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Reg. No. :

Question Paper Code: 51P02

M.E. DEGREE EXAMINATION, NOV 2019

First Semester

CAD / CAM

15PCD102 - ADVANCED FINITE ELEMENT ANALYSIS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) A simple supported beam subjected to uniformly distributed load   CO1- App   (20)
         over entire span and it is subjected to a point load at the centre of
         the span. Calculate the deflection using Rayleigh-Ritz method and
         compare with exact solutions.

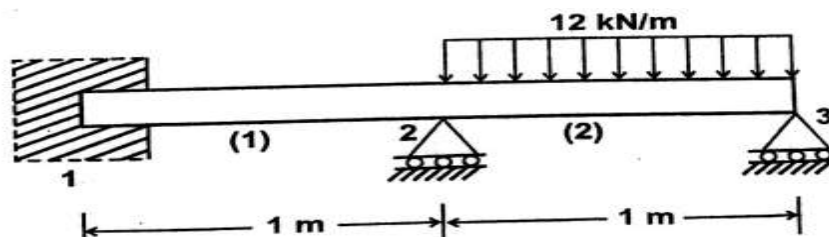   Or

    (b) Explain the step by step procedure of FEA.   CO1- App   (20)

2. (a) Develop the Shape function, Stiffness matrix and force vector for   CO2 -App   (20)
         one dimensional linear element.

                                    Or

    (b) For the beam and loading as shown in figure. Calculate the slopes at   CO2- App   (20)
         nodes 2 and 3 and the vertical deflection at the mid-point of the
         distributed load. Take E=200 GPa and I=4x10-6 m^4

3. (a) Determine the shape functions for a Constant Strain Triangular CO3-App (20)
(CST) element.

Or

(b) Develop the shape function derivation for a two-dimensional CO3-App (20)
quadratic element.

4. (a) Write the mathematical formulation for a steady state heat transfer CO4- App (20)
conduction problem and derive the stiffness and force matrices for
the same.

Or

(b) Derive a finite element equation for one dimensional heat CO4- App (20)
conduction with free end convection.

5. (a) How to do volume meshing in finite element analysis? Explain in CO5- U (20)
details.

Or

(b) Define element connectivity? And explain in details. CO5- U (20)

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