CONTINUOUS INTERNAL EVALUATION- 3

Dept: ME	Sem / Div: 6 A	Sub: Finite Element Methods	S Code: 18ME61
Date: 04/08/2021	Time: 9:30 am -11:00 am	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

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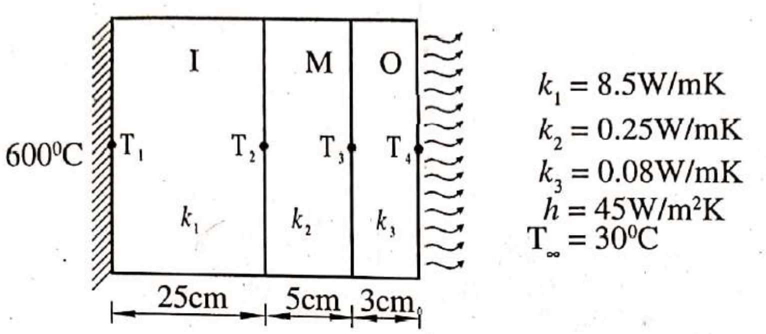
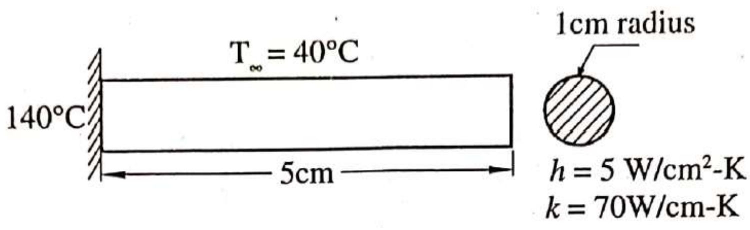
Q N		Questions	Marks	RBT	COs
		PART A			
1	a	Derive the shape function for the axisymmetric triangular element.	12	L2	CO5
	b	An induction furnace wall is made up of three layers; inside, middle and outer layer with thermal conductivity k_1, k_2 and k_3 respectively as shown in the figure. Determine the nodal temperature. 	13	L3	CO4
		OR			
2	a	Arrive at the expression of the stiffness matrix for the axisymmetric triangular element.	13	L2	CO5
	b	Find the temperature distribution in the 1D fin shown in the figure. Consider two elements for the FE model. 	12	L3	CO4
		PART B			
3	a	Derive the lumped mass matrix for the bar element.	8	L2	CO5
	b	Derive the shape function for 1D heat conduction element.	8	L2	CO4
	c	Determine the temperature distribution in a one dimensional fin shown in the figure. There is an internal heat generation inside the wall of 500W/m^3	9	L3	CO4

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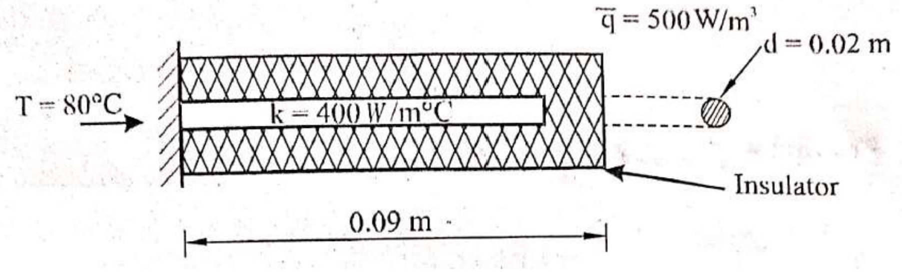
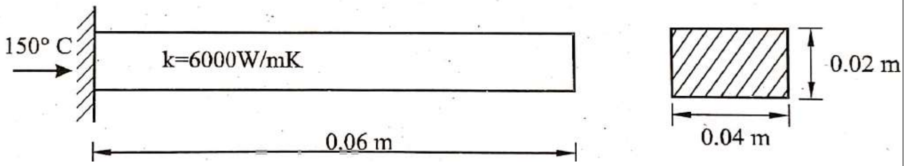
					
		OR			
4	a	Derive the consistent mass matrix for the bar element.	8	L2	CO5
	b	Derive the conductivity matrix for the 1D heat conduction element.	8	L2	CO4
	c	Determine the temperature distribution in the rectangular fin shown in the figure. Neglect convective heat transfer and assume heat generated inside the fin as 500W/m^3 	9	L3	CO4