School of Mechanical Engineering
Mechanical Engineering
ETE - Jun 2023

Time : 3 Minutes   Marks : 50

Sem II - MCCR5022 - Finite Element Methods
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1. Write the Polynomial form of interpolation functions for linear element.   K2 CO2 (2)
2. Discuss the application of boundary conditions method and the material properties for the   K2 CO4 (2)
   governing equations
3. Explain the application of FEM in Aerospace and Manufacturing Industries.   K2 CO1 (2)
4. Write the steps of Direct Integration method.   K2 CO5 (2)
5. Discuss the Linear interpolation function in terms of global coordinates for triangular elements. K2 CO3 (2)

6. Simplify the node systems such as One node, and Two Node in the discretized space of any   K4 CO3 (5)
   element.
7. Present the One Dimensional heat transfer problem using the FEM approach.   K3 CO2 (5)
8. Prsent the polynomial function for the shape functions for a CST element.   K4 CO4 (6)

9. Calculate the temperature distribution in a 1-D fin, the fin is rectangular in shape and is 120 mm K5 CO5 (8)
   long, 40 mm wide and 10 mm thick. One end of the fin is fixed and other end is free. Assume
   that convection heat loss occurs from the end of the fin. Use two elements. The temperature at
   fixed end is 120degreeC, h = 10-3 W/mm degreeC, K = 0.3 W/mm degreeC, T(am(B) =
   20degreeC
10. Examine cantilever beam problem using FEM method.   K4 CO3 (8)
11. Write all the shape functions for the elements shown in the figure below.   K4 CO2 (8)