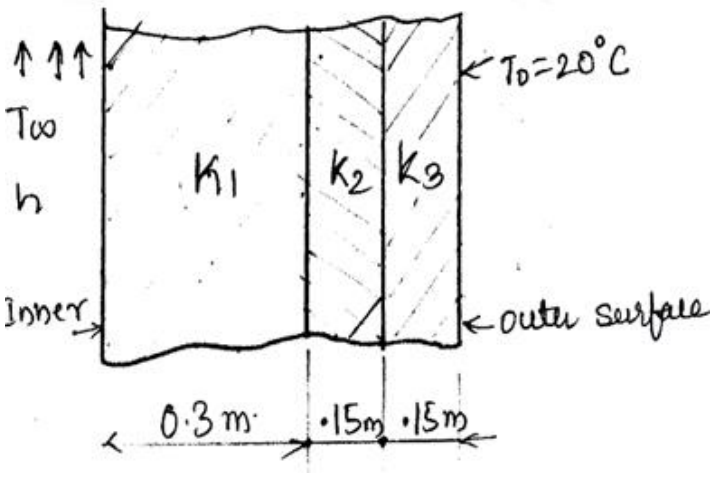
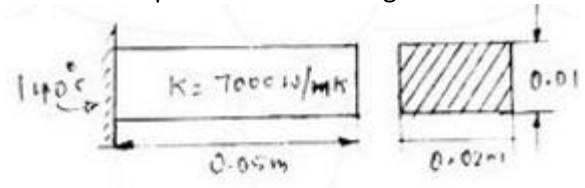
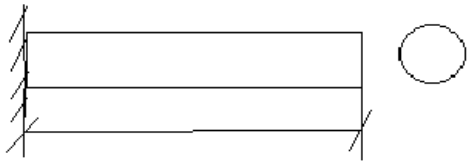
ACS College of Engineering, Bangalore
Mechanical Engineering Department

SEM :VI **SUB:FINITE ELEMENT ANALYSIS (17ME61)** **INTERNAL ASSESSMENT - III**

1	Derivation of temperature function (T) and shape function (N) for one dimensional Heat conduction.
2	Derive the Stiffness Matrix for one dimensional heat conduction using functional approach method
3	Derive the Stiffness Matrix for one dimensional heat conduction with end convection
4	Derivation of one dimensional heat transfer through fin. Or Discuss the derivation of one dimensional heat transfer in thin films. Or Derivation of one dimensional formulation of fin (heat transfer in thin films)
5	Explain the various boundary condition in steady state heat transfer problem with simple sketches
6	A wall of 0.6m thickness having thermal conductivity of 1.2W/mK the wall is to be insulated with a material thickness of 0.06m having an average thermal conductivity of 0.3W/mK the inner surface temperature is 1000^0C and the outside of the insulation is exposes to atmospheric air at 30^0C with heat transfer co-efficient 35W/m^2K. Calculate the nodal temperature.
7	A metallic fin with thermal conductivity of 70W/cm^0C, 1cm radius and 5cm long extends from a plane wall whose temperature is 1400C Determine the temperature distribution along the fin if heat is transferred to ambient air at 200C with heat transfer co-efficient 5W/m20C. Take two elements along the fin.
8	A composite wall consists of 3 materials shown in Fig. The outer temperature isT_0= 20^0C, determine the temperature distribution in the wall. Convection heat transfer takes place at inner surface with T∞=800^0C. Take h = 25w/m^{2o}C, Area = 1 m^2 
9	A wall of 0.06m thickness having thermal conductivity of 6W/m^0C the wall is to be insulated with a material thickness of 0.02m having an average thermal conductivity of 20W/m^0C the inner surface temperature is 20^0C and the outside of the insulation is exposes to The ambient temperature is -5^0C with heat transfer co-efficient 1000W/m^2K. Calculate the nodal temperature.
10	Determine the temperature distribution in the Rectangular fin as shown in Fig. Assume steady and only conduction process. Take heat generated inside the fin an 400W/m^3 
11	 Find the Temperature distribution in One Dimensional circular fin diameter 2cm and length of the Fin is 6cm shown in fig. T_0=150^0C, T∞=50^0C. Take h = 6W/m^{2o}C, thermal conductivity of 6W/cm^0C,