is fatigue failure?
- c) What are the various stresses induced in the shaft?
- d) Write down the advantages of Threaded Joints.
- e) What is Sunk Key and write down their types?
- f) What is the difference between tearing and crushing?
- g) What is stress concentration?
- h) Write down the practical applications of knuckle joint.
- i) What is bolt of uniform strength?
- j) Write down the types of pipe joint commonly used in engineering practice.



## SECTION-B

2. A Plate 75 mm wide and 12.5 mm thick is joined with another plate by a single transverse weld and double parallel fillet welds as shown in Figure 1. The maximum tensile and shear stresses are 70 MPa and 56 MPa respectively. Find the length of each parallel fillet weld, if the joint is subjected to both static and fatigue loading.

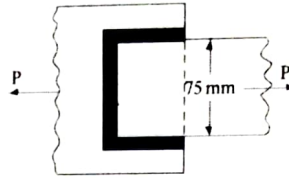


Figure 1

3. Design a knuckle joint to transmit 150 KN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression.
4. A foot lever is 1 m from the center of shaft to the point of application of 800 N load. Find:
- Diameter of the shaft, b. Dimensions of the key, and c. Dimensions of rectangular arm of the foot lever at 60 mm from the center of shaft assuming width of the arm as 3 times thickness. The allowable tensile stress may be taken as 73 MPa and allowable shear stress as 70 MPa.
5. Design a clamp coupling to transmit 30 KW at 100 r.p.m. The allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are six. The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and the shaft surface may be taken as 0.3.
6. A cast iron pipe of internal diameter 200 mm and thickness 50 mm carries water under a pressure of 5 N/mm<sup>2</sup>. Calculate the tangential and radial stresses at radius (r) = 100 mm; 110 mm; 120 mm; 130 mm; 140 mm; and 150 mm. Sketch the stress distribution curves.
7. Enumerate the various manufacturing methods of machine parts which a designer should know.

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Total No. of Pages : 02

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 :

Time : 3 Hrs.

Max. Marks : 60

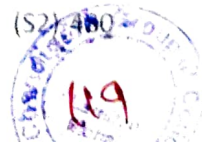
**INSTRUCTIONS TO CANDIDATES :**

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 clearly the bearing stress developed at the area of contact between two members.
- b) What information do you obtain from Soderberg diagram?
- c) What is difference between shaft and an axle?
- d) What are advantages of rolling contact bearings over sliding contact bearings?
- e) What are the factors upon which the coefficient of friction between the belt and the pulley depends?
- f) What are the various terms used in spur gear terminology?
- g) *'The extension springs are in considerably less use than the compression springs.'* Why?
- h) How does the function of a brake differ from that of a clutch?
- i) What are the assumptions made in the design of welded joint?
- j) What is self-locking property of threads and where it is necessary?





## SECTION - B

2. An electric motor driven power screw moves a nut in a horizontal plane against a force of 75 kN at a speed of 300 mm / min. The screw has a single square thread of 6 mm pitch on a major diameter of 40 mm. The coefficient of friction at screw threads is 0.1. Estimate power of the motor.
3. An engine running at 150 r.p.m. drives a line shaft by means of a belt. The engine pulley is 750 mm diameter and the pulley on the line shaft is 450 mm. A 900 mm diameter pulley on the line shaft drives a 150 mm diameter pulley keyed to a dynamo shaft. Find the speed of dynamo shaft, when 1. there is no slip, and 2. there is a slip of 2% at each drive.
4. Determine the diameter of a circular rod made of ductile material with a fatigue strength (complete stress reversal),  $\sigma_e = 265$  MPa and a tensile yield strength of 350 MPa. The member is subjected to a varying axial load from  $W_{\min} = -300 \times 10^3$  N to  $W_{\max} = 700 \times 10^3$  N and has a stress concentration factor = 1.8. Use factor of safety as 2.0.
5. Design a close coiled helical compression spring for a service load ranging from 2250 N to 2750 N. The axial deflection of the spring for the load range is 6mm. Assume a spring index of 5. The permissible shear stress intensity is 420 MPa and modulus of rigidity,  $G = 84$  kN/mm<sup>2</sup>. Neglect the effect of stress concentration.
6. A plate 100 mm wide and 10 mm thick is to be welded to another plate by means of double parallel fillets. The plates are subjected to a static load of 80 kN. Find the length of weld if the permissible shear stress in the weld does not exceed 55 MPa.

## SECTION-C

7. 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.
8. A plate clutch having a single driving plate with contact surfaces on each side is required to transmit 110 kW at 1250 f.p.m. The outer diameter of the contact surfaces is to be 300 mm. The coefficient of friction is 0.4. (a) Assuming a uniform pressure of 0.17 N/mm<sup>2</sup>; determine the inner diameter of the friction surfaces, (b) Assuming the same dimensions and the same total axial thrust, determine the maximum torque that can be transmitted and the maximum intensity of pressure when uniform wear conditions have been reached.
9. Discuss the design procedure of spur gears.

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**B.Tech.(ME) (Sem.-5)**  
**COMPUTER AIDED DESIGN AND MANUFACTURING**

**Subject Code : BTME-502**

**M.Code : 70603**

**Date of Examination : 17-12-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

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

**SECTION-A**

1. **Answer briefly :**

- a) Discuss the fundamentals CAD/CAM systems.
- b) Explain the IGES graphic standard in CAD.
- c) Give the advantages of solid model over wire frame model.
- d) Discuss the parametric and non-parametric representation of curves.
- e) Explain in brief some of the recent advances in FEM.
- f) Discuss how CNC machine have more benefits than NC machine.
- g) Explain the methods to implement GT in an organization.
- h) What is the method of data selection systems in CAPP?
- i) Explain the basic need and elements of CIM.
- j) Discuss the importance of part classification and coding systems in GT.



## SECTION-B

2. Discuss in brief various input and output devices used in CAD systems.
3. Discuss using suitable 2-D example what is concatenation of transformation matrices.
4. What do you mean by CSG model and also give benefits of parametric Modeling Technique?
5. Discuss in brief the basic principle and general procedure of FEM.
6. Discuss the concept of DNC system using block diagram and discuss its types.

## SECTION-C

7. Discuss the concept of adaptive control in machining system and explain various sources of variability in it.
8. Discuss how part families are formed in GT and explain Group technology machine cells.
9. Discuss various layout considerations and benefits of FMS.

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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ME) (Sem.-5)**  
**MANUFACTURING PROCESSES**

Subject Code : BTME-503-18

M.Code : 78249

Date of Examination : 17-12-22

Time : 3 Hrs.

Max. Marks : 60

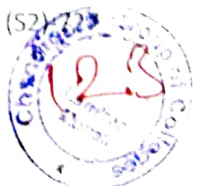
**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) Name two casting defects and give their reasons and remedies.
- b) Explain the classification of broaching machines.
- c) Define Machinability.
- d) Enlist the parameters on which solidification time depends in metal casting.
- e) What are the specific merits of cold working over hot working?
- f) Discuss the effect of amplitude and frequency of vibration on surface finish obtainable in ultrasonic machining.
- g) What is meant by rapid tooling?
- h) What effect does the carbon content of steel have on weldability?
- i) Explain the term: core prints.
- j) List reasons for the development of unconventional machining processes.





## SECTION - B

2. Explain the elements of gating system giving a neat sketch and explain the significance of various elements.
3. Describe briefly the factors that influence the quality of cut in Plasma Arc Machining (PAM). Discuss the process capabilities of Electron Beam Machining (EBM).
4. Why is investment casting process capable of producing fine surface detail on castings? Explain with suitable sketch.
5. Explain the nomenclature of grinding wheel giving brief description of various elements.
6. Explain the methods of obtaining metal powders used in powder metallurgy process with the help of neat sketches.

## SECTION - C

7. What is the principle of Electrochemical Machining (ECM)? Describe the chemistry involved in the ECM process. Enlist the elements of ECM process with a neat sketch. What are the materials commonly used for making a tool for use in this method? What are the functions of an electrolyte?
8.
  - a) Describe the press and die setup. Also, explain the forging operations using progressive and combination dies giving neat sketches.
  - b) Describe the characteristic features, advantages, disadvantages of various types of cutting tool materials used in machining operations.
9.
  - a) What do you understand by Heat Affected Zone (HAZ) in welding? How does HAZ affect weld zone performance?
  - b) What is meant by solid-state welding? Explain the principle underlying the seam welding process. What are the faying surface in solid-state welding processes? Enlist the names of products wherein this process is used?

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Total No. of Questions : 09

**B.Tech.(ME) (Sem.-5)**  
**MECHANICAL MEASUREMENT AND METROLOGY**

Subject Code : BTME-503

M.Code : 70604

Date of Examination : 20-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Answer briefly :**

- a) What do you know about measurement and standard?
- b) What is fidelity of a measuring instrument?
- c) Distinguish between threshold and resolution.
- d) State different sources of errors in measurements.
- e) What information is needed to describe a transducer for a particular measurement.
- f) Explain the principle employed in manometers used for the measurement of pressure.
- 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) What are sine bars and how are they used for angular measurements?



## SECTION-B

2. What are primary, secondary and tertiary measurements? Explain with examples.
3. Define sensitivity. Would you prefer sensitivity to be low or high for an instrument. Explain.
4. The resistance of a certain wire has been determined by measuring the current flow and power fed into the circuit. Calculate the maximum possible error in resistance when the absolute (limiting) errors in the power and current are 1.8 % and 1.2% respectively. The expression relating power to current and resistance is  $P = I^2R$ .
5. The output of a transducer with a total resistance of  $120\Omega$  has been measured with a potentiometer ballast circuit. The supply voltage is 100 volts and maximum sensitivity is attained at the mid plane of the transducer. Make calculations for the sensitivity at 25 and 75 % position, and comment on your findings.
6. Sketch a micrometer and explain its working. Explain the terms least count, zero error, and backlash error in connection with micrometer.

## SECTION-C

7. A liquid-filled thermometer has a bulb volume 8 times that of the capillary plus Bourdon tube. Estimate the error due to increase of ambient temperature of  $16^\circ$  calibration. (Assume that the thermometer is not fitted with any compensating device for the ambient temperature variations).
8. Explain the working of a pneumatic load cell for the measurement of force.
9. How signal conditioning is achieved in the liquid in-glass thermometers, and the filled-in system thermometers? A bourdon tube temperature indicator has a range of  $0^\circ\text{C}$  to  $250^\circ\text{C}$  and produces a corresponding rotation of 0 to  $270^\circ$ . Work out the sensitivity of the bourdon tube in radians per degree Celsius if the mechanical levers and gears have an amplification of 30.

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## SECTION-B

2. Describe various principles of organization in management.
3. What is the law of demand?
4. What are the essentials of a sound controls system?
5. Explain straight line method of depreciation.
6. Describe the importance of effective planning in an organization.

## SECTION-C

7. Critically explain quantitative theory of management.
8. Critically explain the law of Returns to Scale.
9. Discuss Maslow's Hierarchy theory of motivation.

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Dec 2022

Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (2012 Onwards) (Sem.-5)

**AUTOMOBILE ENGINEERING**

Subject Code : BTME-505

M.Code : 70606

Date of Examination : 24-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Answer briefly :

- a) What are various types of automobile vehicles?
- b) What is the use of camber in the vehicles?
- c) What is the role of the clutch in the transmission system of an automobile?
- d) What is the function of a carburetor?
- e) What are the advantages of tubeless tyres?
- f) What are the disadvantages of frameless chassis?
- g) What is the stopping distance?
- h) What is the function of the propeller shaft?
- i) What is the function of the "Pitman arm" in the Steering system?
- j) What is overdrive?



## SECTION-B

2. Explain construction and working of differential.
3. Discuss the working of the braking system with a neat sketch.
4. What is wheel balancing and why it is necessary?
5. Explain different methods of battery ratings.
6. Explain crankcase ventilation and dilution.

## SECTION-C

7. Explain hydraulic power steering with neat sketch and also write down its advantages.
8. Explain different types of chassis and frames.
9. Explain different methods of testing the battery.

**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) (CE) (Sem.-6)

**COMPUTER AIDED DESIGN**

Subject Code : BTME-613-18

M.Code : 79658

Date of Examination : 23-12-22

Time : 3 Hrs.

Max. Marks : 60

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B.Tech  
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**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) Name the different curve primitives.
- b) Define the concept of boundary representation in brief.
- c) What are the benefits of CAD?
- d) Define parametric representation of a line.
- e) What is graphic standard?
- f) Which matrix is used for performing 3D transformations and why?
- g) What is software configuration of a graphics system?
- h) How does a CRT work?
- i) Give a brief note on intrinsic equations.
- j) What do you understand the 'snap' feature in CAD?





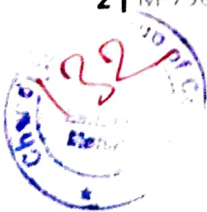
## SECTION-B

2. Differentiate between Boundary representation method and Constructive solid geometry method in detail.
3. Define the Cubic Spline and Bezier curves. Which of them is more popular in CAD and why?
4. Explain in detail the various analytical properties associated with assembly design.
5. CAD/CAM system use parametric representation for surfaces as they do for curves. Explain how a surface is generated?
6. Explain in detail different types of sweep techniques available for 3D geometric construction.

## SECTION-C

7. Explain the concept of “*Surface of Revolution*” in details.
8. A rectangle has corner co-ordinates (10, 20) (40, 20), (40, 40), (10, 40). This rectangle is rotated by  $30^\circ$  anticlockwise about (a) origin and (b) about the point (40, 20). Compute the new co-ordinates in both cases.
9. Write short note on following :
  - a) Concept of layers
  - b) Solid modeling.

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



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(ME) (Sem.-6)**  
**NON-TRADITIONAL MACHINING**

Subject Code : DE/ME-2.0

M.Code : 71252

Date of Examination : 21-12-2022

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) Enumerate the advantages and applications of Non Traditional Machining Processes.
- b) Define flexible manufacturing.
- c) Enumerate the disadvantage of unconventional machining processes.
- d) What are the abrasive materials used in ultrasonic machining process? Also explain the abrasive size used in USM process.
- e) Why vacuum is required electron beam machining process?
- f) What are the three main types of maskants used in chemical machining?
- g) Discuss the effect of concentration of electrolyte on the process efficiency of electrochemical machining process.
- h) Define the term 'wear ratio' as used in EDM.
- i) Explain the working principle of CO<sub>2</sub> laser machining process.
- j) Why is effective flushing of dielectric so important in EDM process?

1 | M - 71252

(S2) - 10



## SECTION-B

2. Classify non-conventional machining process w.r.t. a) type of energy used; b) Mechanism of material removal and c) Source of energy used. State the importance of various processes.
3. Explain the different types of transducers used in ultrasonic machining process.
4. Sketch a schematic diagram of electrochemical machining process set-up. Explain the mechanism of material removal and process parameters involved in the ECM process.
5. Explain the material removal mechanism and working of solid state laser machining process giving a neat sketch.
6. Explain the principle of operation, elements and applications of electron beam machining process with the help of a neat sketch.

## SECTION-C

7. a) With the help of a neat sketch, explain the elements of Water Jet Machining setup, giving the mechanism of material removal in WJM.  
b) Describe the principle of operation of electro discharge machining process with the help of a neat sketch. What factors govern the selection of tool material for EDM process?
8. a) What is Abrasive Flow Machining process? What are the main elements of AFM setup? Explain the mechanism of material removal in AFM.  
b) Explain the elements of Electro-chemical deburring process and discuss the mechanism of material removal giving a neat sketch.
9. a) Explain the types of plasma arc torches used in Plasma Arc Machining.  
b) Describe with sketch the working of a hybrid non-conventional machining process in which two mechanical non-conventional machining processes is combined.

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

2 | M - 71252



(S2) - 1003

Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Mechanical Engineering) (Sem.-6)**  
**INTRODUCTION TO INDUSTRIAL MANAGEMENT**

**Subject Code : BTME604-18**

**M.Code : 79653**

**Date of Examination : 19-12-22**

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) What is Total Quality Control? Discuss its salient features.
- b) Enlist the different tools of management science. Discuss any one.
- c) Write down the factors that affect product design.
- d) What is the industrial cost? Briefly explain the different elements of cost.
- e) Discuss the significance of materials management.
- f) Differentiate between 'Single Tender' and 'Open Tender'.
- g) Enumerate the various elements of preventive maintenance.
- h) What is waste? Name different classes of waste.
- i) Distinguish between product and process benchmarking.
- j) Briefly explain the role of marketing in today's competitive scenario.





## SECTION-B

2. In the present age of modern management and improved technology, what do you think about the role of an Industrial Engineer? Justify your answer.
3. '*TQM ensures high quality at a low price*'. How? Discuss the relevance of TQM in today's competitive world.
4. In an unstable market for raw materials, what type of buying policy should be followed? Discuss in detail and justify your answer.
5. Discuss the significance of ergonomic and aesthetic considerations in engineering design with suitable examples.
6. What is the relevance of customer complaints? How would you proceed with handling customer complaints? Discuss in detail.

