Total No. of Questions : 7]

SEAT No. :

P4134

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[4760] - 1069

M.E. (Mechanical Design)

FINITE ELEMENT METHOD

(2013 Credit Pattern) (Semester - II) (502209)

Time : 2Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume Suitable data if necessary.***

Q1) Discuss finite element i.e. geometry of element, its nodes, nodal dof? **[10]**

Q2) Solve the following equation using Galerkin's Method (Use at least two parameters solution) **[10]**

$$dy/dx = 40(1 + \cos x) - 0.05y,\ 0 \leq x \leq 1$$

$$y(0) = 230$$

Q3) The fixed bar shown in fig 1. has axial forces applied at L/3 and 2L/3. Use FEM to compute the axial deflection and support reaction? **[10]**

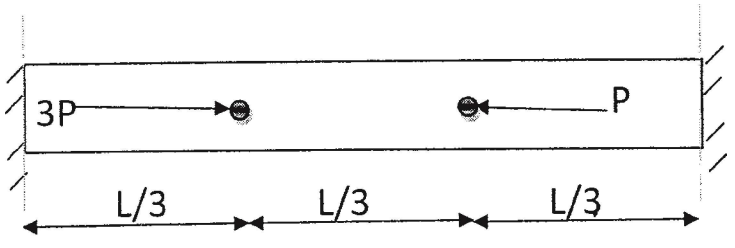

fig1.

Q4) Explain in detail shape functions linear and quadratic. **[10]**

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Q5) Determine the two eigenvalues and eigenvectors corresponding to the two nonzero masses, using the method of subspace iteration. **[10]**

$$[K]=\begin{vmatrix} 2 & -1 & 0 & 0 \\ -1 & 2 & -1 & 0 \\ 0 & -1 & 2 & -0 \\ 0 & 0 & -1 & 1 \end{vmatrix}$$

$$[K]=\begin{vmatrix} 2 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{vmatrix}$$

Q6) Explain in detail Adaptive finite element technique. **[10]**

Q7) What is explicit method? Explain it in detail? **[10]**