Code No: **P18MET18**

R18

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
IV B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH-2023
FINITE ELEMENT METHODS
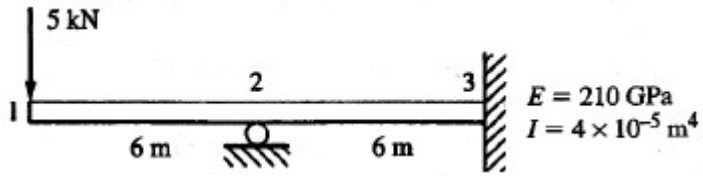(Common to AME & ME Branch)

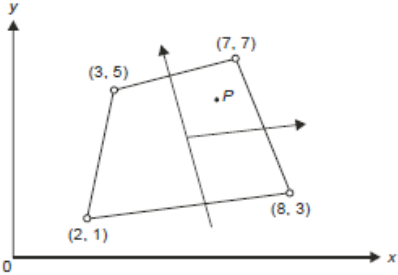Time: 3 hours   Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)
PART-A
Answer **all** the questions in Part-A (**5X2=10M**)

Q.No.		Questions	Marks	CO	KL
1.	a)	Write the basic equation used to solve a problem using Ritz method.	[2M]	1	1
	b)	What is meant by convergence in finite element method?	[2M]	2	1
	c)	Write the difference between bar and beam element.	[2M]	3	4
	d)	List out the weights used in guassian quadrature approach for three point formula.	[2M]	4	1
	e)	What is meant by dynamic analysis?	[2M]	5	1

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.		Explain different weighted residual methods	[10M]	1	2
		OR			
3.		Derive the stress strain relations for plane strain problem	[10M]	1	4
		UNIT-II			
4.	a)	What are the various steps involved in Finite Element Method?	[5M]	2	1
	b)	What are various types of elements used in Finite Element Method?	[5M]	2	1
		OR			
5.	a)	Explain about interpolation functions used in finite element method	[5M]	2	2
	b)	Explain about treatment of different types of boundary conditions	[5M]	2	2
		UNIT-III			
6.		For the beam shown in figure, determine the displacements and the slopes at the nodes, the forces in each element, and the reactions.	[10M]	3	5
		OR			
7.		Derive the stiffness matrix for a two noded truss element	[10M]	3	4
		UNIT-IV			
8.		Derive the shape functions for a four noded quadrilateral element in natural coordinate system.	[10M]	4	4
		OR			

9.		Determine the Cartesian coordinates of the point P having the natural coordinates (0.5,0.6) shown in Fig	[10M]	4	5
UNIT-V					
10.	a)	What is meant by dynamic analysis? Explain in detail	[5M]	5	1
	b)	Derive the mass matrix for one dimensional bar element	[5M]	5	4
OR					
11.		A composite wall consists of three materials A, B and C. The thermal conductivity and thickness of left-most material A are, 1.5 W/m^{0}C and 250mm. The same for next material B are 0.08 W/m^{0}C and 150mm. The values for right-most material C are 0.6 W/m^{0}C and 150mm. The leftmost surface is subjected to convection with coefficient 75 W/m2-^{0}C and surrounding temperature 1700^{0}C. The right side surface is at 80^{0}C. Compute the temperature distribution across the thickness of the wall. Consider 1m2 area.	[10M]	5	5

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