

**DESIGN OF MECHINE MEMBERS-II
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | Marks | CO | BTL |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|
| 1. | a) Derive the expression for the wall thickness of a cylinder using Lamé's equation. | 10 M | CO1 | K2 |
| | b) A hydraulic press has a maximum capacity of 1000 KN. The piston diameter is 250 mm. Calculate the wall thickness if the cylinder is made of a brittle material for which the permissible strength may be taken as 80 MPa. | 4 M | CO1 | K3 |

(OR)

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|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|----|
| 2. | a) Explain the design procedure for studs used to secure a cylinder head to the cylinder body. | 10 M | CO1 | K2 |
| | b) Design a cast iron cylinder for a four-stroke engine with the following specifications: brake power = 7 kW, speed = 800 r.p.m., indicated mean effective pressure = 0.6 MPa, and mechanical efficiency = 85%. Assume suitable data and state the assumptions made. | 4 M | CO1 | K3 |

UNIT-II

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|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|----|
| 3. | a) Explain the concept of buckling of a connecting rod and the various stresses it is subjected to. | 4 M | CO2 | K2 |
| | b) Design a connecting rod for a high-speed IC engine using the following data: cylinder bore = 100 mm, length of the connecting rod = 250 mm, mass of the reciprocating parts = 1.2 kg, length of stroke = 100 mm, engine speed = 2500 r.p.m., maximum gas pressure = 3.2 N/mm ² . Design the cross-section of the connecting rod. | 10 M | CO2 | K3 |

(OR)

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|----|----------------------------------------------------------------------------------------------------------------------|------|-----|----|
| 4. | a) Describe the procedure for designing a centre crankshaft when the crank is at the top dead centre (TDC) position. | 10 M | CO2 | K3 |
| | b) Explain the different types of stresses that a crankshaft is subjected to. | 4 M | CO2 | K2 |

UNIT-III

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|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|----|
| 5. | a) Explain the overhauling and self-locking conditions in power screws. | 4 M | CO3 | K2 |
| | b) A screw jack with a square thread is used to lift a load of 15 kN. The screw has an outside diameter of 60 mm and a pitch of 10 mm. The coefficient of friction between the screw and the nut is 0.15. The thrust collar has a mean diameter of 75 mm, with a coefficient of friction of 0.12. The handle length is 500 mm. Determine the force required to lift the load and the efficiency of the screw jack. | 10 M | CO3 | K3 |

(OR)

6. a) What are the advantages of a V-belt drive over a flat belt drive? 4 M CO3 K2
b) Design a V-belt drive to transmit 20 kW power from an electric motor running at 1440 r.p.m. to a machine operating at 480 r.p.m. The centre distance is 500 mm. Assume standard belt sizes and material properties are used. 10 M CO3 K3

UNIT-IV

7. a) A pair of helical gears is to transmit 10 kW. The pinion runs at 10,000 r.p.m. and has a pitch diameter of 75 mm. The gear has a pitch diameter of 300 mm. The helix angle is 45° , and the normal pressure angle is 20° . The gears are made of steel with an allowable static strength of 120 MPa. Determine a suitable module and face width from static strength considerations. 10 M CO4 K3
b) Explain the force analysis on a helical gear tooth. 4 M CO4 K2

(OR)

8. a) Enumerate the factors that affect the beam strength of a spur gear tooth. 4 M CO4 K1
b) A pair of spur gears with 20° full depth involute teeth is required to transmit 15 kW at 300 r.p.m. of the pinion. The speed ratio is 4:1. The static stress for the gear of cast iron is 80 MPa, and for the steel pinion, it is 120 MPa. The face width is 10 times the module. The number of teeth on the pinion is 18. Determine the module and face width of the gears. 10 M CO4 K3

UNIT-V

9. a) Differentiate between full and partial journal bearings. 4 M CO5 K2
b) A full journal bearing of 75 mm diameter and 120 mm long has a bearing pressure of 1.2 N/mm^2 . The speed of the journal is 1000 RPM. The ratio of journal diameter to the radial clearance is 1200. The bearing is lubricated with oil whose absolute viscosity at the operating temperature may be taken as 0.015 N-S/m^2 . The room temperature is 30°C . Determine the heat generated and the amount of artificial cooling required if the bearing dissipates heat at a rate of $2.5 \times 10^{-3} \text{ W/mm}^2/^\circ\text{C}$. 10 M CO5 K3

(OR)

10. a) Explain the following terms with reference to the journal bearing 4 M CO5 K2
(i) Bearing characteristic curve (ii) Bearing modulus
b) Design a journal bearing for supporting a generator shaft of 75 mm diameter with a load of 12 kN running at 1,440 rpm. Also, calculate the maximum pressure, energy loss due to friction, the heat generation, and the oil flow required for heat dissipation. 10 M CO5 K3

