Roll No .....

MVSE - 202

M.E./M.Tech., II Semester

Examination, December 2015

FEM in Structural Engineering

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume missing data suitably.

1. a) Explain the difference between finite difference and finite element method.
   b) Outline stepwise procedure for determination of stress and deformations in a structure by means of FEM.

2. a) Describe the Gaussian elimination approach for the solution of large system of simultaneous equations.
   b) Describe the application of FEM in solving the propagation problems.

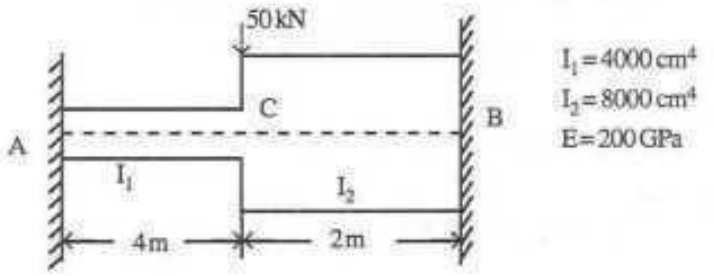
3. What are the criteria in selecting interpolation polynomials? Explain convergence requirements in finite element formulation. Derive the shape function for a four noded plate bending element by Lagrangian interpolating function.

4. Find the approximate deflection of a simply supported beam under a UDL using Rayleigh-Ritz, Galerkin, finite difference and finite element method.

5. What are the factors to be considered in the selection of interpolation functions? Derive the interpolation function for a rectangular element with co-ordinate of four corners as (1, 1), (4.5, 1), (4.5, 3.5) and (1, 3.5).

6. Describe discretisation process of the domain in the finite element method in detail.

7. Using the Finite Element Analysis. Find the displacements and forces for the beam shown in figure below:



8. What is the use of Hermitian interpolation function? Derive shape functions for a 6-noded quadrilateral element.

9. Write short notes on any four of the following:
   a) In corporation of Boundary conditions
   b) Formulation of equilibrium equations
   c) Static condensation
   d) Sky line storage scheme
   e) Plane stress and plane strain element

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