

AQ-2911

Faculty of Engineering & Technology
M.E. Civil (Structural Engg.) Semester—II (New-C.G.S.) Examination

FINITE ELEMENT METHOD

Paper—2 SFSE 1

Sections—A & B

Time : Three Hours]

[Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
- (2) Answer **THREE** questions from Section A and **THREE** questions from Section B.
- (3) Due credit will be given to neatness and adequate dimensions.
- (4) Assume suitable data wherever necessary.
- (5) Illustrate your answers wherever necessary with the help of neat sketches.

SECTION—A

1. (a) State and explain concept of Minimum Potential Energy Theorem. 4
(b) Derive shape function for 9 noded rectangular element and 3 noded triangular element. 10
2. Formulate Constant Strain Triangle (CST). 13
3. Derive element stiffness matrix for 3-dimensional 8 noded rectangular element. 13
4. (a) What do you mean by Isoparametric element ? 3
(b) Obtain integral by Gauss Integration for 4 Gauss point. 10
5. Develop shape function for 2-D, 4 noded isoparametric element, mapped on $2 \times 2D$. 13

SECTION—B

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| 6. | Develop formulation for 8-noded Isoparametric element for plane stress 2-D. | 14 |
| 7. | Develop formulation for analysis of axisymmetric structure subjected to axisymmetric loading using Isoparametric 4 noded rectangular ring type element. | 13 |
| 8. | (a) What do you mean by C^0 continuity and C^1 continuity ? | 4 |
| | (b) Derive element stiffness matrix for solid triangular prism, 3-D structure. | 9 |
| 9. | Carry out formulation for Bogner-Fox plate element, 16 d.o.f. ? | 13 |
| 10. | Formulate the element stiffness matrix for ACM plate element. | 13 |