**DATA MINING
(INFORMATION TECHNOLOGY)****Time: 3 Hours****Max Marks: 70**

Answer ONE Question from each Unit

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Describe different measures of similarity and dissimilarity used in data mining?	7	CO1	L3
	b) Define various types of data encountered in data mining?	7	CO1	L1
(OR)				
2.	a) Discuss the relationship between data quality, data preprocessing?	7	CO1	L2
	b) Explain the steps involved in data preprocessing?	7	CO1	L2
<u>UNIT-II</u>				
3.	a) Discuss the various schemas used in a multidimensional data model?	7	CO2	L2
	b) Describe the process of analytical characterization?	7	CO2	L3
(OR)				
4.	a) Describe the three-tier architecture of a data warehouse?	7	CO2	L3
	b) Explain the importance of concept description in knowledge discovery?	7	CO2	L2
<u>UNIT-III</u>				
5.	a) Explain the Apriori algorithm for mining frequent item sets?	7	CO3	L2
	b) Explain the concept of pattern growth in FP-Growth and its role in mining frequent patterns?	7	CO3	L3
(OR)				
6.	a) Analyse the advantages and disadvantages of FP-Growth compared to Apriori.	7	CO3	L4
	b) List out frequent patterns and association rules?	7	CO3	L2
<u>UNIT-IV</u>				
7.	a) Analyse how backpropagation improves classification accuracy in neural networks?	7	CO4	L4
	b) Define holdout, cross-validation, and bootstrap methods for accuracy evaluation?	7	CO4	L2
(OR)				
8.	a) Discuss how classification accuracy can be improved using ensemble methods	7	CO4	L2
	b) Evaluate the importance of error measures in comparing prediction models?	7	CO4	L4
<u>UNIT-V</u>				
9.	a) Describe the approach of distance-based outlier detection?	7	CO5	L2
	b) Compare partitioning methods and hierarchical methods of clustering?	7	CO5	L2
(OR)				
10.	a) Discuss the working of k-Medoids clustering?	7	CO5	L2
	b) Explain the process of agglomerative hierarchical clustering?	7	CO5	L2

Time: 3 Hours

Max Marks: 70

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- | | | | Marks | CO | BTL |
|-----------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|
| UNIT-I | | | | | |
| 1. | a) | What if State Space Search? Solve water jug problem with 3,4 and 2 lts. using State Space Search. | 8 M | CO1 | K3 |
| | b) | What are the characteristics of production systems? Discuss with relevant examples from AI problem solving. | 6 M | CO1 | K2 |
| (OR) | | | | | |
| 2. | a) | Discuss Control Strategies in AI. Compare and contrast Breadth-First Search (BFS) and Depth-First Search (DFS) with examples. | 7 M | CO1 | K4 |
| | b) | Explain the characteristics of AI problems. How do these characteristics influence the choice of search strategy. | 7 M | CO1 | K2 |
| UNIT-II | | | | | |
| 3. | a) | Demonstrate the Generate and Test method of heuristic search with an example. What are its advantages and limitations. | 7 M | CO2 | K2 |
| | b) | Explain the working of the Best-First Search algorithm with a suitable example. Compare it with Breadth-First and Depth-First search. | 7 M | CO2 | K2 |
| (OR) | | | | | |
| 4. | a) | Explain Heuristic Search Techniques in Artificial Intelligence. How do they differ from uninformed search methods. | 6 M | CO2 | K2 |
| | b) | Define Constraint Satisfaction Problems (CSPs). Solve the Crypto arithmetic problem SEND + MORE = MONEY using CSP. | 8 M | CO2 | K3 |
| UNIT-III | | | | | |
| 5. | a) | Explain the design and role of the DART expert system. How did it contribute to military logistics planning. | 7 M | CO3 | K2 |
| | b) | Describe about different plots for data visualization. | 7 M | CO3 | K3 |
| (OR) | | | | | |
| 6. | a) | Demonstrate the structure, working, and applications of the MYCIN expert system. Why is it considered a milestone in medical AI. | 7 M | CO3 | K3 |
| | b) | Classify the importance of Heuristics in expert systems. How do heuristics improve decision-making. | 7 M | CO3 | K4 |
| UNIT-IV | | | | | |
| 7. | a) | What is Naive Bayes Classification? Derive the mathematical formulation and explain its applications in text classification. | 7 M | CO4 | K2 |
| | b) | Explain the working of a Support Vector Machine (SVM). Illustrate with a diagram how SVM separates classes using hyperplanes. | 7 M | CO4 | K2 |
| (OR) | | | | | |
| 8. | a) | Discuss the concept of Regression in supervised learning. Explain Linear Regression, Multiple Linear Regression, and Polynomial Regression with examples. | 7 M | CO4 | K4 |
| | b) | Explain accuracy, precision, recall, F1-score, and ROC curve in detail with suitable example. | 7 M | CO4 | K2 |
| UNIT-V | | | | | |
| 9. | a) | What is Feature Selection ? Explain the methods used for selecting important features in a dataset. | 7 M | CO5 | K2 |
| | b) | Explain the concept of Dimensionality Reduction in machine learning. Why is it necessary. | 7 M | CO5 | K3 |
| (OR) | | | | | |
| 10. | a) | Define Feature Extraction. How is it different from feature selection? Give examples where extraction is more suitable. | 7 M | CO5 | K3 |
| | b) | Demonstrate the Principal Component Analysis (PCA) Algorithm. Illustrate with an example how PCA reduces dimensionality. | 7 M | CO5 | K2 |

