Reg. No. : | | | | | | | | | | |

Question Paper Code: 52112

M.E. DEGREE EXAMINATION, NOV 2016

First Semester

CAD / CAM

15PCD102 - ADVANCED FINITE ELEMENT ANALYSIS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

(5 x 20 = 100 Marks)

1. (a) Explain the process of discretization of a structure in finite element method in detail, with suitable illustration for each aspect being and discussed. (20)

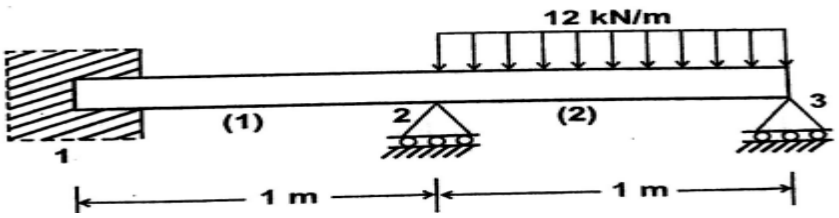
Or

(b) A simple supported beam subjected to uniformly distributed load 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. (20)

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

Or

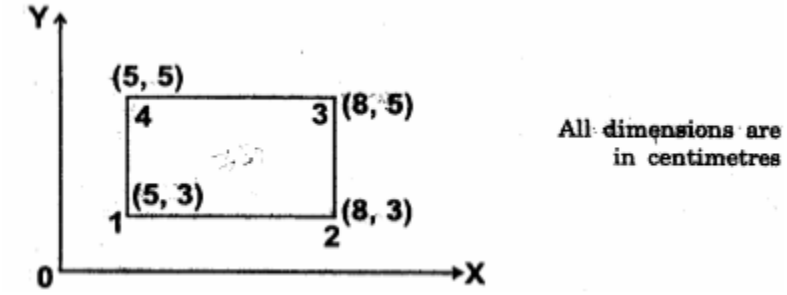
(b) For the beam and loading as shown in figure. Calculate the slopes at nodes 2 and 3 and the vertical deflection at the mid-point of the distributed load. Take E=200 GPa and $I=4x10^{-6}$ m^4. (20)



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

Or

(b) For a 4-noded rectangular element shown in figure. Calculate the temperature point (7, 4). The nodal values of the temperatures are T1 = 42°C, T2 = 54°C and T3 = 56°C and T4 = 46°C. Also determine 3 point on the 50°C contour line. (20)



4. (a) Derive a finite element equation for one dimensional heat conduction with free end convection. (20)

Or

(b) Derive the force vector for one dimensional heat convection and internal heat generation with free end convection. (20)

5. (a) Define element connectivity? And explain in details. (20)

Or

(b) Illustrate how many methods involved in transferring work in the finite element analysis packages? Explain any five in details. (20)

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