

M. Tech. Civil Engg. (Structural Engineering & Construction) (CBCS Pattern) Semester - II  
**PSES21 - Finite Element Method**

P. Pages : 1



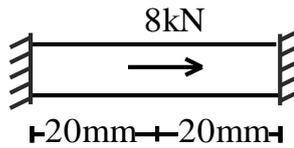
**GUG/S/23/11013**

Time : Four Hours

Max. Marks : 70

- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.
  5. Solve **any five**.

1. Use Rayleigh – Ritz method to find the stress and displacement at loading point of a bar shown in figure. **14**

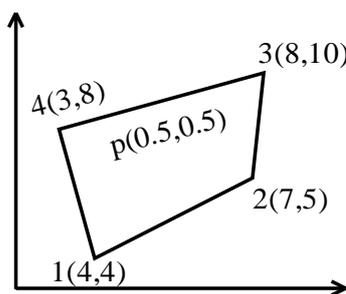


2. Briefly discuss elimination approach to handle boundary condition for solution of system of equation. **14**

3. Determine all natural frequencies of simply supported beam as shown in fig. **14**  
 $E = 200\text{GPa}$   $\rho = 7850\text{kg/m}^3$   $I = 2000\text{mm}^4$



4. Evaluate Jacobian matrix at  $\xi = \eta = 0.5$  for linear quadrilateral element shown. **14**



5. a) Discuss convergence required for mesh generation. **7**  
 b) Briefly discuss the discretization process and type of element used for discretization. **7**
6. Derive the stiffness matrix of axisymmetric bodies with triangular element. **14**
7. Derive the stiffness matrix for mindline thin and thick plate. **14**

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