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Define Managerial Economics. Discuss scope of managerial economics.	7M	1	Understand
b)	Discuss the different types of price elasticity of demand.	7M	1	Understand
	(OR)			
2. a)	Describe the determinants of demand.	7M	1	Understand
b)	How does demand forecasting differ for new products as compared to established products?	7M	1	Understand
	<u>UNIT-II</u>			
3. a)	What is a production function and explain its importance.	7M	2	Understand
b)	Discuss the following cost concepts:			Understand
	1. Explicit Cost Vs Implicit cost			
	2. Fixed cost Vs Variable Cost	7M	2	
	3. Short-run cost Vs Long-run cost			
	4. Incremental cost Vs Sunk Cost			
	(OR)			
4. a)	In XYZ manufacturing unit, the fixed cost is Rs. 60000/- and variable cost is Rs.5/- and selling price is Rs.8/- find break even quantity and break even sales.	7M	2	Apply
b)	Explain break even analysis and Discuss the managerial significances of break-even analysis.	7M	2	Understand
	<u>UNIT-III</u>			
5. a)	Define market and explain different types of markets.	7M	3	Understand
b)	Discuss the price output determination in short period under perfect competition.	7M	3	Understand
	(OR)			
6. a)	Describe the monopoly competition and explain its features.	7M	3	Understand
b)	Compare and contrast value-based pricing and market-based pricing	7M	3	Understand
	<u>UNIT-IV</u>			
7. a)	Discuss Henri Fayol's principles of management in detail.	7M	4	Understand
b)	Explain Herzberg's Two-Factor Theory of Motivation.	7M	4	Understand
	(OR)			
8. a)	Explain the nature and importance of management.	7M	4	Understand
b)	"Leadership style plays a critical role in organizational success." Discuss the various leadership styles with suitable examples.	7M	4	Understand
	<u>UNIT-V</u>			
9. a)	Critically examine the various types of channels of distribution employed in Marketing.	7M	5	Analysis
b)	Discuss the role of grievance handling in employee relations.	7M	5	Understand
	(OR)			
10. a)	Explain the importance of HRM in any organization.	7M	5	Understand
b)	Explain different stages of product life cycle and state the significance of each stage.	7M	5	Understand

Time: 3 Hours**Max Marks: 60**

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<u>UNIT-I</u>		Marks	CO	Blooms Level
1.	a) Define CAD. Discuss its benefits towards the standardization of design, drafting and documentation procedures.	5	1	2
	b) What are the various processes that should be considered in getting the problem-identification phase of the product design?	5	1	2
(OR)				
2.	a) Explain the Raster scan approach for generating images in computer graphics with the help of suitable illustrations.	4	1	2
	b) Explain with a neat sketch stages of product life cycle in CAD / CAM system.	6	1	2
<u>UNIT-II</u>				
3.	a) Compare the measures of continuity of curves and surfaces.	5	2	2
	b) What is the common modeling methods available for surface design in a surface modeling software?	5	2	2
(OR)				
4.	Describe briefly the following methods of surface modeling with a few application examples: i. surface of Revaluation ii. Tubular surfaces iii. B-Spline surface iv. Bezier surface	10	2	2
<u>UNIT-III</u>				
5.	A rectangle has corner co-ordinates (10,20) (40,20), (40,40), (10,40). This rectangle is rotated by 30° anticlockwise about (i) origin and (ii) about the point (40,20). Compute the new co-ordinates in both cases.	10	3	3
(OR)				
6.	a) What are the most common primitives used in solid modelling? Give their parametric equations.	5	3	2
	b) Compare CSG and b-rep schemes giving their relative advantages.	5	3	2
<u>UNIT-IV</u>				
7.	a) Describe 'fixed-zero' and 'floating-zero' tool relative positions in NC systems with suitable diagrams	5	4	2
	b) Explain the following motion control systems with neat sketches: 1. Point-to-point NC 2. Straight-cut NC 3. Contouring NC	5	4	2
(OR)				