## SECTION-C

7.
  - a) How does the classification of materials affect the inventory control for the same? What difficulties would you visualize in installing the ABC classification system in an organization?
  - b) Does JIT combine the benefits of job-order production and that of line production? Explain.
8.
  - a) Discuss the importance of maintenance in the engineering field. Should maintenance be regarded just as a repair function? Discuss in detail.
  - b) Efficiency has been defined as "*doing things better*" and effectiveness as "*doing better things*". Describe how benchmarking can be used to improve both efficiency and effectiveness.
9. Write a short note on any two of the following :
  - a) Product Life Cycle
  - b) Factors of Excellence in Manufacturing
  - c) Product Development.

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Roll No.

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (ME) (Sem. – 6)

**FLUID MACHINERY**

M Code: 71187

Subject Code: BTME-603

Date of Examination: 16-12-2022

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) Classify the hydraulic turbine according to flow of water in runner.
- b) Define mechanical efficiency of hydraulic turbine.
- c) State advantages of a Francis turbine over a pelton wheel.
- d) What is a draft tube and state its function?
- e) Define specific speed of turbine.
- f) What is NPSH?
- g) State two functions of air-vessels.
- h) State harmful effects of cavitation.
- i) State losses in centrifugal pump.
- j) What is negative slip in reciprocating pump?

M-71187



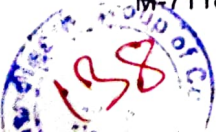
## SECTION-B

2. Derive an equation for force exerted on a curved plate by jet at the centre, when plate is moving in the direction of motion.
3. Differentiate between Francis turbine and Kaplan turbine.
4. In an inward flow reaction turbine the head on the turbine is 32m. The external and internal diameters are 1.44m and 0.72m respectively. The velocity of flow through the runner is constant and equal to 3m/s. The guide blade angle is 10 degree and the runner vanes are rigid at inlet. If the discharge at outlet is radial, determine:
  - a) Speed of turbine
  - b) Hydraulic efficiency
  - c) Vane angle at outlet
5. A hydro-turbine is required to give 25MW at 50m head and 90rpm runner speed. The laboratory facilities available permit testing of 20KW model at 5m head. What should be the model runner speed and model to prototype ratio.
6. Derive an expression for minimum starting speed for starting a centrifugal pump.

## SECTION-C

7. A centrifugal pump impeller runs at 80rpm and has outlet vane angle 60 degree. The velocity of flow is 2.5m/s throughout and diameter of the impeller at exit is twice that at inlet. If the manometric head is 20m and manometric efficiency is 75%, determine inlet vane angle and diameter of impeller at exit.
8. A single acting reciprocating pump has a stroke length of 150mm, suction pipe is 7m long and the ratio of suction pipe diameter to the piston diameter is 3/4. The water level in the sump is 2.5m below the axis of the pump cylinder and the pipe connecting the sump and pump cylinder is 75mm in diameter. If the crank is running at 75rpm, determine the pressure head on the piston at the beginning, middle and end of the suction stroke. Take  $f = 0.01$ .
9.
  - a) Explain the working of hydraulic intensifier
  - b) Discuss working and construction of fluid coupling.

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



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Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTME 603-18

M.Code : 79652

Date of Examination : 16-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) Explain in details the 'continued' and 'timed' injection systems.
- b) What are the functions of piston rings?
- c) Why racing cars use petrol engines?
- d) Name the parameters on which torque depends in case of single plate clutch.
- e) What are the functions of a gear box?
- f) What is the function of overdrive?
- g) Make a list of important quantities to be measured during the testing of an engine.
- h) How is CNG better than diesel from pollution viewpoint?
- i) State the function of ignition coil, contact breaker and distributor in a battery ignition system.
- j) Is differential compulsory part of transmission system? Explain in brief.







Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (M.E.) (Sem.-6)**  
**MECHANICAL MEASUREMENT AND METROLOGY**

Subject Code : BTME-602-18

M.Code : 79651

Date of Examination : 14-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) Define hysteresis and list the reasons for the presence of hysteresis in measuring systems.
- b) Explain the following terms: (i) Resolution, (ii) Zero stability.
- c) What are the main standards of measurement systems followed across various countries?
- d) Explain the importance of gauge factor.
- e) What is temperature compensation in strain gauges?
- f) Discuss the need for inspection.
- g) List the major features of the stylus system of measurement.
- h) What is an LVDT?
- i) What is comparator? Name any two of them.
- j) List the various sources of errors in manufacturing of gears.





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: 14-12-2022

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 significance of negative temperature gradient?
- b) Why electrical analogy is applied to heat transfer phenomenon?
- c) Define critical thickness of insulation.
- d) How performance of fins is evaluated?
- e) Classify heat exchangers.
- f) Define Stefan Boltzman law.
- g) Define Nusselt Number. What is its significance?
- h) In which type of condensation heat transfer coefficient remains more and why?
- i) What is Newtonian cooling of solids?
- j) What is the purpose of dimensional analysis?





## SECTION-B

2. What are the three dimensions in case of spherical coordinate system? How they are obtained?
3. Derive the relation of temperature distribution and heat transfer for rectangular fin of long length.
4. Derive momentum equation for boundary layer over a flat plate.
5. Derive equation of film wise condensation on a vertical plate.
6. Derive relation of emissive power for non-black long parallel plates.

## SECTION-C

7. An electric wire with 2mm diameter is covered with 2.5mm thick layer of insulation with  $k = 0.5 \text{ W/mK}$ . Heat is dissipated to the atmosphere at  $25^\circ\text{C}$  with  $h = 10 \text{ W/m}^2\text{K}$ . The wire is maintained at temperature of  $120^\circ\text{C}$ . Estimate the heat dissipation from the wire with and without insulation. Calculate the thickness of insulation when the heat dissipation rate is maximum, also maximum value of heat dissipation rate.
8. Derive equation of effectiveness of parallel flow heat exchanger using NTU method.
9. Write short notes on:
  - a) Dimensional analysis
  - b) Variable thermal conductivity

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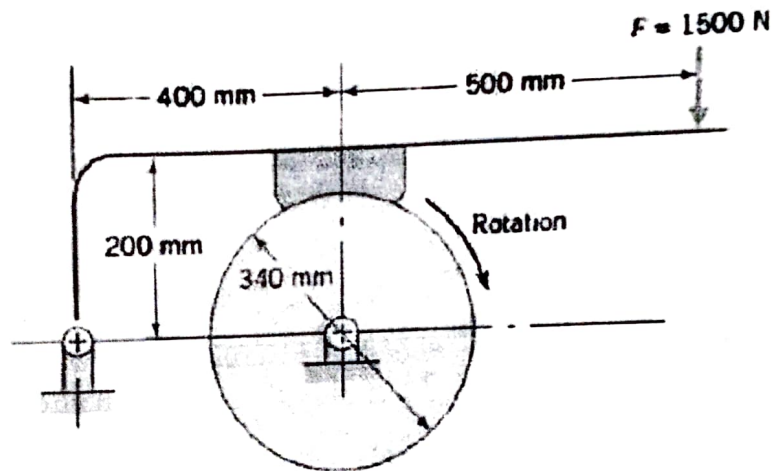
M-71185



4. A single dry plate clutch is to be designed to transmit 8.5kW at 920 rpm. Find :
- Diameter of the shaft
  - Mean radius and face width of the friction lining assuming the ratio of the mean radius to the face width as 4
  - Outer and inner radii of the clutch plate
  - Dimensions of the spring, assuming that the number of springs are 6 and spring index = 6. The allowable shear stress for the spring wire may be taken as 420MPa.
5. Figure below shows a brake with only one shoe, being applied by a 1.5kN force. Four seconds after force F is applied, the drum comes to a stop. During this time the drum makes 120 revolutions.

Use the short-shoe approximation and an estimated coefficient of friction of 0.32.

- What is the magnitude of the torque developed by the brake?
- How much work does the brake do in bringing the drum to a stop?
- What is the average braking power during the 4-second interval?



- Design  $20^\circ$  involute worm and gear to transmit 10kW with worm rotating at 1400 rpm and to obtain a speed reduction of 12: 1. The distance between the shafts is 225mm
- Design a suitable journal bearing for a centrifugal pump from the following available data: Load on the bearing = 14 kN; Diameter of the journal = 82mm; Speed = 1460 rpm.; Bearing characteristic number at the working temperature ( $75^\circ\text{C}$ ) = 30; Permissible bearing pressure intensity =  $0.7\text{N/mm}^2$  to  $1.4\text{N/mm}^2$ ; Average atmospheric temperature =  $30^\circ\text{C}$ . Calculate the cooling requirements, if any.

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Dec 2022

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Total No. of Pages : 03

Total No. of Questions : 09

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

Subject Code : BTME-601-18

M.Code : 79650

Date of Examination : 12-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) 1.5 kW per ton of refrigeration is required to maintain the temperature of  $-40^{\circ}\text{C}$  in the refrigerator if the refrigeration cycle works on Carnot cycle. Find the COP and temperature of surroundings.
- b) Why a throttle valve is used in vapor compression refrigerator rather than an expansion cylinder to reduce pressure between the condenser and evaporator.
- c) On a particular day the weather forecast states that the dry bulb temperature is  $37^{\circ}\text{C}$  while the relative humidity is 50% and the barometric pressure is 1.01325 bar. Find the humidity ratio.
- d) What is the necessity of antifreeze solution?
- e) What do you understand by performance characteristic of a refrigerant compressor?
- f) Why it is necessary to keep refrigerants free from moisture?
- g) Define the term bypass factor used for cooling or heating coil with the help of a sketch.
- h) Explain the difference between comfort air conditioning and industrial air conditioning.





- i) Define the term contact factor as used for cooling coils.
- j) What are the limitations of reversed Carnot cycle with gas as refrigerant?

### SECTION - B

2. The capacity of a refrigerator is 210 TR when working between  $-6^{\circ}\text{C}$  and  $25^{\circ}\text{C}$ . Determine the mass of ice produced per day from water at  $25^{\circ}\text{C}$ . Also find the power required to drive the unit. Assume that the cycle operates on reversed Carnot cycle and latent heat of ice is 335 kJ/kg.
3. An R12 refrigeration system works between pressure limits 1.8 bar and 9.6 bar respectively. The heat transfer from the condenser is found to be 85 kJ/mm. The refrigerant vapor leaves the evaporator in the saturated state. The condensate leaves the condenser in just saturated state. The refrigerant flow through the system is found to be 0.6 kg/min. Find a) COP, b) capacity of the plant and c) the energy input to the compressor.
4. Moist air at 1 atm pressure has a dry bulb temperature of  $32^{\circ}\text{C}$  and a wet bulb temperature of  $26^{\circ}\text{C}$ . Calculate a) the partial pressure of water vapour, b) humidity ratio, c) relative humidity, d) dew point temperature, e) density of dry air in the mixture, f) density of water vapour in the mixture and g) enthalpy of moist air.
5. Explain the working of a refrigeration cycle with two stage compression. What are its advantages over single stage compression?
6. One kg of air at  $40^{\circ}\text{C}$  DBT and 50% RH is mixed with 2 kg of air at  $20^{\circ}\text{C}$  and  $12^{\circ}\text{C}$  dew point temperature. Calculate temperature and specific humidity of the mixture.

### SECTION - C

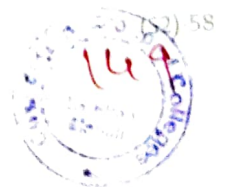
7. a) Where centrifugal compressors are preferred over reciprocating compressors in refrigeration systems? Describe the advantages and disadvantages of centrifugal over reciprocating compressors.  
b) Explain the working of a automatic with the help of a neat sketch. Also draw p-h diagrams for under load, designed load, and overload conditions.
8. An air conditioned room that stands on a well ventilated basement measures 3 m wide, 3 m high and 6 m deep. One of the two 3 m walls faces west and contains a double glazed glass window of size 1.5 m by 1.5 m, mounted flush with the wall with no external shading. There are no heat gains through the walls other than the one facing west. Calculate the sensible, latent and total heat gains on the room, room sensible heat factor from the following information. What is the required cooling capacity?

Inside conditions:	25°C DBT 50% RH
Outside conditions:	43°C DBT, 24°C WBT
U-value for wall:	1.78 W/m <sup>2</sup> – K
U-value for roof:	1.316 W/m <sup>2</sup> – K
U-value for floor:	1.2 W/m <sup>2</sup> – K
Effective Temperature Difference (ETD) for wall:	25°C
Effective Temperature Difference (ETD) for roof:	30°C
U-value for glass:	3.12 W/m <sup>2</sup> – K
Solar Heat Gain (SHG) of glass;	300 W/m <sup>2</sup>
Internal Shading Coefficient (SC) of glass:	0.86
Occupancy:	4 (90W sensible heat/person), (40W latent heat/person)
Lighting load:	33W/m <sup>2</sup> of floor area
Appliance load:	600W (Sensible) + 300 W (latent)
Infiltration:	0.5 Air Changes per Hour
Barometric pressure:	101 kPa

9. Explain the following :

- a) Comparison between vapor absorption and compression systems
- b) Eco-friendly refrigerants.

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



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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CE/CSE/ECE/ME) (Sem.-6/7)  
**NON-CONVENTIONAL ENERGY RESOURCES**

Subject Code : BTME-615-18

M.Code : 79660

Date of Examination : 23-12-2022

Time : 3 Hrs.

Max. Marks : 60

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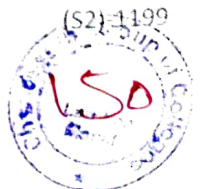
**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) What are the advantages and disadvantages of concentrating collectors over a flat - plate collectors?
- b) Define Solar Constant and what are the factors on which it depends?
- c) How are gasifiers classified?
- d) What do you understand by bio diesel?
- e) What are the advantages of vertical axis machines over horizontal axis machines?
- f) What are difficulties associated with hydrogen as a source of energy?
- g) What are different components of tidal power plants?
- h) What do you mean by anaerobic digestion?
- i) What are secondary energy sources?
- j) What is a solar pond?



## SECTION-B

2. What are the various instruments used for solar radiation measurement? Explain pyranometer with a neat sketch.
3. Derive an expression for power developed due to wind.
4. "Energy plantation can be considered as the long term alternatives to fossil and nuclear energy resources." Comment on the statement.
5. Explain the basic principle of a fuel cell with reference to hydrogen-oxygen fuel cell.
6. Describe the construction and working of any one type of wave energy conversion machine.

## SECTION-C

7. Enumerate the different types of concentrating type collectors. Explain the collector used in power plant for generation of Electric energy.
8. Explain with neat sketches the various methods of Tidal power generation? What are the limitations of each?
9. Write Short notes on the following :
  - a) Industrial biogas plants
  - b) Engine performance with alcohol fuels

**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 / EE / E & EE / IT / ME) (Sem.-7)

**ELECTRONIC DEVICES**

Subject Code : BTEC-301-18

M.Code : 90606

Date of Examination : 16-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Explain how Zener diode can be used as a voltage regulator.
- b) What is the principle of working of varactor diode?
- c) Define ripple factor and PIV.
- d) Which of the BJT configurations are suitable for impedance matching applications? Why?
- e) Compare linear regulator with switching regulator.
- f) Differentiate between NPN and PNP transistors.
- g) Compare positive feedback with negative feedback.
- h) Compare LED with ordinary diode.
- i) What do you mean by Sputtering?
- j) Define ripple factor and PIV.



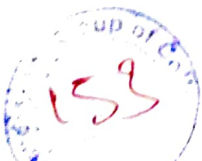
## SECTION-B

2. 'Zener diode can be used as a voltage regulator'. Justify it.
3. Explain the DC and AC load Line analysis.
4. Derive the expression for Diffusion capacitance of a diode.
5. Draw the circuit diagram of a PNP junction transistor in CE configuration and describe its characteristics.
6. Draw the circuit diagram of a half wave rectifier circuit and explain its working.

## SECTION-C

7. Explain the process of Photolithography with diagrams.
8. Explain the operation of Depletion mode MOSFET in detail.
9. Explain Voltage Divider Bias.

