PRN:		Course Code :	MET 4071R1

Final Year **B. Tech** End Semester Examination Summer 2024

Finite Element Analysis

Day and Date: 1 MAY 2024, Friday Max Marks: **50**

Time : 10:30AM To 12.30PM Duration: **02** hrs

Instructions: All questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Attempt any two from the following**			
a)	Explain the past, present and future of FEA.	06	1	CO1
b)	Explain the Rayleigh-Ritz method with the help of an example.	06	2	CO1
c)	Describe the applications of FEA	06	2	CO1
Q.2	**Attempt any two from the following**			
a)	Determine stiffness matrix for bar element.	06	2	CO2
b)	Explain the different types of elements used in FEA.	06	1	CO2
c)	Explain the principle of minimum potential energy with an example.	06	1	CO2
Q.3	**Attempt the following**			
a)	Explain the properties of shape functions.	06	2	CO3
b)	Explain the derivation for stiffness matrix and shape function of 1 D bar	07	2	CO3
	or			
b)	Consider a bar as shown in fig 1, Young's Modulus $E=2x10^5$ N/mm^2, $A_1=2$ cm^2, $A_2=1$ cm^2 and force of 100 N. Calculate the nodal displacement.	07	1	CO3

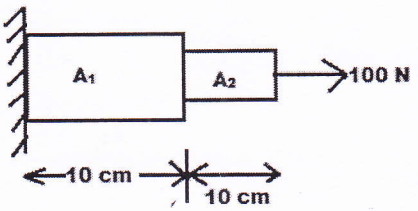


Fig 1

Q.4	**Attempt the following**			
a)	What is meant by axisymmetric field problem? Axisymmetric element and its application.	06	1	CO4

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b) A two-member truss is as shown in Fig. 2. The cross-sectional area of each member is 200 mm2 and the modulus of elasticity is 200 GPa. Determine the deflections, and stresses in each of the members. 07 1 CO4

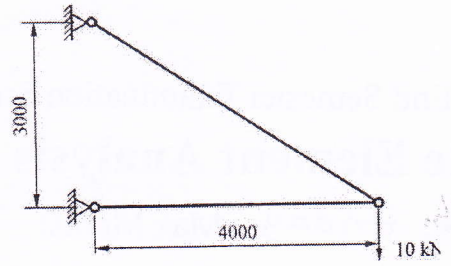


Fig 2

or

b) Describe the iso-parametric elements. 07 2 CO4

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