8.	Examine the following CNC part programs. Give the errors in the programs and also explain the error	10	4	3
	a). % O7001* N2 GO X3.0 Y4.0* N3 GI X7.0 F100* N4Y1.0 N5 X3.0* N6 Y4.0* N10 M02*	b). % O9401* N1 G17 T1 M6* N2 G92 X90.0 Y70.0* N3 G81 Y2.0 Z-10.0 F200 S500 M3* N5 G01 X4.0 Y12.0 F150* N10 M02*		
<u>UNIT-V</u>				
9.	a) What are the various methods available for forming groups in group technology? Explain briefly.	5	5	2
	b) Explain the basic structure of the Opitz classification system used in group technology with suitable illustration	5	5	2
(OR)				
10.	a) Explain the working of variant type CAPP with suitable illustration	5	5	2
	b) Discuss the benefits of CAPP over the manually oriented process planning	5	5	2
<u>UNIT-VI</u>				
11.	a) Describe the working of Robot-centered FMS layout with a neat sketch.	5	6	2
	b) Describe the role of primary and secondary material handling systems used in FMS	5	6	2
(OR)				
12	b) Explain the working of any two rapid prototyping processes you are familiar with?	10	6	2

UNIT-IMarks CO Blooms
Level

1. a) Explain data mining tasks. 5 CO1 K2
b) Explain different types of data sets. 5 CO1 K2

(OR)

2. a) Explain data quality? What are the various aspects of data quality related to data measurement and collection? 5 CO1 K2
b) Consider marks of 10 students in a subject as follows:
12,15,20,25,30,21,22,24,26,28 find
Range, Quartiles (25th percentile and 75th percentile) and draw a
Boxplot to get the distribution of data? 5 CO1 K3

UNIT-II

3. a) Suppose a data warehouse consists of three dimensions time, doctor and patient and two measures count and charge, where charge is the fee that a doctor charges a patient for a visit.
(i) Enumerate three classes of schemas that are popularly used for modelling data warehouses.
(ii) Draw a schema diagram for above data warehouse using schema classes listed in (i). 5 CO2 K3
b) Discuss the various schemas for multidimensional database. 5 CO2 K2

(OR)

4. a) Suppose that a college data warehouse consists of four dimensions course, student, staff, department and two measures count and charge, where charge is the fee that a department charges a student for offering a course. Draw a star schema diagram for the data warehouse and also give necessary details. 5 CO2 K3
b) What are the typical OLAP operations? Explain with a diagram. 5 CO2 K2

UNIT-III

5. a) Explain the applications of association rule analysis? Illustrate with examples 5 CO3 K2
b) How to find frequent item sets using candidate generation? Explain with algorithm 5 CO3 K3

(OR)

6. a) A database has five transactions. Let min sup = 3 and min conf = 80% 5 CO3 K3

ID	Items bought
T100	{M, O, N, K, E, Y}
T200	{D, O, N, K, E, Y}
T300	{M, A, K, E}
T400	{M, U, C, K, Y}
T500	{C, O, O, K, I, E}

Find all frequent itemsets using Apriori.

- b) Write the drawbacks of the Apriori Algorithm over FP-tree Algorithm? 5 CO3 K4

UNIT-IV

7. a) What is classification? What are the applications of Classification? 5 CO4 K2
b) Explain General approach to solve a classification problem? Explain using the terms training data, test data and Model building 5 CO4 K2

(OR)

8. a) Consider the below confusion matrix indicating the performance of a model on a test dataset. 5 CO4 K3

		Predicted Class	
		Class = 1	Class = 0
Actual Class	Class = 1	f_{11}	f_{10}
	Class = 0	f_{01}	f_{00}

Here $f_{11}=5, f_{10}=3, f_{00}=6, f_{01}=7$

Find accuracy, Error rate, precision and recall of the model.

- b) Explain the working of decision tree induction? 5 CO4 K2

UNIT-V

9. a) What are the different types of clusters? 5 CO5 K2
b) Consider five points $\{X_1, X_2, X_3, X_4, X_5\}$ with the following coordinates as a two dimensional sample for clustering : $X_1 = (0.5, 2.5)$; $X_2 = (0, 0)$; $X_3 = (1.5, 1)$; $X_4 = (5, 1)$; $X_5 = (6, 2)$ Illustrate the K-means partitioning algorithms using the above data set. 5 CO5 K3

(OR)

10. a) Illustrate the K-Means Partitioning Algorithm with an example. 5 CO5 K3
b) Write the Strengths, Weaknesses, Time, and space complexity of K-Means? 5 CO5 K4