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Dec 2, 2022

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

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

Subject Code : BTME-701-18

M.Code : 90474

Date of Examination : 12-12-2022

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

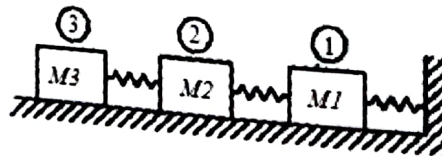
- a) If the motion of a particle is represented by  $x = 5\sin(2\pi t)$  determine its acceleration at time,  $t = 0.1s$ .
- b) The analog to digital converter on a microcontroller can take data samples at a frequency of 220 kHz. Calculate the number of samples ( $2k$ ) that will be recorded for each cycle of the 5<sup>th</sup> harmonic of a 100 Hz periodic signal.
- c) Given  $x_1 = 5\sin(2t)$  and  $x_2 = 4\sin(2t + \pi/4)$ ; Determine analytically the phase-angle  $\beta$  of the resultant,  $x_R$  with the first SHM  $x_1$
- d) The barrel of an artillery gun weighs 50kg. Upon firing, it recoils by 5cm against a recoil spring having stiffness of 10kN/m. Determine the critical damping coefficient for the system.
- e) The undamped natural frequency of a 1DoF spring-mass system is 100 Hz. What should be the damping factor, so that the frequency of damped free vibrations of this system drops to 80 Hz.
- f) A 1DoF system comprises of a 10kg mass, attached to a support through a parallel combination of a spring of stiffness 1000 N/m along with viscous dashpot whose damping coefficient equals 100 N/m/s. Determine the damping ratio.



- g) A displacement measuring instrument having natural frequency of 10 Hz indicates a relative amplitude of 0.5mm, when placed on a machine vibrating at 200 Hz. Neglecting damping in the instrument, determine the true amplitude of vibrations.
- h) For a system exhibiting a damping ratio of 0.2, determine the logarithmic decrement under free vibrations.
- i) What do you understand by Maxwell's Reciprocal Theorem?
- j) The rotor of a machine weighs 250g and is mounted midway on a thin vertical shaft having stiffness of 8000 N/m. Determine the critical speed for the system.

### SECTION - B

2. A mass,  $m = 2$  kg is suspended from a spring of stiffness,  $k = 200$  N/m, in parallel with a viscous dashpot, having damping coefficient,  $c = 4$  N/m/s. Determine the time period of damped free oscillations for this system. Also determine the residual amplitude ( $X_3$ ) of free damped oscillations after three cycles, if the mass is released after giving an initial displacement,  $X_0 = 100$ mm.
3. The suspension of a vehicle weighing 2000 kg undergoes a static deflection of 98mm under its own weight. If the viscous dashpots provide a damping factor of 1.5, determine the steady state amplitude of damped vibrations of the vehicle, while the engine produces an unbalanced force given by (in Newtons)  $F=500\sin(100t)$ . Take  $g = 9.8$  m/s<sup>2</sup>.
4. Determine the absolute amplitude of steady-state oscillations of the vehicle in Q3 above, if it rolls down a slope (with engine being off) at a velocity of 20m/s, while the road profile follows a sinusoidal contour having amplitude of 0.1m and wavelength of 10m.
5. Determine the flexible influence coefficients ( $a_{ij}$ ) for the system shown in figure and put them in matrix form.



6. State and prove Maxwell's reciprocal theorem.





## SECTION - C

7. The rotor of the electric motor of a mixer-grinder weighs 500g and is mounted midway on a thin vertical steel shaft ( $E=200$  GPa), whose diameter is 8mm and length is 120mm between the bearings. The radial clearance between the rotor and the stator is 0.5mm, while the rotor's cg is offset by 3mm from the shaft axis. Neglecting damping, determine the maximum safe operating speed of the motor, so that the rotor runs clear of the stator.
8. Determine the harmonics of the square-wave function given by:  
 $f(t) = 2$  for  $0 < t < 0.5$  and  $f(t) = -2$  for  $0.5 < t < 1.0$ .
9. The barrel of an artillery gun weighs 300kg. When it fires a shell of mass 3 kg with an initial velocity of 800 m/s, the barrel recoils by 0.3m against a recoil spring. A dashpot engages at the end of the recoil stroke, which provides a damping factor of 1.2. Neglecting spring preload, determine the time taken from the instance of firing the shell, in which the barrel will return back to within 2mm of its equilibrium position.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (ME) (Sem.-7,8)**  
**AUTOMATION IN MANUFACTURING**

Subject Code : BTME 702-18

M.Code : 90475

Date of Examination : 14-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Write briefly :**

- a) Write the importance of automation in manufacturing industry.
- b) What is the use of Mechatronics?
- c) What is the application of catalogues?
- d) What do you understand by data acquisition?
- e) Write the application of linear motion bearings.
- f) Write the various types of compressors.
- g) Write the application of hydraulic power pack.
- h) Differentiate between NC and CNC.
- i) State the benefits of FMS.
- j) What is part programming?



## SECTION-B

2. With neat block diagram, explain the basic elements of automated system.
3. Explain the functioning of various types of Transfer Mechanisms with suitable diagram.
4. Discuss the design procedure of hydraulic circuits.
5. Explain the CNC-adaptive control system.
6. Explain the single station machine cell.

## SECTION-C

7. Explain the various sensors required in an automated system for manufacturing.
8. State the operating principle and discuss criteria for the selection of electrical drives.
9. Describe briefly, forms of '*computer process control*'.

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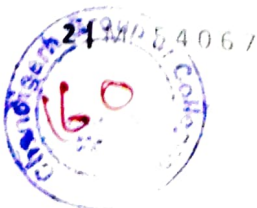
## SECTION- B

2. Explain the model for Grievance Resolution Procedure.
3. Explain the concept of Wage administration.
4. What is the difference between absenteeism and labour turnover?
5. Explain the family pension scheme.
6. Explain the minimum wage act-1961.

## SECTION-C

7. Explain the workmen's gratuity Act 1972 along with benefits and impact.
8. Explain the theory of motivation and its impact on quality of work life.
9. Explain the scope and importance of human resource management in industry.

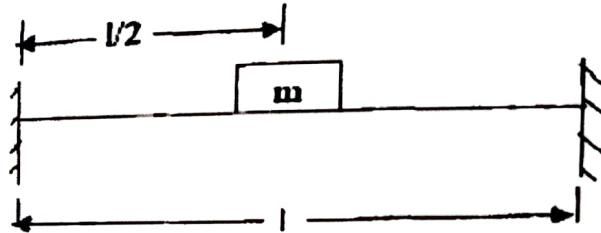
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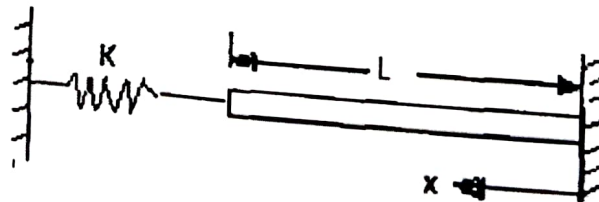


## SECTION-B

2. A harmonic motion is given by  $x(t) = 10 \sin \left( 30t - \frac{\pi}{3} \right)$  mm where  $t$  is in seconds and phase angle in radians. Find (i) frequency and period of motion (ii) the maximum displacement, velocity and acceleration.
3. Find the natural frequency of the system shown in fig.



4. A reciprocating engine has a mass of 40 kg and runs at a constant speed of 3000rpm. After it was installed, it vibrated with large amplitude at operating speed. What dynamic vibration absorber should be coupled to the system if the nearest resonant frequency of the combined system has to be at least 25% from the operating speed.
5. Explain Dunkerley's method with suitable example used in muti-degree of freedom system.
6. 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.



## SECTION-C

7. A vibratory system performs the motion as expressed by the following equation:

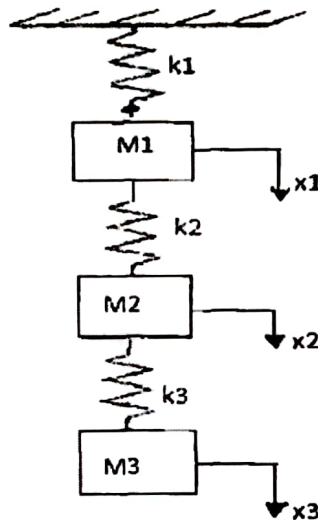
$$\ddot{x} + 800x + 90\theta = 0,$$

$$\ddot{\theta} + 800\theta + 90x = 0$$



If the system is turned through 1.5 radians and released, find the frequencies and mode shapes.

8. A spring-mass system with mass  $m$  kg and stiffness ' $k$ ' N/m has a natural frequency of ' $f$ ' Hz. Determine the value of the stiffness ' $k$ ' of another spring which when arranged in conjunction with spring of stiffness  $k$  in series will lower the natural frequency by 20% and in parallel will raise the natural frequency by 20%.
9. Use Stodola's method to determine the natural frequency of spring mass system as shown in fig.



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

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## SECTION-B

2. Explain various design considerations. Write a detailed note on "Ergonomics and Aesthetics in Product Design".
3. Explain in detail structure of Product Design. Write a detailed note on morphology of design.
4. Explain in detail break even analysis.
5. Explain in detail Quality Function Deployment.
6. Describe productivity and fabrication in pressed component design.

## SECTION-C

7. Describe concurrent engineering in detail. Write benefits of concurrent engineering.
8. What are essential features of Product Design? Differentiate between design by evolution and design by innovation.
9. Explain Production Consumption cycle. What do you mean by Flow and Value addition in the same.

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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 : 19-01-2023

Time : 3 Hrs.

Max. Marks : 60

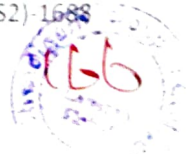
**INSTRUCTIONS TO CANDIDATES :**

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 Management?
- b) What are the 5 principles of management?
- c) Is management an Art or Science? Explain.
- d) Enumerate various types of plant layouts used in industries.
- e) Differentiate between Marketing and Selling.
- f) Enumerate the charts and diagrams for recording the data.
- g) What is work sampling method?
- h) Define Productivity.
- i) Enumerate various training programmes for employees.
- j) Discuss the criteria for recruitment of employees at workplace.



## SECTION-B

2. Explain the five primary functions of Management by giving suitable examples.
3. What is the product life cycle? What are the six steps to the life cycle of a product?
4. Define method study. Explain the step-by-step methodology for method study.
5. Define value engineering. What are various types of values? Explain.
6. Discuss the principles of a good personnel policy.

## SECTION-C

7. a) 'Management is a Class and Status System'. Explain.  
b) Write a short note on "Six Sigma and Lean Manufacturing".
8. a) What is supply chain management and why is it important? Explain various elements of supply chain management.  
b) What is operator performance rating? How operator performance rating can be calculated?
9. a) Explain the methods for improving productivity.  
b) How employees can be motivated to improve safety at workplace?

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June 2023

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**PHILOSOPHY**

Subject Code : HSMC-102-18

M.Code : 77082

Date of Examination : 24-01-2023

P.T. Question  
B.Tech CSE  
Sem-3

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. Avidya
- b. Upanishads
- c. Non-self
- d. Siksha Valli
- e. Vedas
- f. Rtam
- g. Ethics codes
8. Creativity
- i. Sushruta
- j. Plato

## SECTION-B

2. Write a note on Francis Bacon's idea of knowledge.
3. Distinguish between orthodox and heterodox school.
4. Write a note on word as root of knowledge.
5. Write a note on Tantrayuktis.
6. Write a note on knowledge as power.

## SECTION-C

7. Write an essay on fourteen knowledge bases as sources of Vidya.
8. Write a note on knowledge as invention.
9. Write an essay on knowledge about self.

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## SECTION-B

2. Distinguish between Clan and Society.
3. Differentiate between Status and Role.
4. Compare any two modes of governing system prevalent in modern societies.
5. Discuss the political system best suited for economic development in current context.
6. Discuss social impact of technology.

## SECTION-C

7. How does economic development lead to social development? Explain.
8. Discuss the idea of decentralization and its significance in economic development.
9. Discuss India's economic development before British period.

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Dec 2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(3D Animation Engineering/CSE/IT) (Sem.-3)

**MATHEMATICS – III**

Subject Code : BTAM-302

M.Code : 70808

Date of Examination : 21-01-2023

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) What do you mean by periodic functions? Also write period of  $\cos 100x$ .
- b) Explain Euler's formula.
- c) Define derivatives of the function of complex variables.
- d) Write down Runge-kutta Method
- e) Explain Binomial distributions.
- f) Evaluate  $L [t^2 e^{-3t}]$
- g) Find the differential equation of all spheres of fixed radius having their centres in the  $xy$ -plane.
- h) Discuss the difference between Euler's method & Euler's modified methods.
- i) Explain  $f$  distribution.
- j) Define mean & variance.



## SECTION-B

2. If  $f(x) = |x|$ , expand  $f(x)$  as a fourier series in the interval  $(-\pi, \pi)$
3. Evaluate the integral by using Laplace transform  $\int_0^{\infty} t e^{-3t} \sin t dt$
4. Solve the following partial differential equations
  - a)  $p - q = \log(x + y)$
  - b)  $xp - yp = y^2 - x^2$
5. Solve  $4r + 12s + 9t = e^{3x-2y}$  where symbol's have their usual meaning.
6. Determine the analytic function whose real part is  $e^{3x}(x \cos 2y - y \sin 2y)$

## SECTION-C

7. Apply Gauss-Seidel iteration method to solve the equations :  
 $20x + y - 2z = 17, 3x + 20y - z = -18, 2x - 3y + 20z = 25$
8. Out of 800 families with 4 children each, how many families would be expected to have :
  - a) 2 boys & 2 girls
  - b) at least one boy
  - c) no girl
  - d) at most two girlsAssume equal probabilities for boy's & girl's.
9. Two random samples are drawn from two normal populations are shown below:

A	17	27	18	25	27	29	13	17
B	16	16	20	27	26	25	21	

Test whether the samples are drawn from the same normal population.

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Jan-2023

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CSE) (Sem.-5)**  
**PROGRAMMING IN PYTHON**

Subject Code : BTCS-510-18

M.Code : 78324

Date of Examination : 27-01-2023

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 briefly about dir() and help() functions.
- b) Differentiate between an error and an exception.
- c) What is persistent storage?
- d) Explain briefly about modulus.
- e) Write a short note on global interpreter lock.
- f) What are regular expressions?
- g) Explain briefly about web surfing.
- h) Describe the relationship between child and parent windows.
- i) Write a short note on application programmer's interface (DB-API).
- j) Write a SQL command to create a table with three fields of different types.

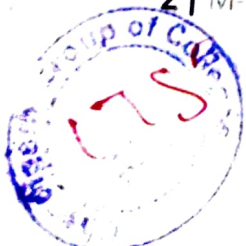


- SECTION-B**
2. Differentiate between Lists and Tuples with the help of an example.
  3. What are command-line arguments? Explain clearly the difference between 'argc' and 'argv' arguments.
  4. What is pattern-matching? Describe two ways to accomplish pattern-matching.
  5. Write a short note on Tkinter, Pmw and Tix GUI highlighting the difference among them.
  6. What are adapters in databases? Discuss various factors to be considered while choosing an adapter.

**SECTION-C**

7. What is Common Gateway Interface (CGI)? Explain in detail about the working of CGI with the help of an example.
8. What are hash tables and how do they relate to dictionaries? Also explain how are the elements inserted, updated and removed from dictionaries.
9. Describe the process of exception detection and handling in detail with the help of an example. What role does assertion play in exception handling?

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Dec 2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**MATHEMATICS-III**

Subject Code : BTAM304-18

M.Code : 76438

Date of Examination : 19-01-23

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**

Solve the following :

1. a) State Geometrical Interpretation of Partial Derivative.

b) Whether the function  $f(x, y, z) = 3x^2 yz + 5xy^2 z + 4z^4$  is homogenous if yes state its degree.

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

d) What do you mean by divergent infinite series?

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

f) Find the integration factor of the differential equation :  $xdy + ydx = 0$ .

g) Define Bernoulli's equation with example.

h) Find the particular integral of the equation :  $4 \frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + y = e^{\frac{x}{2}}$ .



i) Define Cauchy's Linear Differential equation.

j) Write down the solution of  $\frac{dx}{dy} + Px = Q$ , where P and Q are functions of y alone.

### SECTION-B

2. If  $u = 1(-2xy + y^2)^{-\frac{1}{2}}$ , prove that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + z \frac{\partial u}{\partial z} = y^2 u^3$ .

3. Evaluate  $\iint e^{2x+3y} dx dy$  over the triangle bounded by the lines  $x = 0$ ,  $y = 0$ , and  $x + y = 1$ .

4. Test for convergence or divergence the series  $\sum_{n=1}^{\infty} \frac{1}{n} \sin \frac{1}{n}$ .

5. Solve the differential equation :  $x^2 \left( \frac{dy}{dx} \right)^2 - 2xy \frac{dy}{dx} + 2y^2 - x^2 = 0$ .

6. Solve  $(2x^2 y^2 + y) dx - (x^3 y - 3x) dy = 0$ .

### SECTION-C

7. Prove that  $\iiint \sqrt{1 - \frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2}} dx dy dz = \frac{\pi^2 abc}{4}$ .

