

Total No. of Questions : 8]

SEAT No. :

P4263

[4860] - 1070

[Total No. of Pages : 2

M.E. (Mechanical Design)
FINITE ELEMENT METHOD
(2013 Credit Pattern) (502209) (Semester - II)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) Solve any five questions*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right side indicate full marks.*
- 4) Use of Calculator is allowed.*
- 5) Assume suitable data, if necessary.*

Q1) Write short note on (any two): **[10]**

- a) Plain stress and plain strain problem.
- b) Characteristics of Global Stiffness Matrix.
- c) The Galerkin Method.

Q2) Evaluate using 2 point Gaussians quadrature method. **[10]**

a)
$$I = \int_{-1}^1 \left[3e^x + x^2 + \frac{1}{(x+2)} \right] dx$$

b)
$$I = \int_{-1}^1 \left[\cos \frac{\pi x}{2} \right] dx$$

Q3) Explain the difference between p and h refinements in Finite Element Method & Write its significance. **[10]**

Q4) What is modal analysis? What are mode shapes? Explain with suitable example. **[10]**

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Q5) Explain lumped mass matrix and consistent mass matrix with suitable example. [10]

Q6) How to decide finite element mesh density for vibration and acoustic analysis? [10]

Q7) Explain Numerical integration by Simpson's 1/3rd rule in detail. Comment on difference between Implicit and Explicit Numerical schemes. [10]

Q8) Compute $I = \int_e N_1 N_2 N_3 dA$, where N_i are the linear shape functions for the 3-noded CST element. [10]