UNIT-VI

11. a) What is an outlier? What are different types of outliers? Explain the challenges of outlier detection? 5 CO6 K2
b) How can clustering used for outlier detection? 5 CO6 K3

(OR)

12. a) What are the various applications of outlier detection? How can histogram help to identify outliers? 5 CO6 K3
b) Explain the parametric and non-parametric approaches for outlier detection? 5 CO6 K2

Time: 3 Hours

Max Marks: 60

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	<u>UNIT-I</u>	Marks	CO	BTL
1. a) Convert a) $(125)_{10} = ()_8$ b) $(74)_{10} = ()_{16}$		5	1	2
b) Determine the 1's complement of 101		5	1	2
(OR)				
2. a) Obtain the decimal equivalent of the following		5	1	2
a) $(135)_8$ b) $(27.1631)_8$				
b) Explain the procedure for Binary to gray code conversion and also convert $(101110)_2 = ()_{\text{gray}}$		5	1	3
UNIT-II				
3. a) Illustrate the different types of universal gates with the help of truth tables		5	2	3
b) Implement the Boolean expression using NAND gate $Y = AC + ABC + AB'$		5	2	3
(OR)				
4. a) Simplify the expression using Boolean theorems in the POS form $F(A,B,C) = A(A'+B)(A'+B+C')$		5	2	3
b) Reduce the expression $F = \sum m(0,1,2,3,5,7,8,9,10,12,13)$ and implement it using universal gates.		5	2	3
UNIT-III				
5. a) Implement a full adder circuit using two half adders and logic gates		5	3	3
b) Realize a Full subtractor using 2-input NOR gates.		5	3	2
(OR)				
6. a) Draw and explain the logic diagram of 4-bit look ahead carry adder.		5	3	2
b) Implement a full adder circuit using a 2-input NOR gates.		5	3	3
UNIT-IV				
7. Explain the detailed procedure of octal to Binary encoder using the truth table and logic diagrams.		10	4	1
(OR)				
8. a) Construct 7 segment LED display decoder circuit.		5	4	2
b) Explain in detail about 2-bit magnitude comparator.		5	4	2
UNIT-V				
9. a) Draw the logic diagram of D flip flop and explain its operation.		5	5	3
b) Discuss the various applications of Flip Flops in detail.		5	5	3
(OR)				
10. a) Explain its operation of T flip flop with the help of logic diagram		5	5	2
b) Convert RS Flip Flop to JK flip flop.		5	5	3
UNIT-VI				
11. a) Explain in detail about Parallel in parallel out shift register.		5	6	2
b) Draw the block diagram of 4-bit ring counter using D flip flops		5	6	3
(OR)				
12. Draw and explain the logic diagram of 4-bit universal shift register.		10	6	3

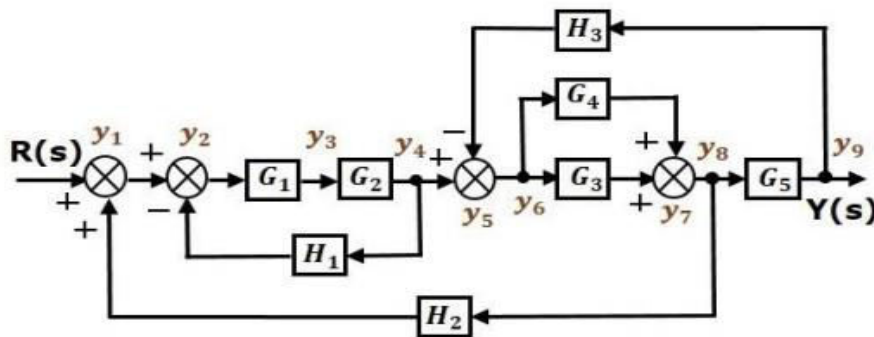
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UNIT-I

- | | | Marks | CO | BTL |
|------|-----------------------------------------------------------------------------------------------------------------------|-------|----|-----|
| 1. | a) Explain in detail the effect of feedback on sensitivity. | 5 | 1 | 1 |
| | b) Define Transfer function and what are the basic elements in the block diagram representation of transfer function. | 5 | 1 | 2 |
| (OR) | | | | |
| 2. | Convert the following block diagram into signal flow graph | 10 | 1 | 3 |

**UNIT-II**

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|----|-----------------------------------------------------------------------------------------------------|---|---|---|
| 3. | a) What is the difference between steady state response and transient response of a control system. | 5 | 2 | 2 |
| | b) Define Delay time, Rise Time, Peak Time, Peak overshoot, Settling Time | 5 | 2 | 2 |

(OR)

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|----|--------------------------------------------------------------------------------|---|---|---|
| 4. | a) Derive the response $c(t)$ of first order system with unit Step signal. | 5 | 2 | 3 |
| | b) Derive the response $c(t)$ of second order system with unit impulse signal. | 5 | 2 | 3 |