8. Apply the method of variation of parameter to solve the equation  $\frac{d^2 y}{dx^2} + 16y = 32 \sec 2x$ .

9. Solve the differential equation :  $(3x + 2)^2 \frac{d^2 y}{dx^2} + 5(3x + 2) \frac{dy}{dx} - 3y = x^2 + x + 1$ .

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## SECTION-B

2. Write a note on manipulators and i/o streams.
3. What is function overriding? Discuss with help of example.
4. Discuss the features of Constructors.
5. Write a program to overload "+" operator.
6. Differentiate between static and dynamic memory allocation.

## SECTION-C

7. Discuss the use of exceptional handling in programming.
8. What are the various file opening modes? Explain.
9. What are different types of inheritance? 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.**



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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS-302-18

M.Code : 76437

Date of Examination : 17-01-23

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. Advantage of copy constructors.
- b. What are the various access modifiers?
- c. Multilevel inheritance
- d. Differentiate between call by value and call by reference
- e. Need of abstract class
- f. Friend class-
- g. Difference between equal to (==) and assignment operator (=).
- h. How will memory allocated to values of a 2D integer array?

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1 | M-76437



(S2) 178

- i. How global variable is difference from local variable?
- j. Illustrate difference in early and late binding.

### SECTION-B

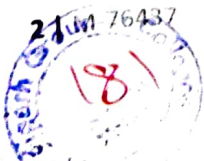
2. What is friend function? Explain by giving suitable example.
3. Write a program to read two numbers from the keyboard and display their average on screen.
4. How exception handling is beneficial for the programming? Write a program to multiply two arrays while catching and handling exceptions.
5. How procedural programming is different from object oriented programming? Explain.
6. Write a C++ program to overload the binary operator '+' to add two complex numbers.

### SECTION-C

7. Design three classes – student, college and university where college is derived from university and student is derived from college. Write suitable function to initialize values and write a main function for execution by creating objects.
8. Write a C++ program by using classes in which user enter the three angles a1, a2, and a3 and then program will check that its valid triangle or not. If it's valid triangle, then find the factorial of a1 with while loop, and find that a2 is a palindrome number or not. If a2 is palindrome, then find the factorial of a2.
9. Write short note on :
  - a. Friend Function
  - b. Pure Virtual Function

Also write suitable program for each of these concepts to illustrate their usage.

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Jan. 2023

Roll No. 

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Total No. of Pages : 03

Total No. of Questions : 09

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

Subject Code : BTCS-303

M.Code : 56593

Date of Examination : 14-01-2023

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 following questions in brief :

- a) How many states can an  $n$ -bit Ring counter and an  $n$ -bit Johnson's counter have?
- b) What is octal representation of hexadecimal AFAFAF.
- c) What are the advantages of ring counter?
- d) What is difference between Moore and Mealy circuits?
- e) What is EEPROM?
- f) What is De-Morgan's law?
- g) What is meant by the term edge triggered?
- h) How many flip-flops are required to design a mod-7 up down counter?
- i) Perform 2's complement subtraction of  $(7)_{10} - (11)_{10}$ .
- j) What is race around condition? How it can be avoided?



## SECTION-B

2. A ROM memory chip is rated at  $4k \times 8$  bits. What, exactly, does this designation mean? How many addresses are there inside this memory chip? How many bits of storage are there, total, in this memory chip? How many address bits are there, and how many data bits are there?
3. Design an FPL A circuit, programmed to implement a 3-bit binary to Gray conversion.
4. Design a circuit that can be built using AOI (AND OR and Invertor) logic and output a 1 when a 4-bit BCD code is translated to a number that uses the upper right segment of a seven segment display. Show the truth table, K-map simplification and the logic diagram of the specified circuit.
5. Design a sequence detector to detect the sequence **1010** (overlapping of the sequence is permitted). Use D flip-flop to design the circuit. Show the intermediate design steps:
- State Diagram
  - Truth Table/ Excitation table
  - Logic Diagram of the circuit.
6. Prove the following identities using Boolean algebra

$$(A + B)(A + (AB)')C + A'(B + C) + A'B + ABC = C(A + B) + A'(B + C')$$

## SECTION-C

7. Using D-Flip Flops explain the working of a 4-bit Universal Shift Register.
8. A sequential circuit with two D flip-flops A and B, two inputs  $x$  and  $y$ , and one output  $z$  is specified by the following next-state and output equations

$$A(t + 1) = x'y + xB$$

$$B(t + 1) = x'A + xB$$

$$z = A$$

- Draw the logic diagram of the circuit.
- List the state table for sequential circuit.
- Draw the corresponding state diagram.





9. A combinational circuit has 3 inputs A, B, C and output F. F is true for following input combinations

A is False, B is True

A is False, C is True

A, B, C are False

A, B, C are True

- a) Write the Truth table for F. Use the convention True = 1 and False = 0.
- b) Write the simplified expression for F in SOP form.
- c) Write the simplified expression for F in POS form.
- d) Draw logic circuit using minimum number of 2-input NAND gates.

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(S2)-2345

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech (CE) / B.Tech.(CSE) (Sem.-3)**  
**DATA STRUCTURE & ALGORITHMS**

**Subject Code : BTCS-301-18**

**M.Code : 76436**

**Date of Examination : 14-01-23**

**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 are the advantages of linked list?
- b. What is Big O notation?
- c. Write the routine to delete an element from queue.
- d. Convert the infix  $(a + b) * (c + d) / f$  into postfix expression.
- e. What are the applications of binary tree?
- f. Define  $B^+$  tree.
- g. What is simple path?
- h. What is an acyclic graph?
- i. What is the output of selection sort after the 3<sup>rd</sup> iteration on this 17, 4, 45, 8, 27, 13 sequences?
- j. Which sorting algorithm is best if the list is already sorted? Why?



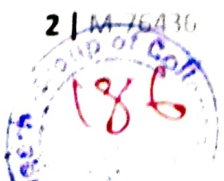
## SECTION-B

2. Write an Algorithm to traverse a graph using Depth First Search.
3. Write an algorithm to insert an element at  $n^{\text{th}}$  position in doubly linked list. Also, discuss the merits and demerits of doubly linked list.
4. What is polish notation? Explain the step-by-step procedure to evaluate the following postfix expression  $623 + - 382 / + * 243 +$ .
5. What is max heap. Construct max heap for the following: 140, 80, 30, 20, 10, 40, 30, 60, 100, 70, 160, 50, 130, 110, 120.
6. How linked list can be used for representing polynomials? Explain using a suitable example.

## SECTION-C

7. Write an algorithm for insertion sort. Compare its best-case, average-case, and worst-case time complexity with merge sort with suitable example.
8. Suppose the following list of letters is inserted in order into an empty binary search tree: J, R, D, G, T, E, M, H, P, A, F, Q. Construct the binary search tree and find the in-order, pre-order and post-order traversal of BST created.
9. What is AVL Tree? Construct a Balanced AVL Tree for the following sequence of numbers: 50, 20, 60, 10, 8, 15, 32, 46, 11, 48.

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Jan 2023

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(CSE / IT / 3D Animation & Graphics Engg.) (Sem.-3)**

**COMPUTER ARCHITECTURE**

**Subject Code : BTCS-301**

**M.Code : 56591**

**Date of Examination: 12-01-2023**

**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 Computer architecture.
- b) Differentiate between Logical and Physical addresses.
- c) Differentiate between Direct and indirect instruction modes.
- d) Differentiate between Arithmetic Shift Left and Arithmetic Shift Right.
- e) What is a microprogram sequencer?
- f) What is instruction-level parallelism?
- g) Why does increasing the capacity of cache tend to increase its hit rate?
- h) What do you mean by memory hierarchy?
- i) How many 128x8 RAM chips are needed to provide memory capacity of 2048 bytes?
- j) Differentiate between isolated I/O and memory-mapped I/O.





## SECTION-B

2. How is Virtual Memory different from Cache memory?
3. What are Interrupts? Explain different types of interrupts.
4. Give the hardware realization of 4-bit arithmetic circuit capable of doing addition, subtraction, increment and decrement.
5. Formulate a six-segment instruction pipeline for a computer. Specify the operations to be performed in each pipeline.
6. What are the various addressing modes? Give examples.

## SECTION-C

7. Explain the difference between hardwired control and micro-programmed control. Is it possible to have a hardwired control associated with a control memory?
8. Give the hardware organization of associative memory. Why associative memory is faster than other memories. Deduce the logic equation used to find the match in the associative memory.
9. What do you mean by initialization of DMA controller? How DMA controller works? Explain with suitable block diagram.

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(S2)-2261

Jan. 2023

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

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (Artificial Intelligence & Machine Learning / Artificial Intelligence (AI) and Data Science / Artificial Intelligence / CSE / Data Science / IT / CSE (Internet of Things and Cyber Security including Block Chain Technology) / Computer Engg.)**

**B.Tech. (CSE) (Artificial Intelligence & Machine Learning) / (CSE) (Cyber Security) / (CSE) (Data Science) / (CSE) (IOT) (Sem.-3)**

**DIGITAL ELECTRONICS**

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

**M.Code : 76435**

**Date of Examination : 12-01-23**

**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**

**Write briefly :**

- a) Convert binary number 11010101 into octal and hexadecimal numbers.
- b) Explain ASCII codes.
- c) Give the applications of Gray codes.
- d) State De-Morgan's Theorem.
- e) Describe Minterms and Maxterms.
- f) Draw half adder circuit diagram.
- g) What do you mean by Ripple counters?
- h) Draw SIPO, SISO, PISO and PIPO shift registers.

- i) Enlist various memories.
- j) Classify D/A conversion techniques.

### SECTION-B

2. Design all other logic gates using 2 inputs NOR gates.
3. Minimize the function  $F = \sum m(1,2,3,5,6,8,9)$  using K-Map.
4. Design Full subtracter with truth table, circuit diagrams.
5. Design mod-6 up counter.
6. Draw and explain complex programmable logic devices.

### SECTION-C

7. Design BCD to 7 segment decoder.
8. Explain counter type analog to digital converters.
9. Encode Decimal number 56 into binary, octal, hexadecimal, BCD, Gray and Excess 3 codes.

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Jan. 2023

Roll No.

Total No. of Pages: 03

Total No. of Questions: 09

**B.Tech. (AI&ML / CE / CSE / IT / Internet of Things and Cyber Security  
including Block Chain Technology) (Sem. - 4)**

**DISCRETE MATHEMATICS**

Subject Code: BTCS-401-18

M Code: 77626

Date of Examination : 04-01-2023

P.T. U Ques  
B.Tech  
Sem -

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

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

**SECTION-A**

1. Answer the following:

- a) Define Cartesian product (AXB) of two non empty sets. How many different elements does  $A \times B$  have if A has  $m$  elements and B has  $n$  elements?
- b) What are the contrapositive, the converse, and the inverse of the conditional statement. The home team wins whenever it is raining?
- c) Prove that if  $n$  is an integer and  $n^2$  is odd, then  $n$  is odd.
- d) What is the power set of the set  $A = \{0,1,2\}$ ?
- e) How many people among 200000 are born at the same time. Use pigeonhole principle to find it.
- f) State fundamental theorem of arithmetic.
- g) Let G be a simple graph with  $n$  vertices. Show that G has at most  $\frac{n(n-1)}{2}$  edges.
- h) Define an abelian group.
- i) Let  $a, b$  be elements in a Boolean Algebra, prove that  $a + a*b = a$
- j) Define vertex colouring in a graph.





## SECTION-B

2. Let  $p$  and  $q$  be the propositions

$p$ : You drive over 65 miles per hour.

$q$ : You get a speeding ticket

Write these propositions using  $p$  and  $q$  and logical connectives (including negations).

- Driving over 65 miles per hour is sufficient for getting a speeding ticket.
  - You get a speeding ticket, but you do not drive over.
3. Among 100 Students, 32 study Mathematics, 20 study Physics, 45 study English, 15 study Mathematics and English, 7 study mathematics and Physics, 10 study Physics and English and 30 do not study any of the three subjects. Find the number of students studying all three subjects. Find also the number of students studying exactly one of the three subjects.
4. Let  $A$  be the set of integers and  $R$  be the relation defined on  $A \times A$  by  $(a, b)R(c, d)$  if  $ad=bc$ . Prove that  $R$  is an equivalence relation.
5. Define the following with suitable examples:
- Isomorphic graphs
  - Eulerian graph
  - Hamiltonian graph
  - weighted tree
6. Show that each subgroup of an abelian group is normal subgroup.

## SECTION-C

7. a) Show that these statements about the real number  $x$  are equivalent:
- $x$  is irrational
  - $3x + 2$  is irrational
  - $x/2$  is irrational

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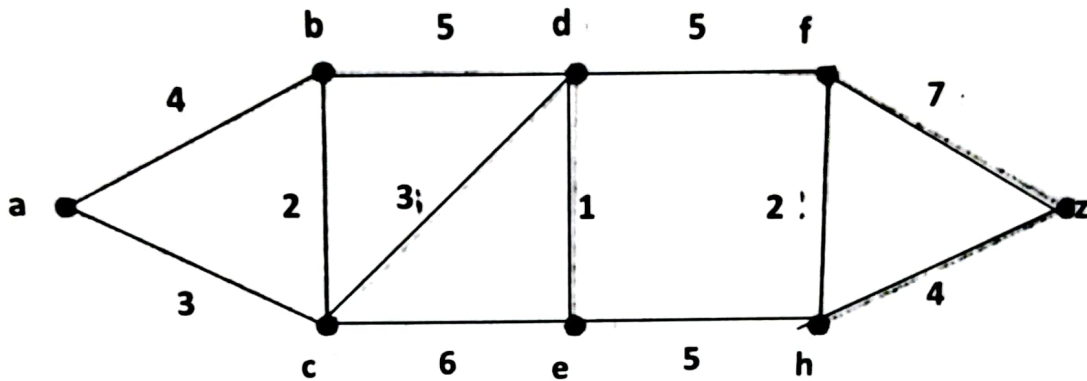


S-1458

b) Find how many arrangements can be made with the letters of the word 'MATHEMATICS'?  
In how many of them:

- i) consonants occur together
- ii) vowels do not occur together?

8. a) Find the length of the shortest path between a and z in the given weighted graph. Explain the algorithm used for finding this path.



b) Prove that a field is an integral domain. Is the converse true?

9. a) Write the function  $x \vee y'$  in the disjunctive normal form in three variables  $x, y$  and  $z$

b) Prove by Boolean algebra:  $A + B.C = (A + B).(A + C)$

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Total No. of Pages: 02

Total No. of Questions: 09

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

**COMPUTER ORGANIZATION & ARCHITECTURE**

**Subject Code: BTES-401-18**

**M Code: 77627**

**Date of Examination : 05-01-2023**

**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 advantages of pipelining?
- b) What is an op code? How many bits are needed to specify 32 distinct operations?
- c) What is the use of EEPROM?
- d) How interrupt requests from multiple devices be handled?
- e) Compare RISC and CISC architecture.
- f) Explain a micro instruction format.
- g) Distinguish between memory mapped and isolated I/O.
- h) An address space is specified by 24 bits and the corresponding memory space by 16 bits.  
How many words are there in the main memory and virtual memory?
- i) What is meant by an interleaved memory?
- j) State the difference between direct and indirect addressing mode?



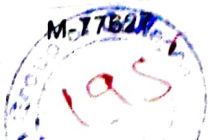
## SECTION-B

2. What is cache coherence and why is it important in a shared multi processors system? How can the problem be solved with a snoopy cache controller?
3. Explain with an example how to multiply two unsigned binary numbers.
4. Explain about DMA controller with help of an example.
5. Elaborate different types of addressing modes with the help of an example.
6. Explain the design of micro programmed control unit in detail.

## SECTION-C

7. Show how transfer from disk to memory is conducted under programmed I/O and interrupt driven I/O ?
8. Explain the various mapping techniques associated with cache memories.
9. What is virtual memory? Explain the steps involved in virtual memory address translation.

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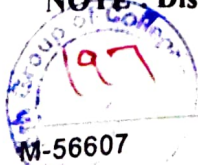
## SECTION-B

2. Explain the architecture of 8251 USART in detail.
3. Explain the following 8086 signals:  
LOCK, TEST, READY, INTR and INTA.
4. Explain different addressing modes of 8086 in detail with examples
5. Explain the various interrupts present in 8085 microprocessor. Also mention their priorities.
6. Explain various types of buses used in microprocessor.

## SECTION-C

7. Explain the interfacing of 8085 microprocessor with keyboard in detail.
8. What is an instruction? Explain the instruction set of 8085 in detail.
9. Explain the architecture and pin diagram of 8086 Microprocessor in detail.

