

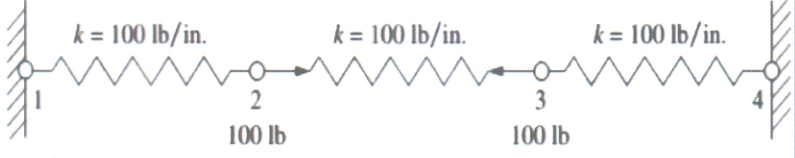
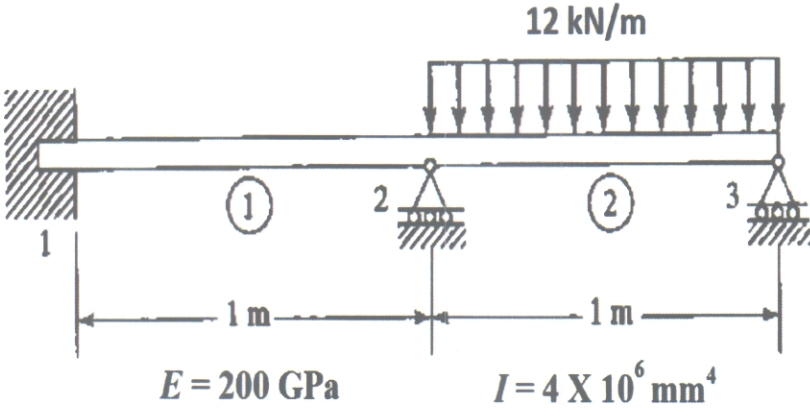
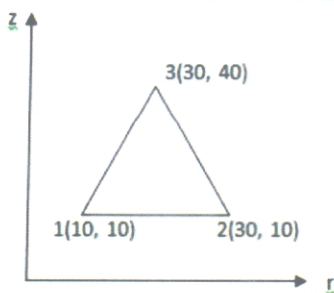
PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)
M.Tech II Semester Regular/Supplementary Examinations, July – 2024


ADVANCED FINITE ELEMENT METHODS
(CAD/CAM)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

Q.NO.	Question	BTL	CO	Marks
1	a. Explain in detail about the applications of FEM.	K2	CO1	6M
.	b. Describe briefly about the shape functions and its characteristics.	K2	CO1	6M
2	a. For the spring assemblages shown in figure determine the nodal displacements by using the concept of potential energy.	K4	CO1	6M
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	b. Explain in detail about the properties of element stiffness matrix.	K2	CO2	6M
3	For the beam shown in the figure, determine the slopes at node 2 and node 3 and vertical deflection at the midpoint of the distributed load.	K3	CO2	12M
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4	a. Describe briefly the procedure involved in plane truss problems.	K2	CO2	6M
.	b. Explain briefly about CST element.	K2	CO3	6M
5	Nodal coordinates for an Axi-Symmetric element are given below. Evaluate Stiffness Matrix. $E=2 \times 10^5 \text{ N/mm}^2$, $\nu = 0.25$.	K3	CO3	12M
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6	a.	Discuss in detail about the concept involved in jacobian matrix .	K2	CO4	6M
	b.	Determine the temperature distribution in 1D rectangular cross section fin with 8cm long, 4cm wide, 1cm thick. Assume that convective heat loss occurs from the end of the fin. Take $K = 3 \text{ W/cm K}$, $h = 0.1 \text{ W/cm}^2 \text{ K}$ and $T_a = 20^\circ\text{C}$. tip temperature is 100°C .	K3	CO4	6M
7	a.	Determine the temperature distribution through the composite wall shown in figure when convective heat loss occurs on the left surface. Assume unit area thickness $t_1 = 4 \text{ cm}$, $t_2 = 2 \text{ cm}$, $K_1 = 0.5 \text{ W/cm K}$, $K_2 = 0.05 \text{ W/cm K}$, $T_a = -50^\circ\text{C}$, $h = 0.1 \text{ W/cm}^2 \text{ K}$. 	K3	CO4	6M
	b.	Explain in detail about the dynamic considerations .	K2	CO5	6M
8	a.	Describe briefly eigen vectors .	K2	CO5	6M
	b.	Explain in detail about the mode shapes .	K2	CO5	6M