UNIT-III

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|----|-------------------------------------------------------------------------------------------------------------|---|---|---|
| 5. | a) Define Routh-Hurwitz Stability Criterion. What are the necessary conditions for Routh-Hurwitz Stability. | 5 | 3 | 2 |
| | b) Determine the value of K in the function $S^3 + 3S^2 + 2S + K = 0$ using Root locus Technique. | 5 | 3 | 3 |

(OR)

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|----|---------------------------------------------------------------------------------|----|---|---|
| 6. | Explain the effect of adding a Zero to the root locus of a second order system. | 10 | 3 | 2 |
|----|---------------------------------------------------------------------------------|----|---|---|

UNIT-IV

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|----|-------------------------------------------------------------------|----|---|---|
| 7. | Obtain the Bode plot of the system given by the transfer function | 10 | 4 | 3 |
|----|-------------------------------------------------------------------|----|---|---|

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

(OR)

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|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
| 8. | a) Define Phase crossover frequency, Gain crossover frequency. | 5 | 4 | 1 |
| | b) If a Nyquist plot of $G(j\omega)H(j\omega)$ for a closed loop system passes through $(-2, j0)$ point in GH plane, Calculate the value of gain margin of the system in dB? | 5 | 4 | 2 |

UNIT-V

- | | | | | | |
|----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
| 9. | a) | Define Gain Margin and Phase Margin with Formulas. | 5 | 4 | 2 |
| | b) | Consider the system represented by the equation given below.
Calculate the total phase value at $\omega = 0$?
$200 / [s^3 (s + 3) (s + 6) (s + 10)]$ | 5 | 4 | 3 |

(OR)

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|-----|------------------------------------------------------------------|----|---|---|
| 10. | Demonstrate the mapping theorem and Nyquist stability criterion. | 10 | 4 | 3 |
|-----|------------------------------------------------------------------|----|---|---|

UNIT-VI

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|-----|----|-----------------------------------------------------------------------------|---|---|---|
| 11. | a) | Explain in detail about Lead compensation and derive the transfer function. | 5 | 5 | 2 |
| | b) | Illustrate briefly about state transition matrix. | 5 | 5 | 2 |

(OR)

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|-----|----|----------------------------------------------------------------------------|---|---|---|
| 12. | a) | Explain in detail about Lag compensation and derive the transfer function. | 5 | 5 | 2 |
| | b) | Explain the State-Space Representations in controllable Canonical Form. | 5 | 5 | 3 |

Time: 3 Hours**Max Marks: 60**

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Write about the UNIX Environment and UNIX Structure.	5	CO1	1
	b) Explain the following commands with syntax. i) mkdir ii) mv iii) cat iv) od	5	CO1	1
(OR)				
2.	a) How can we remove a write protected directory? Explain using the respective command. Is it possible to have interactivity during the removal of directory / file? Write the syntax.	5	CO1	1
	b) Explain the File related commands used in UNIX	5	CO1	1
<u>UNIT-II</u>				
3.	a) What is meta character? Explain shell's meta characters with examples.	5	CO2	1
	b) Explain in detail about the shells interpretive cycle,	5	CO2	1
(OR)				
4.	a) State the application in which connecting commands used. Explain it.	5	CO2	2
	b) What is I/O redirection? Explain redirection operators with suitable examples.	5	CO2	1
<u>UNIT-III</u>				
5.	Explain looping structures used in shell programming with suitable examples	10	CO3	1
(OR)				
6.	a) Explain working of environment variables or built-in variables of the shell.	5	CO3	2
	b) Write a shell script to generate fibonacci series.	5	CO3	4
<u>UNIT-IV</u>				
7.	Explain the process of wait, waitpid, wait3, and wait4 functions in UNIX.	10	CO4	1
(OR)				
8.	a) Explain process identifiers in detail.	5	CO4	1
	b) Explain any three exec family of functions.	5	CO4	1
<u>UNIT-V</u>				
9.	Explain the Error Logging and Client-Server Model with its application.	10	CO5	1
(OR)				
10.	a) Explain how signals are supported by unix kernel.	5	CO5	1
	b) Explain sigsetjmp and siglongjmp functions.	5	CO5	1
<u>UNIT-VI</u>				
11.	Explain about various IPC Methods and compare with FIFO system.	10	CO6	1
(OR)				
12.	a) Differentiate between pipes and message queues.	5	CO6	2
	b) Explain how to attach and detach shared memory segment?	5	CO6	1