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Jan 2023

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Total No. of Pages: 02

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**B.Tech. (AI&ML / CE / CSE) / CSE (Internet of Things and Cyber Security  
including Block Chain Technology) (Sem. – 4)**

**OPERATING SYSTEMS**

**Subject Code: BTCS-402-18**

**M Code: 77628**

**Date of Examination : 06-01-2023**

**Time: 3 Hrs.**

**Max. Marks: 60**

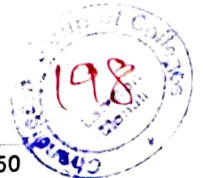
**INSTRUCTIONS TO CANDIDATES:**

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 different functions of Operating system?
- b) Define spooling
- c) What is a sector?
- d) Difference between turnaround time and response time.
- e) What is long term scheduler?
- f) Why do we need proc?
- g) Define Semaphore.
- h) State Belady's Anomaly.
- i) Define thrashing.
- j) What is the impact of page size on the overall system performance?



## SECTION-B

2. What is process management? Discuss process state diagram.
3. What is arrival time of a process? Suppose a new process in a system arrives at an average of six processes per minute and each such process requires an average of 8 seconds of service time. Estimate the fraction of time the CPU is busy in a system with a single processor.
4. What is page replacement? Explain LRU page replacement algorithm with the help of example.
5. Describe bounded buffer problem in process synchronization.
6. What is deadlock? Explain four necessary and sufficient conditions for a deadlock to occur.

## SECTION-C

7. What is memory management? Compare and contrast paging and segmentation memory management techniques.
8. What are differences between time sharing, multiprogramming and multitasking operating systems?
9. Write a Short note on
  - a) Resource Allocation graph
  - b) Page fault
  - c) Fork() and exec() system call
  - d) Starvation.

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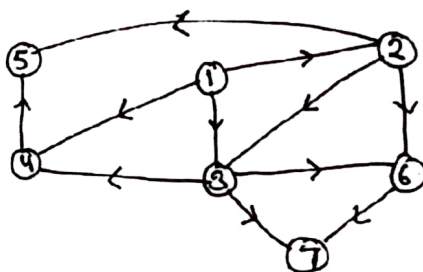


## SECTION-B

2. Explain Bin packing problem.
3. Give a set  $S = \langle 1, 4, 5, 6, 7, 3 \rangle$  and  $W = 12$ . Obtain the sum of subset using backtracking approach.
4. Write a short note on Masters Method for solving recurrences
5. Explain Greedy method with suitable example
6. Explain Dijkstra's shortest path algorithm with suitable example. Find the time complexity for it.

## SECTION-C

7. What is topological sort? Show the ordering of vertices produced by topological sort on the following digraph.



8. Explain the various classes problems (i.e P, NP, NP-Complete, NP-Hard). Also show relationship among them with the help of a diagram.
9. Write a short note on following:
  - a) Heuristics and their characteristics
  - b) Network flow algorithm

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## SECTION-B

2. Explain dynamic linking. What is the use of Linkage editor?
3. Why do we use YACC? Differentiate LEX and YACC tools.
4. Write note on:
  - a) Full Screen Editors
  - b) Multi Window Editors
5. What is debugging in system programming? Discuss the debugging techniques used in embedded systems?
6. Discuss absolute loader scheme. Also, write its advantages and disadvantages.

## SECTION-C

7. Explain the one-pass assembler in detail with block diagram. What are the problems faced by a one-pass assembler. How can we overcome with the problems faced by the one pass assembler?
8. Explain the different phases of compilers.
9. Explain recursive macro expression in detail. How could a non-recursive macro preprocessor allow for the invocation of macros within the macros? What would be the advantages and disadvantages of such an approach?

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M-56608



S-2143





- f) Holistic technologies are eco-friendly and people-friendly.  
 समग्र प्रौद्योगिकियों पर्यावरण के अनुकूल और लोगों के अनुकूल होना चाहिए।  
 सरवांगी तकनीकों पर्यावरण के अनुकूल अਤੇ लोको के अनुकूल होनी चाहीदीआं हन।
- g) There is no self-regulation in Nature.  
 प्रकृति में कोई आत्म-नियमन नहीं है।  
 कुदरत विंच कोसी आत्म-नियमनता नही है।
- h) Value Education should be rational  
 मूल्य शिक्षा तर्कसंगत होनी चाहिए।  
 मूल सिखिआ उरकसंगत होनी चाहीदी है।
- i) Giving all the priorities to Physical Facilities is living with Animal consciousness.  
 भौतिक सुविधाओं को सभी प्राथमिकताएं देना पशु चेतना के साथ रहना है।  
 सररीरक सुहुलतां नुं ही सारीआं परिहलां देनीआं पसु बिरती नाल रहिटा है।
- j) The value "care" is related with body.  
 मूल्य "ध्यान" शरीर के साथ संबंधित है।  
 मूल धिआन सररीर के नाल संबधत है।

### SECTION-B

(5 × 4 = 20)

2. Explain harmony in family.  
 परिवार में तालमेल के बारे में बताएं।  
 परिवार विंच तालमेल के बारे विंच दसो।
3. What is the difference between prosperity and wealth?  
 समृद्धि और धन के बीच क्या अंतर है?  
 सुसहली अते पैसे के विंच की अंतर है?
4. Differentiate between intention and competence. How do we come to confuse between the two?  
 इरादा और क्षमता के बीच क्या अंतर है? कैसे हम गलती करते हैं?  
 इरादा अते समरथता के विंच की अंतर है? किवे असी गलती करदे हां?
5. What are the basic guidelines of value education?  
 मूल्य शिक्षा की बुनियादी दिशा-निर्देश क्या हैं?  
 मूल सिखिआ के बुनियादी दिशा-निर्देश की हन?



6. How there is Self-Regulation in Nature?

प्रकृति में आत्म नियमन कैसे है?

ਕੁਦਰਤ ਵਿੱਚ ਆਤਮ-ਨਿਯਮਤਾ ਕਿਵੇਂ ਹੈ?

SECTION-C

(5 × 6 = 30)

7. 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।

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

8. 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?

OR

What is the need of value-Education?

मूल्य शिक्षा की क्या ज़रूरत है?

ਮੁੱਲ ਸਿੱਖਿਆ ਦੀ ਕੀ ਜ਼ਰੂਰਤ ਹੈ?

9. What do you mean by universal human order/ What could be your role in moving towards it?

आप सार्वभौमिक मानवीय आदेश से क्या समझते हैं? इसमें आपकी भूमिका क्या हो सकती है?

ਤੁਸੀਂ ਸਾਰਵਭੌਮਿਕ ਮਾਨਵੀ ਆਦੇਸ਼ ਵਲੋਂ ਕੀ ਸਮਝਦੇ ਹੋ? ਇਸ ਵਿੱਚ ਤੁਹਾਡੀ ਭੂਮਿਕਾ ਕੀ ਹੋ ਸਕਦੀ ਹੈ?

OR

Explain Competence in Professional-Ethics.

पेशेवर नैतिकता में क्षमता समझाओ।

ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਸਮਰੱਥਾ ਸਮਝਾਓ।



10. Describe in brief the salient values in human relationships.

मानवीय रिश्तों में संक्षिप्त मुख्य मूल्यों का विवरण दें।

ਮਾਨਵੀ ਰਿਸ਼ਤਿਆਂ ਵਿੱਚ ਸੰਬੰਧਿਤ ਮੁੱਖ ਮੁੱਲਾਂ ਦਾ ਵਰਨਣ ਕਰੋ।

OR

What are the five dimensions of human endeavour in society?

समाज में मानव प्रयास के पांच आयाम क्या हैं?

ਸਮਾਜ ਵਿੱਚ ਮਨੁੱਖੀ ਕੋਸ਼ਿਸ਼ ਦੇ ਪੰਜ ਪਹਿਲੂ ਕੀ ਹਨ?

11. What do you mean by Respect? What are the different patterns of differentiation?

आप का सम्मान से क्या मतलब है? भेदभाव के विभिन्न पैटर्न क्या हैं?

ਤੁਹਾਡਾ ਆਦਰ ਦਾ ਕੀ ਮਤਲਬ ਹੈ? ਫਰਕ ਦੇ ਵੱਖ-ਵੱਖ ਪੈਟਰਨ ਕੀ ਹਨ?

OR

What is Happiness ? What are the wrong notions about attaining happiness?

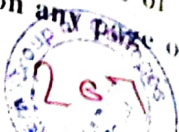
What are the problems faced due to the wrong notions about happiness and prosperity?

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

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

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

[M-77630]





Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

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

**WEB TECHNOLOGIES**

Subject Code : BTCS-520-18

M.Code : 78326

Date of Examination : 07-01-2023

P.T.U Questions  
B.Tech CSE  
Sem-5

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 Web Server?
- b) What is the purpose of name space?
- c) What is DHTML?
- d) What is Proxy Server?
- e) What is XML? List two characteristics of XML.
- f) What are Cookies?
- g) Differentiate between 'Get' and 'Post' methods in PHP.
- h) What is the role of CSS in HTML?
- i) Why JavaScript is used in HTML?
- j) What is the use of JSON?



## SECTION-B

2. What are the drawbacks of HTML? How are they addressed in XML?
3. Define Array. How can we declare one dimensional and two-dimensional array in PHP?
4. Briefly explain the control flow statements in Java script with example.
5. What is the syntax of declaring an attribute in a DTD?
6. How to create a table in HTML? Explain with relevant example.

## SECTION-C

7.
  - a) Explain database connectivity in PHP with reference to MYSQL.
  - b) Define Session and Cookies. Explain with an example program.
8. Discuss AJAX architecture and compare it with DOM.
9. Write a short note on the following
  - a) Web Browser
  - b) Jason Schema

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





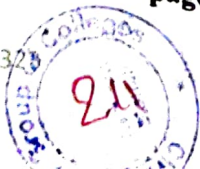
## SECTION-B

2. Differentiate between Wired and Wireless Networks in detail.
3. Write a detailed note on CSMA/CD.
4. What is IP addressing? How it is classified? Also briefly explain about subnets.
5. Write a detailed note on Leaky Bucket Algorithm.
6. Explain in detail about Firewalls.

## SECTION-C

7. Write a detailed note on Transmission Media.
8. Write a detailed note on Link State Routing Protocol.
9. **Explain the following terms in detail :**
  - (a) DDNS
  - (b) HTTP
  - (c) Bluetooth

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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 : BTCS-503-18  
M.Code : 78322  
Date of Examination : 02-01-23

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 do you mean by software configuration management?
- b) Differentiate between verification and validation.
- c) What is cyclomatic complexity?
- d) How two processes are joined in DFD?
- e) What is software reuse?
- f) What is test coverage?
- g) What is SRS?
- h) Define feasibility study.
- i) What is data dictionary?
- j) Define coding standards.



## SECTION-B

2. What is the Difference between Gantt and PERT Chart? Explain with the help of an example.
3. Differentiate between functional and non-functional requirements and explain them.
4. Explain component-based software development.
5. Explain the scheduling of software project.
6. Explain the waterfall model with the help of diagram.

## SECTION-C

7. Explain black box testing methods and its advantages and disadvantages.
8. Explain Water fall Model. What are the problems that are sometimes encountered when the waterfall model is applied?
9. What are the characteristics of a good design? Describe different types of coupling and cohesion. How design evaluation is performed?

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## SECTION-B

2. Differentiate Mealy and Moore machines.
3. Construct a minimum DFA equivalent to the DFA described by:

State	0	1
→q <sub>0</sub>	q <sub>1</sub>	q <sub>5</sub>
q <sub>1</sub>	q <sub>6</sub>	q <sub>2</sub>
⊙q <sub>2</sub>	q <sub>0</sub>	q <sub>2</sub>
q <sub>3</sub>	q <sub>2</sub>	q <sub>6</sub>
q <sub>4</sub>	q <sub>7</sub>	q <sub>5</sub>
q <sub>5</sub>	q <sub>2</sub>	q <sub>6</sub>
q <sub>6</sub>	q <sub>6</sub>	q <sub>4</sub>
q <sub>7</sub>	q <sub>6</sub>	q <sub>2</sub>

4. Design a NFA for a language that accepts all strings over {0, 1} in which the second last symbol is always '1'. Then convert it to its equivalent DFA.
5. What is Pushdown Automata? Construct a PDA that accepts:

$$L = \{0^n 1^n \mid n \geq 0\}$$

6. Construct a Mealy Machine that prints 'a' whenever the sequence '01' is encountered in any input binary string and then convert it to its equivalent Mealy Machine.

## SECTION-C

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

$$L = 0^N 1^N$$

8. Describe pumping lemma for regular languages with the help of example.
9. Define Greibach Normal Form. Convert the following Context Free Grammar to Greibach Normal Form:

$$P : S \rightarrow CA \mid BB, B \rightarrow b \mid SB, C \rightarrow b, A \rightarrow a$$

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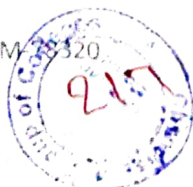
## SECTION-B

2. What is the need of DBMS and discuss in detail the different DBMS Models.
3. Define Normalization. Explain 3NF and BCNF with the help of a suitable example.
4. What is the concept of locking techniques? Discuss the Two-phase locking protocol.
5. Explain the concept of ACID properties with the help of suitable example.
6. Explain the concept of authorization and authentication

## SECTION-C

7. What are different data models used in DBMS? Discuss in detail about the ER Model used in the RDBMS.
8. Explain different types of Joins used in RDBMS with the help of example and why do we use self-join?
9. Write a short note on :
  - a) Object Relational Databases
  - b) Query Optimization

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



Jan 2023

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTES-501-18

M.Code : 78319

Date of Examination : 24-01-2023

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. SCM
- b. BPR
- c. Vendor
- d. Planning
- e. Disadvantages of ERP
- f. Human Resource Management
- g. SSA
- h. PeopleSoft
- i. QAD
- J. OLAP



## SECTION-B

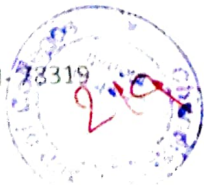
2. What do you understand by Business process Reengineering?
3. Explain in detail the ERP Implementation methodology.
4. How does ERP helps in Human Resource and Finance Management?
5. Explain the role played by Oracle in ERP Market Place.
6. How Internet is helping in the growth of ERP?

## SECTION-C

7. Explain in detail the Parameters involved in ERP Implementation.
8. Explain the benefits of the ERP Package achieved at different levels of business modules.
9. Write a note on Data warehousing, Data mining, and OLAP in enhancing the capabilities of ERP.

B.Tech CSE

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Dec 2022

Roll No.

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 : 12-12-2022

P.T.U. Question  
B.Tech CSE  
Sem-6

Max. Marks : 60

Time : 3 Hrs.

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

Write briefly :

1. a. Token
- b. DFA
- c. Augmented Grammar
- d. Preprocessor
- e. Loop Optimization
- f. DAG
- g. Parse tree
- h. Parsing Table
- i. Symbol Table
- j. Heap



## SECTION-B

2. Explain the role of lexical analyzer.
3. Perform predictive parsing on following grammar

$$E \rightarrow TE'$$

$$E' \rightarrow +TE' \mid \epsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' \mid \epsilon$$

$$F \rightarrow \text{id} \mid (E)$$

\*  $\epsilon$  denotes epsilon

4. Explain the role of basic blocks with the use of a suitable example.
5. Discuss issues of code generation in compiler design.
6. Write a note on Lex.

## SECTION-C

7. Write a note on peephole optimization.
8. What is a directed acyclic graph? Discuss the procedure for construction of a directed acyclic graph with suitable example.
9. How three address code is implemented in compiler? Explain in detail.

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



Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

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

Subject Code : BTCS-601

M.Code : 71107

Date of Examination : 12-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**Answer briefly :**

1. What is dynamic allocation?
2. List advantages of Simulation.
3. Discuss modeling of a system.
4. What is statistical analysis?
5. How java is used in simulation?
6. How normal distribution is performed?
7. What is sample size?
8. Define position arrival pattern.
9. Discuss linear regression.
10. What is Network Simulator?



## SECTION - B

2. What are applications of Queuing Model?
3. How symbolic models are represented in simulation?
4. Discuss the concept of calibration and validation.
5. Explain the generation of random numbers.
6. Write a short note on process CPU and Memory Simulation.

## SECTION - C

7. Give the examples of simulation and modeling system models in computer system.
8. Define simulation language. Give detailed overview of MATLAB.
9. Give the steps of measures of performance and estimation of simulation system.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE) (2012 to 2017) (Sem.-6)

**RDBMS-II**

Subject Code : BTCS-602

M.Code : 71108

Date of Examination : 14-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) What is DCL command? Give its two examples.
- b) How does the system generate timestamps?
- c) What is data mart? Which schema is suitable for data mart?
- d) Discuss the three levels of data abstraction.
- e) Discuss the ACID properties of transactions in databases.
- f) What is Big data?
- g) Define two phase locking protocol.
- h) What do you mean by query optimization?
- i) What are the advantages and disadvantages of OODBMS?
- j) What is buffer management?

**SECTION-B**

2. What is deadlock? Explain the schemes for deadlock detection and recovery.
3. Explain the steps in query processing? How would you estimate the cost of the query?



4. Discuss five level schema in distributed database system. Also give its advantages and disadvantages.
5. Explain the architecture of a data warehouse with the help of a diagram.
6. Discuss the different phases of data mining process.

