PRN:		Course Code :	P69PC101

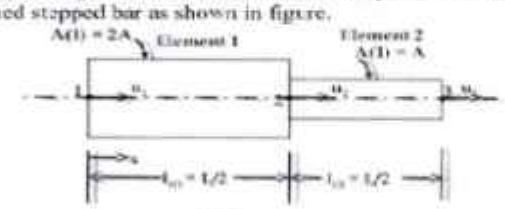
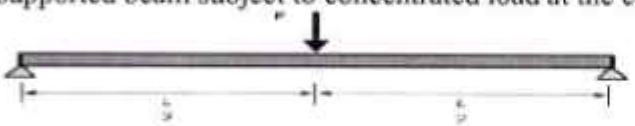
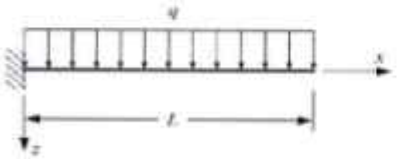
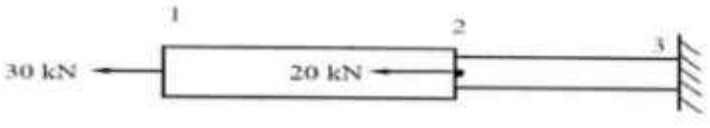
First Year **M. Tech** Semester End Examination Winter 2024

Finite Element Method

Day and Date: Sat 30 Nov 2024 Max Marks: **50**

Time : 10:30AM To 12:30PM Duration: **02** hrs

Instructions:
1. All questions are compulsory.
2. Assume suitable data wherever necessary and mention it clearly.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following Question.**			
a)	Explain FEM in detail with advantages and applications. Write the FEM uses in Fluid Mechanics and Heat transfer.	10	2	1
Q.2	**Attempt the following Question.**			
a)	Find the mode shapes (Eigen vectors) for the natural frequencies of longitudin of the unconstrained stepped bar as shown in figure. 	10	3	1
	OR			
b)	Find the deflection at the centre using Ritz method for the simply supported beam subject to concentrated load at the centre. 	10	3	2
Q.3	**Attempt the following Question.**			
a)	A cantilever beam of length L is subjected to uniform distributed load q. Use the Rayleigh-Ritz method with following assumed displacement field to find the maximum deflection of the beam, and discuss the results. The beam has a uniform bending rigidity EI. (1) assume $v(x) = a_1x^2 + a_2x^3$ (2) assume $v(x) = A(1 - \cos\frac{\pi x}{2L})$ 	10	3	3
	OR			
b)	Formulate the axis symmetric triangular element.	10	3	3
Q.4	**Attempt the following Question.**			
a)	An axial bar is shown below. Using the finite element method determine, (a) the nodal displacements (b) the displacement at the midpoint of element 1 and 2 	10	3	4

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		OR			
	b)	Determine the Buckling Loads and Modes	10	3	4
Q.5		**Attempt the following Question.**			
	a)	Explain One Dimensional Heat Transfer Analysis	10	2	5
		OR			
	c)	Explain fluid mechanics and heat transfer involved in FEM with example.	10	2	5

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