Time: 3 Hours

Max Marks: 60

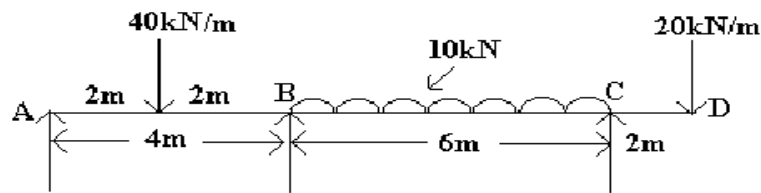
Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

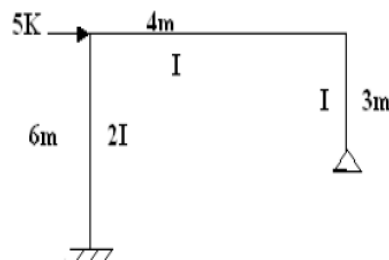
UNIT-IMarks CO Blooms
Level

1. The continuous beam ABCD. Find the final moments using moment distribution method of the continuous beam loaded as shown in Figure. Sketch the B.M.D.

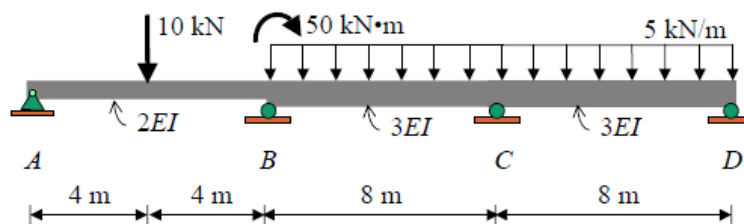


(OR)

2. By using slope deflection method, determine the final moments at all the joints of the Portal frame shown in figure. Sketch the B.M.D.

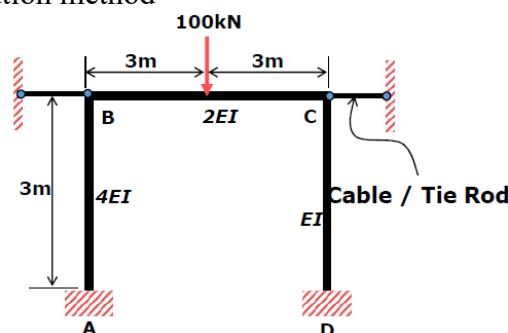
**UNIT-II**

3. For the beam shown use the moment distribution method to determine all the moments at the supports.



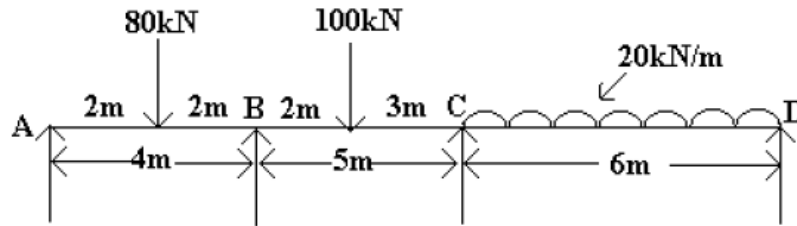
(OR)

4. Determine the final moment for frame ABCD shown below. Use moment distribution method



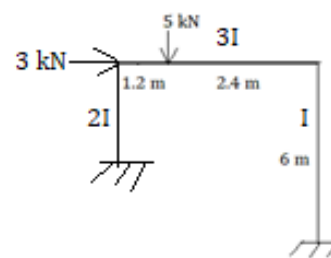
UNIT-III

5. Analyse the three-span continuous beam loaded as shown in Fig. by the 10M CO3 3
moment distribution method, if the moments of inertias of spans
AB, BC and CD are I , $1.5 I$ and $2 I$ respectively.



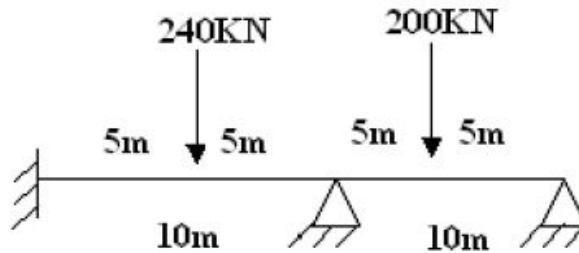
(OR)

6. Determine the moments at each joint for the frame shown below. Consider EI is constant.



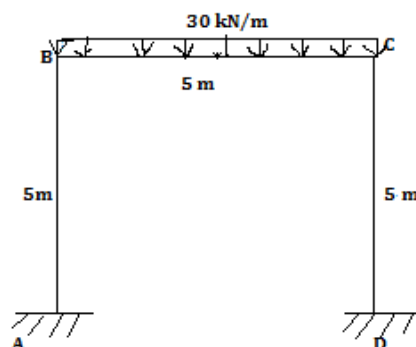
UNIT-IV

7. A continuous beam shown in the figure has two equal spans of 10 m each with the A as fixed and support C as hinged. Spans AB and BC carry central point loads of 240 kN and 200 kN respectively. Supports B and C settle by $2000/EI$ & $1000/EI$ respectively. Calculate the slopes at B and C in terms of EI and hence find the end moment at B using displacement method.