### SECTION-C

7. Write short note on following commands :
  - a) Select with where clause, group by clause, having clause
  - b) Drop and Delete
  - c) Grant and Revoke
  - d) Sum and Count function
  - e) Alter and Update.
8. Give a comparative study of different features of MySQL, Oracle and Microsoft SQL Server.
9. Illustrate the statement syntax for following operations on given table.
  - a) Create above given table.
  - b) Change the marks of Rahul in English subject from 89 to 91.
  - c) Display the name of students who got more than 80 marks in any subject.
  - d) Calculate total marks of individual student.
  - e) Increase marks by adding 5 marks whose marks are less than 75.

Sr.No	S-Name	English	Science	Maths	IT
100	Arjun				70
101	Suraj	75	85	73	84
102	Ravi	88	75	95	91
103	Payal	89	77	82	92
104	Meena	75	72	70	71
		86	85	81	

**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. – 5)

**COMPUTER NETWORKS-II**

Subject Code: BTCS-501

M Code: 70534

Date of Examination: 13-12-2022

Time: 3 Hrs.

Max. Marks: 60

**INSTRUCTIONS TO CANDIDATES:**

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

**SECTION-A**

1. Answer briefly:

- a) What do you understand by SKIP?
- b) What is IS-95 for 2.5G CDMA?
- c) Bluetooth
- d) MAC protocol
- e) CDMA
- f) Cellular system
- g) WLL
- h) IKE
- i) PAN
- j) Encapsulating Security Payload.

## SECTION-B

2. Provide a simple overview of IPv6 and compare it with IPv4.
3. Give details of IKE phases and IKE encoding.
4. What are the features, advantages and applications of adhoc networks?
5. Differentiate 2G and 3G.
6. Explain the channel assignment and handoff strategies.

## SECTION-C

7. What is the difference between proactive and reactive routing protocols? Explain in detail any two routing protocols used in Adhoc networks?
8. What is the need of IKE? Explain in detail various IKE phases and SKIP protocol.
9. Explain the basics of network security also give the details about Encapsulating SecurityPayload(ESP).

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



M-70534



Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

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

**CLOUD COMPUTING**

**Subject Code : BTCS-612-18**

**M.Code : 79254**

**Date of Examination : 14-12-22**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**Answer Briefly :**

1. Virtualization
2. PaaS
3. Authorization
4. Azure
5. Resource Management
6. Hybrid Cloud
7. Service Hijacking
8. Elasticity
9. Data Leak
10. Data Security.



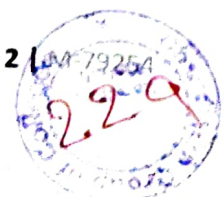
## SECTION-B

11. Differentiate between grid, utility and cloud computing.
12. Explain the role of hypervisors and API in cloud computing.
13. Compare existing cloud deployment models.
14. How migration to cloud happens? Explain its steps.
15. What do you understand by internal security breach? Explain measures involve reducing it.

## SECTION-C

16. Explain in detail driving factors for migrating to a cloud.
17. Write a note on security dangers associated with cloud computing.
18. Explain in detail various cloud service models available, along with their examples.

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



Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**Subject Code : BTCS-603**

**M.Code : 71109**

**Date of Examination : 16-12-2022**

**Time : 3 Hrs.**

**Max. Marks : 60**

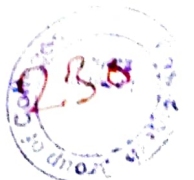
**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Answer briefly :**

- a) What is need of Behavior Feasibility in software development?
- b) What are the different quality metrics for software?
- c) How maintenance of software become important part of cost of software?
- d) Differentiate between white box and black box testing.
- e) Why do we need to create SRS document?
- f) List problems associated with SDLC.
- g) Define CMMI.
- h) What are advantages of Object oriented software development?
- i) List various coding standards.
- j) Prerequisites to draw GANTT chart.



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## SECTION-B

2. "Requirements for a software must be collected in a structured manner to develop a reliable software". Justify this statement with reasons and types of requirements.
3. What are the factors that affect cost estimation for a software?
4. How UML helps in modelling for a software? Illustrate with suitable example.
5. Differentiate between DFS and structure chart. Draw a DFD elaborating working of software for movie ticket booking.
6. What is user interface design and what are various issues that must be taken care for a good user interface design?

## SECTION-C

7. What are the various steps of evolutionary model? Explain and compare it with water fall model.
8. **Write note on following :**
  - a) Role of PSP and Six Sigma in software quality management
  - b) Computer aided software engineering.
9. Why testing is necessary for software's? What are the different methods to test software? Discuss with suitable example(s).

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**Subject Code : BTCS-602-18**

**M.Code : 79250**

**Date of Examination : 16-12-2022**

**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) Artificial Intelligence
- (b) Intelligent agent
- (c) Best, first search
- (d) Random search
- (e) Conditional probability
- (f) Hidden Markov model
- (g) Markov decision process
- (h) Partially observable Markov decision process
- (i) Passive reinforcement learning
- (j) Adaptive dynamic programming.



## SECTION-B

2. Differentiate between tree and graph structures.
3. "A\* Search algorithm is one of the best and popular technique used in path-finding on graph traversals". Justify.
4. In a class, there are 70% of the students who like English and 40% of the students who like English and Mathematics, and then what is the percent of students those who like English also like Mathematics?
5. How does value iteration work in Markov decision process?
6. Discuss the Q-learning algorithm in reinforcement learning.

## SECTION-C

7. Differentiate between depth first and breadth first search.
8. Discuss the various application areas of Artificial Intelligence.
9. How Bayesian networks are represented? Explain.

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Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 18

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

Subject Code : BTCS-620-18

M.Code : 79258

Date of Examination : 19-12-2022

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. Mobile agents
2. Android multimedia
3. Broadcast receiver.
4. Emulator.
5. System permission.
6. Activity State
7. SQLite
8. List any two SMS APIs.
9. Shared preferences.
10. Two limitation of Android OS.



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## SECTION-B

11. Define Activity Life Cycle? Explain with neat diagram Activity Life Cycle.
12. Define APK. Explain the steps involved in preparing App for release.
13. Demonstrate with code snippet of database operation with SQLite database.
14. With a neat diagram explain the life cycle of Services.
15. Define Shared Preferences. Differentiate between Shared Preferences and Saved Instance State.

## SECTION-C

16. Develop an application to store student details like roll no, name, branch, marks, percentage and retrieve student information using roll no. in SQLite databases.
17. What are the security issues in the Android? Explain the remedies to resolves security issues in Android.
18. Explain the Android architecture with the help of neat diagram.

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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CSE) (Sem.-6)**  
**MACHINE LEARNING**  
Subject Code : BTCS-618-18  
M.Code : 79257  
Date of Examination : 19-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Define the following term:

- a) Big Data
- b) Well-Posed Learning Problems
- c) Data Cleaning
- d) Feature scaling
- e) Mean Absolute Error
- f) Correlation
- g) SVM
- h) Logistic Regression
- i) Mutation
- j) Elistism.

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## SECTION-B

2. Explain need and applications of Clustering.
3. Compare Simple Linear Regression, Multiple Linear Regression and Polynomial Regression.
4. What is the difference between training set and test set?
5. Compare Supervised, Unsupervised and Reinforcement Learning.
6. How decision trees are used in Machine Learning?

## SECTION-C

7. Define Machine Learning. Explain the basic machine learning workflow. Discuss the advantages and challenges of machine learning.
8. Explain the concept of classification in detail.
9. Write need and application of Artificial Neural Network.

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## SECTION-B

2. What do you mean by agile methodology? Explain it with the help of Extreme Programming.
3. List down the various benefits of agile in software development in detail.
4. Elaborate the role of product owner, team members and scrum master in Scrum framework.
5. Explain how Waterfall model is the basic model for software development.
6. Elaborate the concept of Liskov-substitution Principle in agile testing along with a suitable example.

## SECTION-C

7. List down the differences between :
  - a) White box Testing and Black box Testing.
  - b) Unit Testing and Functional Testing.
8. List down the brief steps that are to be followed to design an Agile software.
9. What do mean by Kanban framework? Explain its workflow in detail along with its merits and demerits?

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Dec 2023

Roll No. 

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Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (CSE/IT) (Sem.-7)**  
**ROUTING & SWITCHING**  
Subject Code : BTEC-905A-18  
M.Code : 90691  
Date of Examination : 10-01-2023

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 Ethernet frame types?
- (b) How an IP address is represented?
- (c) What are the considerations when expanding network?
- (d) Write the limitations of using circuit switching network for data communication.
- (e) What is OSPF?
- (f) What are IPv6 application services?
- (g) Difference between GARP and GVRP.
- (h) What is frame relay and its basic features?
- (i) How can we secure data with IPsec?
- (j) What is ADSL internet services?



(S2)- 1528

## SECTION-B

2. List the features of Java Programming Language.
3. Explain the need of Wrapper classes in Java.
4. Why multiple inheritance is not part of java and how we can achieve multiple inheritance java?
5. Discuss the concept of Exception Handling in detail.
6. Discuss various Stream Classes present in Java to manage I/O.

## SECTION-C

7. Write steps how we can create and use Package in Java.
8. Explain CORBA. Java Beans, RMI,
9. What is Java IDL? Explain in detail.

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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (CSE/EEE/ECE/EE/ME) (Sem.-7)**  
**DATABASE MANAGEMENT SYSTEMS**

Subject Code : BTCS-501-18

M.Code : 90493

Date of Examination : 13-01-23

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 data abstraction?
- b) Write the syntax of create table command. Create student table with any three attributes.
- c) Define super key. Give an example.
- d) What is weak entity?
- e) Define connectivity in ER Diagram.
- f) List various advantages of ER Diagram.
- g) What is Join dependency?
- h) How can starvation occur in lock-based protocol?
- i) Define transaction. Give example.
- j) What is SQL Injection?



## SECTION-B

2. Explain different entities used in database management system.
3. Discuss in detail Armstong's Axioms rules.
4. Explain in detail various levels of database security.
5. Explain in detail web databases.
6. What is lock-based protocol? Discuss lock compatibility. How can deadlock occur in lock-based protocol?

## SECTION-C

7. Discuss all forms of normalizations with the help of an example each.
8. What is checkpoint? Explain the algorithm used for recovery from failure using checkpoints.
9. Describe the overall architecture of a Database Management System. Discuss each component of DBMS architecture.

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## SECTION-B

2. Differentiate between uniform and three parent cross over.
3. Explain with example any 2 operators involved in simple GA.
4. Explain different defuzzification techniques.
5. Explain how animal behaviour in bees is used for Swarm Intelligence.
6. Explain training algorithm used in adaptive linear neuron.

## SECTION-C

7. **Explain:**
  - a) McCulloch Pitts neuron model.
  - b) Application of NN for Character Recognition.
8. Explain the characteristics and different classifications of a neuro-fuzzy hybrid system.
9. Implement OR function using perceptron training algorithm with binary inputs and bipolar targets.

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Jan  
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Total No. of Pages : 02

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

**ARTIFICIAL INTELLIGENCE**

Subject Code : BTEC-908A-18

M.Code : 90678

Date of Examination : 22-01-2023

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) Draw basic flow chart of Genetic Algorithm.
- (b) Draw a basic model of artificial neural network.
- (c) Compare biological neural network and artificial neural networks.
- (d) Define fuzzy logic and crisp logic.
- (e) Illustrate with examples fuzzy union and fuzzy compliment.
- (f) What is the role of different layers present in an ART network?
- (g) What is the importance of learning and testing algorithm in ANN?
- (h) Discuss Biasing in ANN.
- (i) Briefly explain Hebb's Rule.
- (j) Differentiate between supervised and unsupervised learning.



(S2)-1711

## SECTION-B

2. With a neat architecture, write the training algorithm of a MADALINE network.
3. With suitable examples, explain the various types of crossover and mutation techniques used in the genetic algorithm process.
4. What is an activation function? Mention various activation functions used in neural network.
5. Draw and explain the architecture of Neuro-Fuzzy Logic.
6. Discuss various applications of Neural networks and Fuzzy Logic.

## SECTION-C

7. Implement a perceptron network for NAND function with bipolar inputs and targets.
8. With suitable examples, explain the operations and properties of fuzzy sets, crisp sets, fuzzy relations and crisp relations.
9. **Explain the following:**
  - (a) FLS for Antilock Braking System
  - (b) Back Propagation Neural Network.

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Jan-2023

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Total No. of Pages : 02

Total No. of Questions : 09

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

**ARTIFICIAL INTELLIGENCE**

**Subject Code : BTCS-602-18**

**M.Code : 90611**

**Date of Examination : 21-01-2023**

**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 Decision Tree?
- b. What is Declarative Knowledge?
- c. What is rule based learning?
- 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?



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## SECTION-B

2. Explain Knowledge based system in detail with suitable example.
3. Explain Depth First Search in detail.
4. Explain Bayesian Network with suitable example.
5. What do you mean by MDP? Explain.
6. Explain Passive reinforcement learning in detail.

## SECTION-C

7. What are the characteristics of AI problem, explain with the help of example.
8. Explain adaptive dynamic programming and active reinforcement learning in detail with appropriate examples.
9. Explain Best first search and game search in detail with suitable examples.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**NETWORK SECURITY AND CRYPTOGRAPHY**

Subject Code : BTCS701-18

M.Code : 90487

Date of Examination : 12-12-2022

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) What is Vulnerability?
- b) What is modular arithmetic give an example to explain?
- c) What is the importance of prime numbers in cryptography?
- d) AES.
- e) What does CIA model?
- f) Define threat and attack.
- g) Euler's Theorem.
- h) Kerberos.
- i) PGP.
- j) Block cipher.



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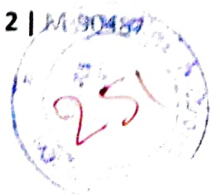
## SECTION-B

2. Differentiate Active and Passive attack.
3. What is Conventional Encryption Model? Explain.
4. Explain the different mode of operations.
5. Give details of RSA algorithm with the help of suitable example.
6. Explain any two key distribution techniques.

## SECTION-C

7. Explain the followings:
  - a) IDS
  - b) Email Security.
8. What are the main Threats in networks .Explain the network Security Control Archicture.
9. Give details of the following :
  - a) Secure Hash Algorithm
  - b) Digital signature.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS-702-18

M.Code : 90488

Date of Examination : 14-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a) Functionality of Search Engine
- b) DHP
- c) ROLAP architecture
- d) Performance metrics for Mining Algorithms
- e) Density based clustering
- f) Web Hierarchy
- g) Prediction
- h) Data Purging
- i) Data Profiling
- j) Multidimensional View.

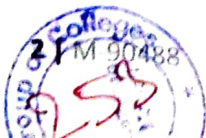
## SECTION-B

2. What are the various types of OLAP servers? Explain.
3. How hierarchal clustering helps in data mining? Discuss key issues.
4. Discuss the need of Data cleaning. How do it improve data quality?
5. Explain Apriori algorithms for frequent item set using candidate generation.
6. What is the need to maintain hierarchy in web structure? Illustrate. What are different rules for web mining?

## SECTION-C

7. What is data ware house? Elaborate data ware house using multi-tier architecture with an elaborative diagram.
8. What are the most important factors for Page ranking on Internet? Explain in detail. What are the methods to improve page ranking? List some tools helpful to improve Page Rank.
9. How clustering helps for data mining in large databases? List clustering methods, explain any two.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

**Subject Code : BTCS-702**

**M.Code : 71894**

**Date of Examination : 02-01-2023**

**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 some applications of TOC.
- b) Define Grammar.
- c)  $\Sigma=\{0,1\}$ , Write RE for the alphabet whose 9th symbol from the L.H.S is 1.
- d) Define Derivation Tree and Yield of Tree.
- e) Define instantaneous description of a Turing Machine
- f) Why do we need different normal forms for CFG?
- g) How PDA is different from FA?
- h) Define Regular grammar.
- i) What is meaning of acceptability of string by FA?
- j) What is halting problem?



## SECTION-B

2. Discuss the procedure for converting NDFA to DFA with the help of a suitable example.
3. What are regular expressions? Can regular expressions be converted into Finite Automata? Justify your answer with the help of an example.
4. What is Pumping Lemma? How is Pumping Lemma used to prove that a given grammar is not a regular grammar?
5. Discuss the concept of left most derivation and right most derivation in reverse with the help of examples.
6. What is a normal form? Explain the Chomsky normal form and write its benefits.

## SECTION-C

7. What is a Context Free Grammar? Prove that if  $L_1$  and  $L_2$  are two context free languages, their union  $L_1 \cup L_2$  will also be context free.
8. Explain the concept of Turing Machine. Construct a TM for  $L = \{0^n 1^n 2^n \mid n \geq 1\}$ .
9. Discuss Chomsky classification of Grammars with the help of writing rules for each type of grammars and show the correspondence of each type of automata with the grammars.

