[5060]-588

M.E. (Mech. Design)
FINITE ELEMENT METHOD
(2013 Course) (Semester - II)

*Time :3 Hours]*   *[Max. Marks : 50*
*Instructions to the candidates:*
> 1) *Answer any five questions.*
> 2) *Answer to the each section should be written in separate books.*
> 3) *Figures to the right indicate full marks.*
> 4) *Use of electronic pocket calculator is allowed.*
> 5) *Assume suitable data, if required.*

Q1) Explain Different methods of Weighted Residual Methods.   **[10]**

Q2) Calculate the maximum deflection in a simply supported beam, subjected to concentrated load 'P' at the center of the beam. Use Galerkins Approach.   **[10]**
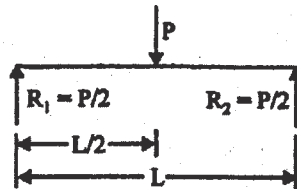
Q3) Determine the nodal displacements and element stresses by finite element formulation for the following figure. Use P=300 k N; A, =0.5 m²; A2=1 m²; E=200 GPa   **[10]**
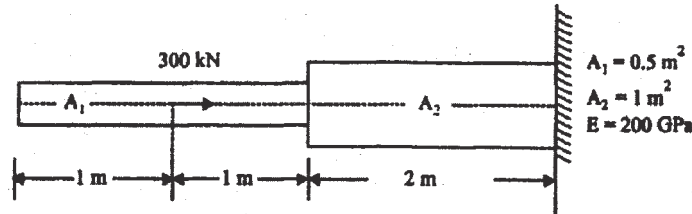
Q4) Explain Iso sub and super parametric Element Formulations and write its advantages our normal element formulations. **[10]**

Q5) Write a note on following (Any two). **[10]**

   a)   Kirchoffs Plate Bending theory

   b)   Mindlin Plate Element

   c)   Degenerated Shell Element

Q6) Find the natural frequencies of longitudinal vibrations of the constrained stepped shaft of areas A and 2 A and of equal lengths (L), as shown below. Compare the results obtained using lumped mass matrix approach and consistent mass matrix approach. **[10]**
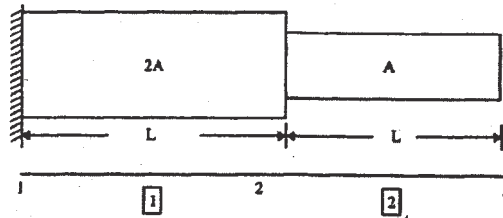
Q7) Write a Note (Any Four). **[10]**

   a)   Geometric Nonlinearity

   b)   Consistent and Lumped Mass Matrices.

   c)   Jacobi Method

   d)   Adaptive Finite Element Technique

   e)   H & P refinements

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