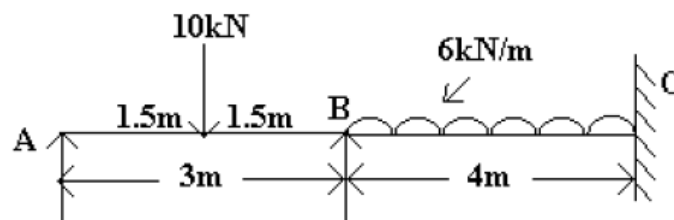
(OR)

8. Analyse the frame for the final end moments as shown below using flexibility method. Take EI is constant.



UNIT-V

9. Using Flexibility method of analysis find the support moments for the two-span continuous beam loaded as shown in Figure. Sketch the BMD. ($E I =$ constant).

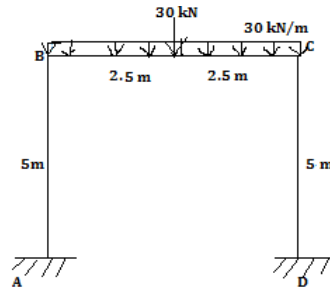


(OR)

10.

10M CO5 3

Analyse the frame for the final end moments as shown below using stiffness method.



UNIT-VI

11.

Find the collapse load of simply supported beam of span 'L' and i) 10M CO6 3
when an eccentric point load 'P' at a distance 'a' from left end and 'b'
distance from right end. ii) when point loads of 'W' are acting at one
third points.

(OR)

12.

a) Find the shape factor for a T-section of flange dimensions 150×10
mm and web dimensions 190×7 mm.

5M CO6 2

b) Write about plastic hinge and collapse load.

5M CO6 3

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Mar ks	CO	Blooms Level
1. a)	What do you understand by the term “software”? Analyze its characteristics and components	5	CO1	K1
b)	Explain about SE layers and Software myths in detail	5	CO1	K2
	(OR)			
2. a)	Describe the evolving nature of the software and software process.	5	CO1	K2
b)	Explain the incremental process models with advantages and disadvantages	5	CO1	K2
	<u>UNIT-II</u>			
3. a)	Distinguish between Prototyping and Agile models.	5	CO1	K3
b)	Explain the characteristics of the requirements in software engineering	5	CO1	K2
	(OR)			
4. a)	What is SRS? Explain the need for SRS and also list the five desirable characteristics of a good SRS document	5	CO2	K3
b)	Analyze the requirement elicitation and analysis process for a Login in online Banking website in detail.	5	CO2	K3
	<u>UNIT-III</u>			
5. a)	What are modeling principles? How do they guide each frame work activity? Discuss.	5	CO2	K2
b)	Consider designing a system for the inventory and billing operations of a “retail medical outlet”. Draw the context level data flow diagrams (DFDs) for the system and also prepare an SRS document?	5	CO2	K3
	(OR)			
6. a)	Define the use case modeling. How it is used to illustrate functional requirements? Explain with an ATM example.	5	CO2	K3
b)	What are Behavioral models? Explain Data-flow models with an example.	5	CO2	K2
	<u>UNIT-IV</u>			
7. a)	What is meant by Design? Differentiate between Analysis and Design with an example.	5	CO2	K2
b)	.Explain briefly about the software architecture style and architecture pattern	5	CO2	K3
	(OR)			
8. a)	Describe component-level design for WebApps.	5	CO1	K3
b)	What is an architectural design? How would you assess various alternative architectural designs?	5	CO2	K2
	<u>UNIT-V</u>			
9. a)	Describe the golden rules for interface design. Substantiate with an example.	5	CO3	K2
b)	Discuss the need for software metrics, measures and indicators.	5	CO3	K2
	(OR)			

10.	a)	Discuss various metrics for testing Object-oriented software.	5	CO3	K2
	b)	State how debugging is different from testing? Give examples.	5	CO3	K2
<u>UNIT-VI</u>					
11.	a)	What are the various testing strategies for software testing? Describe them briefly.	5	CO3	K1
	b)	Write short notes on the following with suitable examples: i. Graph-Based testing methods ii. Equivalence Partitioning	5	CO3	K2
(OR)					
12.	a)	What is cyclomatic complexity? Explain with an example of how to construct a flow graph for a program (Fibonacci series) and compute cyclomatic complexity.	5	CO3	K3
	b)	State the characteristics of OO Testing strategies	5	CO3	K2