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Total No. of Questions : 09

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**B.Tech. (CSE/ECE/ME) (Sem.-7,8)**  
**MAINTENANCE AND RELIABILITY**

**Subject Code : BTME617-18**

**M.Code : 90485**

**Date of Examination : 11-01-2023**

**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 Breakdown maintenance?
- b) How Maintenance Record keeping is different from Inventory record keeping?
- c) Differentiate between Age replacement and Periodic replacement policy.
- d) What is the need of maintenance planning for a production system and identify the benefits of effective maintenance?
- e) How the performance of maintenance is measured?
- f) Define the concept of system reliability.
- g) Define Overall Equipment effectiveness (OEE).
- h) Briefly explain Reliability function.
- i) Define system Availability?
- j) How Reliability can be incorporated in the design of equipment?



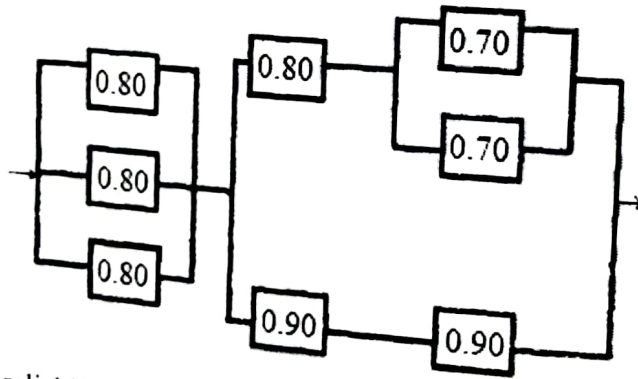
(S2)-1366

## SECTION-B

- Write various objective and functions of maintenance management.
- Discuss about Maintenance Planning and the factors to be considered in maintenance planning.
- A particular machine has a constant failure rate of  $\lambda = 0.02$  hrs. (i) What is the probability that it will fail within first 10 hours, (ii) Suppose that the machine has successfully operated for 100 hrs, what is the probability that it will fail during the next 10 hours of operation.
- Write difference between MTTF and MTBF with suitable examples.
- What are various costs involved with a Machine breakdown? How this can be reduced with proper manpower planning and Training?

## SECTION-C

- a) Find the system reliability of the following series-parallel configuration. The components reliabilities are given as shown below:



- b) Write various reliability improvement techniques.
- What do you understand by diagnostic maintenance? How it can be applied to thermal power plant? Discuss.
- Define the concept of Failure Tree Analysis (FTA). Explain the key elements and steps involved in FTA. State some applications/uses of FTA.

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Dec 2022

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Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTCS716-18

M.Code : 90507

Date of Examination : 13-01-23

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 are the functions performed by the node in WSN ?
- b) Routing Protocol for Adhoc Wireless Network.
- c) IEEE 802.15.4
- d) What is a contention based protocol?
- e) What is proactive routing?
- f) How the table driven protocols work in adhoc network?
- g) Why MAC protocol is used in wireless sensor network?
- h) What is SPINS?
- i) List five applications of WSN.
- j) What do you mean by Wakeup concepts?



## SECTION-B

2. Outline the issues in designing a routing protocol for Adhoc networks.
3. Explain MAC protocols for wireless sensors Networks.
4. Differentiate DSDV and AODV.
5. What are the designs challenges in Ad hoc and sensor Networks?
6. Explain in briefly :
  - a) S-MAC
  - b) LEACH

## SECTION-C

7. What are the various challenges for wireless Sensor Networks, explain?
8. Explain the layer wise attack in wireless sensor network.
9. What is TCP? Discuss with example TCP over Ad hoc wireless network.

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





Dec 2022

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

Subject Code : BTES-302-18

M.Code : 76394

Date of Examination : 21-01-2023

P.T.U Bueglic  
B.Tech CI  
Sem-

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

**1. Answer briefly :**

- a) What are the advantages of carry look-ahead adder?
- b) What do you mean by input-output subsystems?
- c) Explain in brief about non-restoring Division.
- d) What do you mean by privileged instructions? Explain.
- e) What do you mean by DMA? Explain.
- f) Explain in brief about the throughput of a pipeline processing.
- g) What do you mean by parallel processing? Also, write the advantages of parallel processing.
- h) What do you mean by Pipeline Hazards? Explain.
- i) What do you mean by Cache Misses? Explain.
- j) What are two main cache write policies?

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## SECTION-B

2. Write a detailed note on Booth Multiplier.
3. Differentiate between hardwired and micro-programmed CPU control unit design.
4. Explain about arithmetic pipelining with an example.
5. Explain in detail about Control Hazards.
6. Write a detailed note on write policies.

## SECTION-C

7. Explain in detail about following :
  - a) Carry save multiplier
  - b) Shift and add multiplier.
8. Explain in detail about I/O device interfaces.
9. Explain the following terms in detail :
  - a) Cache Coherency
  - b) Memory Interleaving.

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



Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

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

**MATHEMATICS-III**

Subject Code : BTAM-304-18

M.Code : 76393

Date of Examination : 19-01-2023

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 the continuity of  $f(x, y)$  at  $(0, 0)$  where  $f(x, y) = \begin{cases} \frac{2xy^2}{x^3 + y^3}, & (x, y) \neq (0, 0) \\ 0, & (x, y) = (0, 0) \end{cases}$ .

b) State Euler's Theorem of homogeneous functions.

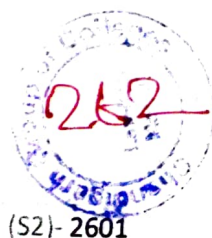
c) Evaluate  $\int_0^1 \int_0^1 (x^2 + 3y^2) dx dy$ .

d) Prove that a Cauchy sequence is bounded.

e) Discuss the behavior of the series  $\sum \left(\frac{n}{n+1}\right)^n$ .

f) Find the integration factor of the differential equation:  $xdy + ydx = 0$ .

g) Solve the differential equation:  $y = px + p - p^3, \left(p = \frac{dy}{dx}\right)$ .



h) Find the particular integral of the equation  $\frac{d^3y}{dx^3} - y = (e^x + 1)^2$ .

i) Define Linear Differential Equation with example.

j) Define Legendre's differential equation.

### SECTION-B

2. If  $u = x^2(y-z) + y^2(z-x) + z^2(x-y)$ , prove that  $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$ .

3. Sketch the region of integration and evaluate the integral  $\int_0^{2y^2} \int_0^x e^y dx dy$ .

4. Test for convergence the series  $\sum \left( n \log \frac{2n+1}{2n-1} - 1 \right)$ .

5. Solve the differential equation:  $\left( \frac{dy}{dx} \right)^2 + 2y \cot x \frac{dy}{dx} = y^2$ .

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

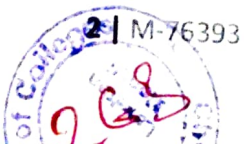
### SECTION-C

7. Show that  $\iiint \frac{dx dy dz}{a^2 + x^2 + y^2 + z^2} = a\pi(4 - \pi)$  over the region  $x^2 + y^2 + z^2 \leq a^2$ .

8. Apply the method of variation of parameter to solve  $\frac{d^2y}{dx^2} - y = \frac{2}{1+e^x}$ .

9. Solve the differential equation:  $x^2 \frac{d^2y}{dx^2} + 2x \frac{dy}{dx} - 20y = (x+1)^2$

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## SECTION-B

2. Write a C++ (using classes) program to generate Fibonacci series using recursion with member function.
3. Explain about the various types of access specifiers are used in C++
4. Write program to overload << and >> operators in complex numbers.
5. Write a program to access the private data of a class by using Friend Function.
6. Discuss about the importance of try, catch and throw keywords.

## SECTION-C

7. What are different decision control statements in C++? Give syntax and example of each using a suitable C++ program.
8. Write a C++ program for swapping two numbers using call by value, call by reference and call by pointer.
9. **Write a Short note on :**
  - a. Parametrized constructors
  - b. Early vs late binding with the help of example.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(IT) (2018 Batch) (Sem.-3)**  
**DATA STRUCTURE & ALGORITHMS**

Subject Code : BTIT-301-18

M.Code : 76391

Date of Examination : 14-01-2023

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) How do you test for an empty queue?
- b) What do you mean by the depth of a binary tree? What is the depth of a complete binary tree.
- c) Which data structure is used to perform recursion and why?
- d) Write different ways of traversing a tree.
- e) How are strings stored in memory?
- f) What are priority queues?
- g) What is time space trade off?
- h) What is adjacency matrix?
- i) What is polish station?
- j) Compare the time complexities of bubble sort and merge sort.



## SECTION - B

2. Explain the addition and deletion operation performed on a circular queue with necessary algorithm.
3. Construct the binary tree given the following traversals :  
Pre-order : E A C K F H D B G  
In-order : F A E K C D H G B
4. Write an algorithm to insert a node into a linked list before a given node.
5. What is single source shortest path? Discuss Dijkstra's single source shortest path algorithm with an example.
6. Explain various hashing functions. What do you mean by collisions in hashing?

## SECTION-C

7. Give an algorithm for constructing a BST. While, constructing the tree, take care duplicate values are not added. Trace algorithm for: S,T,P,Q,M,N,O,R,K,V,A,B.
8. a) How 2-d arrays are represented in memory? Explain in detail.  
b) Write a program to multiply two-dimensional arrays.
9. Write down quicksort Algorithm and illustrate its working to sort list:  
25, 15, 30, 9, 99, 20, 26, 80, 42

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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 : 10/1/2023

P.T.U. Quest  
B.Tech CIP  
Sem -

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 operating system and list the basic services provided by the operating system.
- b) Explain in brief about the concept of virtual machine.
- c) Explain the term context switching in brief.
- d) Differentiate between Pre-emptive and Non-pre-emptive scheduling algorithms.
- e) Explain the term Critical Section in reference to Inter-process communication.
- f) What do you mean by Semaphores? Explain
- g) What are the conditions under which a deadlock situation may arise?
- h) What is resource-allocation graph in reference to deadlocks?
- i) Explain the term Compaction in brief.
- j) List various file operations.

M-77539

S-1659



## SECTION-B

2. Explain in detail about the categories of system calls.
3. Explain in detail about the following CPU scheduling algorithms with an example.
  - a) Shortest Job First
  - b) Round Robin
4. Write a detailed note on Monitors in reference to Inter-Process Communication.
5. Define the term virtual memory. What is its need? Write various advantages of virtual memory.
6. Explain deadlock avoidance with a suitable example using banker's algorithm.

(2.5+2.5)

## SECTION-C

7. Explain in detail about the following terms in reference to structure of OS:
  - a) Monolithic System
  - b) Layered Systems
  - c) Micro Kernels
8. a) Define process. Explain process states and process control block in details.  
b) Write a detailed note on Reader's & Writer Problem in reference to Inter-process communication.
9. Write a detailed note on various disk scheduling algorithms with a suitable example.

(3+3.5+3.5=10)

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

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## SECTION-B

2. Explain in detail the functions of following OSI layers.
  - a) Data Link Layer
  - b) Transport Layer
3. Write a detailed note on CSMA/CD.
4. Explain in detail about RARP.
5. Write a detailed note on Leaky Bucket algorithm.
6. Explain in detail about firewalls.

## SECTION-C

7. Write a detailed note on Transmission Media.
8. Write a detailed note on Transmission Control Protocol.
9. Write a detailed note on following in reference to application Layer: (3,3,4)
  - a) Domain Name Space(DNS)
  - b) TELNET
  - c) SNMP

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Roll No.

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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 : 07-01-23

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) Family
- b) Social system
- c) Society
- d) Social structure
- e) Political system
- f) Governing system
- g) Socialism
- h) Barter
- i) Small is Beautiful
- j) Swaraj.

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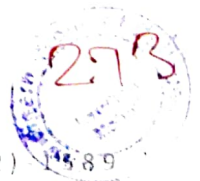
## SECTION-B

2. Discuss the concepts behind the origin of clan.
3. Discuss various types of social system.
4. Discuss democracy as a mode of governing system.
5. What is Marxism? Write a note on its origin.
6. Discuss the concept of economic development during British period.

## SECTION-C

7. Make a comparative study of different models of social structure.
8. Compare different models of governing system.
9. Elaborate E.F. Schumacher's idea of Economic Development.

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



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Total No. of Pages: 02

Total No. of Questions: 09

**B.Tech. (IT) (Sem. – 4)**  
**DESIGN & ANALYSIS OF ALGORITHMS**

**Subject Code: BTIT-403-18**

**M Code: 77540**

**Date of Examination : 06-01-2023**

**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 an algorithm?
- b) Explain the application of depth first search.
- c) What is flow network?
- d) What is NP-complete problem?
- e) Explain how greedy paradigm of algorithm differs from dynamic programming.
- f) Solve the following recurrence relation:  
$$T(n)=T(n-2)+n, n>1$$
$$T(0)=C$$
$$T(1)=d$$
- g) Explain general backtracking method.
- h) What do you mean by randomization?
- i) What is cook's theorem?
- j) Define live node and dead node.

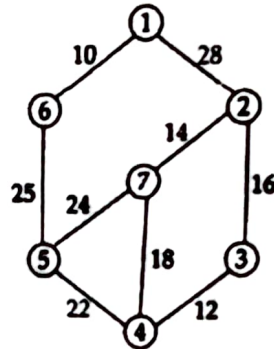
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## SECTION-B

2. What is the relationship among P, NP and NP complete problems? Show with the help of a diagram.
3. Explain breadth first search algorithm with an example.
4. Explain the concept of minimum spanning trees. Solve the following graph using prim's algorithm.



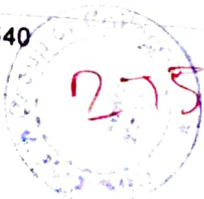
5. Explain various notations for representations of time complexity of an algorithm with suitable example.
6. Explain the greedy method with a suitable example.

## SECTION-C

7. Explain the advantages of using dynamic programming. Introduce travelling salesman problem. Explain the technique to solve travelling salesman problem using this technique.
8. Why do we perform topological sorts only on directed acyclic graph? Explain.
9. Discuss Heuristics and its characteristics.

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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 : BTIT501-18

M.Code : 78256

Date of Examination : 13-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :

- a. What do you mean by NFA?
- b. Differentiate between TYPE1 and TYPE2 grammar.
- c. Define PDA.
- d. Write applications of Finite Automata.
- e. Define Linear bounded automata.
- f. Define Turing Machine.
- g. What do you mean by NP-complete problem?
- h. What do you mean by Chomsky Normal form?
- i. Define term ambiguity with example.
- j. What do you mean by Automata theory?

## SECTION-B

2. Explain non-deterministic finite automata in detail with example.
3. Explain Context free grammars in detail.
4. What do you mean by linear bounded automata, explain with proper example?
5. Explain basic model of Turing machine in detail.
6. Explain Cook-Levin theorem with suitable example.

## SECTION-C

7. Describe pumping lemma for regular set with the help of suitable example.
8. Define Regular Expression and explain the properties of regular expressions.
9. Discuss about NP Hard problems with proper 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.**



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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (IT) (Sem.-5)**  
**PROGRAMMING IN JAVA**  
Subject Code : BTIT-503-18  
M.Code : 78258  
Date of Examination : 15-12-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

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

**SECTION-A**

1. Write briefly :
  - a) Java virtual machine
  - b) Array
  - c) Garbage collection
  - d) Recursion
  - e) Thread
  - f) Applets
  - g) Socket
  - h) Reading consol input
  - i) Object
  - j) Exception.

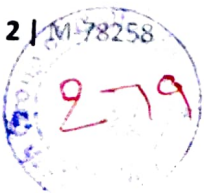
## SECTION-B

2. What is an operator? Explain different types of operators available in Java.
3. Differentiate between extends and implements, with suitable example.
4. Write a program to print Fibonacci series using recursion.
5. Explain the life cycle of thread.
6. What is an Applet? How applets are different from standalone java application program.

## SECTION-C

7.
  - a) What is multithreading? Give two advantages and disadvantages of multithreading.
  - b) Write a program in javc that receive two numeric input from user and then perform different arithmetic operations on them.
8. Explain the following keywords :
  - a) Abstract class
  - b) Overloading
  - c) Bitwise operator.
9. How an applet is created? Describe the applet life cycle. What are the requirement for creating an Applet?

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## SECTION-B

2. Write a brief note on functional and non-functional requirements?
3. Explain in detail about object modeling using UML.
4. Write a detailed note on White-box-testing.
5. Explain in detail about Project Planning and Control.
6. Write a detailed note on Component based software Development.

## SECTION-C

7. Explain the following Software life cycle models in detail:
  - a) Waterfall Model
  - b) Evolutionary Model
8.
  - a) Explain in detail about DFD and structure chart.
  - b) Write a detailed note on test case design techniques.
9. Write a detailed note on PSP and Six Sigma.

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## SECTION-B

2. Write a brief note on functional and non-functional requirements?
3. Explain in detail about object modeling using UML.
4. Write a detailed note on White-box-testing.
5. Explain in detail about Project Planning and Control.
6. Write a detailed note on Component based software Development.

## SECTION-C

7. Explain the following Software life cycle models in detail:
  - a) Waterfall Model
  - b) Evolutionary Model
8.
  - a) Explain in detail about DFD and structure chart.
  - b) Write a detailed note on test case design techniques.
9. Write a detailed note on PSP and Six Sigma.

**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 : 20-12-22

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. Fill in the blanks / True / False :**

(10 × 1 = 10)

- a) Physical facilities are necessary but ..... for humans.  
भौतिक सुविधाएं मनुष्य के लिए आवश्यक है, लेकिन ..... है।  
भौतिक सुविधाएं मनुष्य के लिए आवश्यक हैं, लेकिन ..... हैं।
- b) Animal order in nature contains ..... and .....  
प्रकृति में पशु आदेश में ..... और ..... होता है।  
प्रकृति में पशु आदेश में ..... और ..... होता है।  
कुदरत ਵਿੱਚ ਪਸ਼ੂ ਆਦੇਸ਼ ਵਿੱਚ ..... ਅਤੇ ..... ਹੁੰਦਾ ਹੈ।
- c) Self-exploration is the process for ..... education.  
आत्म-अध्ययन ..... शिक्षा के लिए प्रक्रिया है।  
ਸਵੈ-ਅਧਿਐਨ ..... ਸਿੱਖਿਆ ਲਈ ਪ੍ਰਕਿਰਿਆ ਹੈ।
- d) To be in a state of liking is .....  
पसंद के हिसाब से एक अवस्था में होना ..... है।  
ਪਸੰਦ ਦੇ ਹਿਸਾਬ ਵਲੋਂ ਇੱਕ ਦਸ਼ਾ ਵਿੱਚ ਹੋਣਾ ..... ਹੈ।
- e) Right understanding + ..... = Mutual prosperity.  
सही समझ + ..... = पारस्परिक समृद्धि।  
ਠੀਕ ਸਮਝ + ..... = ਆਪਸੀ ਖੁਸ਼ਹਾਲੀ।

[M-78260]



(S-17)-977

- f) Human values are universal.  
ਮਾਨਵੀ ਮੁੱਲ ਸਾਰਵਭੌਮਿਕ ਹਨ।  
ਮਾਨਵੀ ਮੁੱਲ ਸਾਰਵਭੌਮਿਕ ਹਨ।
- g) Prosperity and wealth are equivalent.  
ਸਮ੍ਰਿਠਿ ਅਠਰ ਖਨਕਨਗ ਬਰਾਕਰ ਹੈ।  
ਖੁਸ਼ਹਾਲੀ ਅਤੇ ਅਮੀਰੀ ਬਰਾਬਰ ਹਨ।
- h) Imaging is an activity of the body.  
ਇਮੇਜਿੰਗ ਸਰੀਰ ਕੀ ਏਕ ਗਤਿਕਿਠਿ ਹੈ।  
ਇਮੇਜਿੰਗ ਸਰੀਰ ਦੀ ਇੱਕ ਗਤੀਵਿਠੀ ਹੈ।
- i) The innateness of material order is existence.  
ਸਾਮਗਰੀ ਆਦੇਸ਼ ਕੀ ਪ੍ਰਕ੍ਰਿਤਿ ਅਸਿਕਿਕ ਹੈ।  
ਸਾਮਗਰੀ ਆਦੇਸ਼ ਦੀ ਕੁਦਰਤੀ ਅਸਤੀਤਵ ਹੈ।
- j) Right understanding forms the basis for definitiveness of human conduct.  
ਸਹੀ ਸਮਝ ਮਾਨਕ ਆਚਰਣ ਕੀ ਨਿਸ਼ਿਕਿਕਤਗ ਕੇ ਲਿਏ ਆਖਾਰ ਬਨਾਗ ਹੈ।  
ਠੀਕ ਸਮਝ ਮਨੁੱਖ ਚਾਲ ਚਲਣ ਦੀ ਨਿਸ਼ਚਿਤਗ ਲਈ ਆਧਾਰ ਬਣਾਉਂਦੀ ਹੈ।

### SECTION-B

2. Explain harmony in family. (5 × 4 = 20)  
ਪਰਿਕਾਰ ਮੇਂ ਗਲਮੇਲ ਕੇ ਬਾਰੇ ਮੇਂ ਕਗਾਓ।  
ਪਰਿਕਾਰ ਵਿੱਚ ਤਾਲਮੇਲ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।
3. What is the difference between prosperity and wealth?  
ਸਮ੍ਰਿਠਿ ਅਠਰ ਖਨ ਕੇ ਬੀਚ ਕਯਾ ਅੰਤਰ ਹੈ?  
ਖੁਸ਼ਹਾਲੀ ਅਤੇ ਪੈਸੇ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ?
4. Differentiate between intention and competence. How do we come to confuse between the two?  
ਇਰਾਦਾ ਅਠਰ ਕਸ਼ਮਗ ਕੇ ਬੀਚ ਕਯਾ ਅੰਤਰ ਹੈ? ਕੈਸੇ ਹਮ ਗਲਗੀ ਕਰਗੇ ਹੈਂ?  
ਇਰਾਦਾ ਅਤੇ ਸਮਰੱਥਾ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ? ਕਿਵੇਂ ਅਸੀਂ ਗਲਗੀ ਕਰਦੇ ਹਾਂ?
5. What are the basic guidelines of value education?  
ਮੁੱਲ ਸਿੱਖਿਠਾ ਕੀ ਬੁਨਿਠਾਦੀ ਦਿਸ਼ਾ-ਨਿਦੇਸ਼ ਕਯਾ ਹੈਂ?  
ਮੁੱਲ ਸਿੱਖਿਠਾ ਦੀ ਬੁਨਿਠਾਦੀ ਦਿਸ਼ਾ-ਨਿਰਦੇਸ਼ ਕੀ ਹਨ?

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(S-17)-977

6. How there is Self-Regulation in Nature?

प्रकृति में आत्म-नियमन कैसे है?

ਕੁਦਰਤ ਵਿੱਚ ਆਤਮ-ਨਿਯਮਤਾ ਕਿਵੇਂ ਹੈ?

SECTION-C

(5 × 6 = 30)

7. 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।

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

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?

OR

What is the need of value-Education?

मूल्य-शिक्षा की क्या जरूरत है?

ਮੁੱਲ-ਸਿੱਖਿਆ ਦੀ ਕੀ ਜ਼ਰੂਰਤ ਹੈ?

9. What do you mean by universal human order? What could be your role in moving towards it?

आप सार्वभौमिक मानवीय आदेश से क्या समझते हैं? इसमें आपकी भूमिका क्या हो सकती है?

ਤੁਸੀਂ ਸਾਰਵਭੌਮਿਕ ਮਾਨਵੀ ਆਦੇਸ਼ ਵਲੋਂ ਕੀ ਸਮਝਦੇ ਹੋ? ਇਸ ਵਿਚ ਤੁਹਾਡੀ ਭੂਮਿਕਾ ਕੀ ਹੋ ਸਕਦੀ ਹੈ?

OR

Explain competence in professional-Ethics.

पेशेवर नैतिकता में क्षमता समझाओ।

ਪੇਸ਼ੇਵਰ ਨੈਤਿਕਤਾ ਵਿੱਚ ਸਮਰੱਥਾ ਸਮਝਾਓ।



10. Describe in brief the salient values in human relationships.  
मानकीय रिश्तों में संक्षिप्त मुख्य मूल्यों का विवरण दें।  
ਮਾਨਵੀ ਰਿਸ਼ਤਿਆਂ ਵਿੱਚ ਸੰਬੰਧਿਤ ਮੁੱਖ ਮੁੱਲਾਂ ਦਾ ਵਰਨਣ ਕਰੋ।

OR

What are the five dimensions of human endeavour in society?  
समाज में मानव प्रयास के पांच आयाम क्या हैं?

ਸਮਾਜ ਵਿੱਚ ਮਨੁੱਖ ਕੋਸ਼ਿਸ਼ ਦੇ ਪੰਜ ਪਹਿਲੂ ਕੀ ਹਨ?

11. What do you mean by Respect? What are the different patterns of differentiation?  
आपका सम्मान से क्या मतलब है? भेदभाव के विभिन्न पैटर्न क्या हैं?  
ਤੁਹਾਡਾ ਆਦਰ ਦਾ ਕੀ ਮਤਲਬ ਹੈ? ਫਰਕ ਦੇ ਵੱਖ ਵੱਖ ਪੈਟਰਨ ਕੀ ਹਨ?

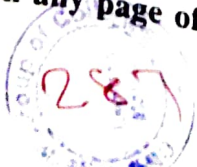
OR

What is happiness? What is the wrong notion about attaining happiness? What are the problems faced due to the wrong notions about happiness and prosperity?  
सुख क्या है? खुशी को प्राप्त करने के बारे में गलत धारणा क्या है? सुख और समृद्धि के बारे में गलत धारणाओं के कारण पेश आ रही समस्याएं क्या हैं?

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

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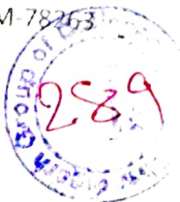
## SECTION-B

2. Explain in detail the Grey Areas of IT Act.2000
3. Discuss origin and evolution of cyber-crime. Explain different categories of cyber-crime.
4. Explain the role of cyber law in network security?
5. Explain Briefly :
  - a. Right to Publish
  - b. Right of Broadcasting.
6. Explain in detail the Justification theories for Intellectual Property Rights (IPRs).

## SECTION-C

7. What is the role of certification Authority? Explain in detail the process of getting Software copyright.
8. Explain by taking a suitable example the purpose of law enforcement agencies. Discuss in detail the challenges faced by law enforcement agencies.
9. **Explain :**
  - a) Infringement of copyright
  - b) Direct infringement and Indirect Infringement.

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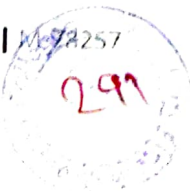
## SECTION-B

2. Discuss the different advantages and disadvantages of Network Model, Relational and Object-Oriented Data Model.
3. What is the need of normalizing a database? How 3 NF works?
4. Explain the ACID properties with the help of a suitable example.
5. Explain process of indexing in database. How it improves the performance of the database?
6. Explain the SQL injection attack with the help of an example.

## SECTION-C

7. Discuss different problems occurred in Concurrent Execution. How these problems have been resolved using different algorithms?
8. Explain the different types of joins with the help of suitable examples. What is the need of self-joining a table?
9. Write Short note on :
  - a. Query Optimization
  - b. Distributed Databases

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Dec 2, 2022

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 : 12-12-2022

P.T.U. Question  
18. Tech. IT  
Sem - 6

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 BASE concept?
- b) What are different types of digital data?
- c) What is MapReduce?
- d) What is TTL index in MongoDB?
- e) What is CQLSH and why it is used?
- f) What is difference between collection and document in MongoDB?
- g) What is HQL in Hive?
- h) What are vectors in R?
- i) What do you understand by datasets?
- j) Define Data Science.



## SECTION-B

2. What is Hadoop? Discuss the Hadoop eco-system and its main components in detail.
3. What is the difference between SQL and NoSQL databases? List NoSQL databases.
4. Explain MongoDB and its features, also discuss CRUD operations?
5. What are Jasper Reports? How does Jasper report connect to database?
6. What are different analytical approaches and tools used for business?

## SECTION-C

7. What are the classifications of analytics? Explain.
8. What are the steps in a MapReduce after job submission? Explain.
9. What is R and their variable? How vector is used in R? Explain.

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## SECTION-B

2. *“Proxy server helps prevent cyber attackers from entering a private network”*. Justify.
3. Describe the basic structure of HTML document in detail.
4. Explain the concepts of local variables in JavaScript.
5. What are the advantages and disadvantages of for each loop in PHP?
6. Why AJAX-based applications, are considered to be difficult to debug, test and maintain?

## SECTION-C

7. What is the World Wide Web and how does it work?
8. *“Websites updating live sports scores can be considered as an example of AJAX”*. Justify.
9. Discuss the various features of CSS3 in detail.

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## SECTION-B

2. Compare the cloud, grid and utility computing.
3. What are virtualization technology and its pros and cons in cloud computing?
4. What measures can reduce security breaches in cloud computing?
5. What is the migration path of cloud computing?
6. What are the security risks to the cloud computing?

## SECTION-C

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

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## SECTION-B

2. How the Liskov Substitution Principle is used in Agile design methodology?
3. Define sprint planning. What are its various roles in Software development?
4. What is a Kanban Board? Write the ways to add the policies in board.
5. Discuss the role of functional and unit testing in Agile software development.
6. How regression test is beneficial in Agile testing? Explain with example.

## SECTION-C

7. What are the characteristics of an Agile life cycle? What is its impact on testing?
8. What is the principle of Agile software development? Discuss its advantages.
9. Discuss Extreme programming. Write about the twelve practices of XP.

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2 | M.79628



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## SECTION-B

2. What do you mean by a well-posed learning problem? Explain the important features that are required for a well-defined learning problem. Formulate the robot driving learning problem as a machine learning task, give its performance measure, training experience, target function to be learned and a target representation.
3. How is information gain used as attribute selection measure in the decision tree algorithm? Explain. What are the limitations of the decision tree algorithm?
4. What do you mean by association rule mining? Describe Apriori algorithm in detail.
5. How is the performance of a linear regression model evaluated? List and define various metrics that are used in this process. Also discuss the role of confusion matrix.
6. Write a note on various methods of data preprocessing. Explain with help of examples.

## SECTION-C

7. Describe K-Nearest Neighbour learning algorithm for continuous valued target function. Discuss the major drawbacks of the algorithm and how they can be corrected?
8. Explain how forward propagation and backward propagation takes place in an artificial neural network? Support your answer with a well labeled diagram of ANN architecture.
9. What are various approaches to machine learning? Compare and contrast these approaches. Discuss the challenges and application areas of reinforcement learning in particular.

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2 | M-29627



(52)-812



## 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 control in Network Security?

## 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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Total No. of Questions : 09

Total No. of Pages : 02

**B.Tech. (Information Technology) (Sem.-7)**

**SOFTWARE PROJECT MANAGEMENT**

Subject Code : BTIT702-18

M.Code : 90550

Date of Examination : 04-01-23

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 do you mean by Software Project Measurement (SPM)?
- b) What do you mean by Software Maintenance?
- c) What is the importance of Decision Making in projects?
- d) Brief the structure of quality assurance team.
- e) What is Risk Assessment?
- f) What is the difference between Error and Fault?
- g) What is the Role of leadership skill in projects?
- h) Write a short note on Testing and Maintenance.
- i) Explain the need of Reliability.
- j) What is the importance of documentation in SPM?



## SECTION-B

2. What are the various types of Risks and how they are evaluated in projects?
3. What are the major activities in Project Monitoring and controlling?
4. **Explain the following terms in detail :**
  - a) Effects of schedule compression
  - b) Cost Benefit analysis.
5. **Write note on the following :**
  - a) Stages in contract placement
  - b) Contract management and acceptance.
6. Explain Project management in terms of Software Development Process.

## SECTION-C

7. What is Test Case? Explain the use of test automation to uncover the errors in software projects.
8. Explain the critical path analysis in Software Project Management.
9. Explain the significance and effects of Quality management and people management in Project management of an Organization.

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## SECTION-B

2. A popular data warehouse implementation is to construct a multidimensional database, known as a data cube. Unfortunately, this may often generate a huge, yet very sparse multidimensional matrix. Present an example illustrating such a huge and-sparse data cube.
3. Describe the taxonomy of data mining tasks.
4. Association rule mining often generates a large number of rules. Discuss effective methods that can be used to reduce the number of rules generated while still preserving most of the interesting rules.
5. Describe the architecture and working of the search engine.
6. Discuss the Dependent Data Mart, Independent Data Mart and Federated Data Mart architectures of Data Warehouse, compare each type with suitable diagrams.

## SECTION-C

7. Explain various methods of data cleaning in detail.
8. Write an algorithm for finding frequency item sets for Mining Multilevel association rules from Transactional Databases.
9. Why naive Bayesian classification is called “naïve”? Briefly outline the major ideas of naive Bayesian classification. Explain Naive-Bayes classification.

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## SECTION-B

2. What is the difference between software safety and software reliability?
3. Explain the configuration management process. Also, mention the role of configuration audit.
4. Differentiate between equivalence partitioning and boundary value analysis method.
5. What do you mean by a test case? Explain the features of a test case.
6. Discuss the various steps used for testing real time systems.

## SECTION C

7. List and explain the various software qualities attributes.
8. Why do we need integration testing? Explain various approaches in Integration testing.
9. Discuss the design phase and program phase testing.

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