

AQ-2941

Faculty of Engineering & Technology

**M.E. (Full Time) (Civil Engg.) (Geotechnical Engg.) (C.G.S.) (New) Semester-II
Examination**

FINITE ELEMENT METHOD IN GEOTECHNICAL ENGG

Paper—2 SFGE 2

Time—Three Hours]

[Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
 - (2) Solve any **FIVE** questions.
 - (3) Assume suitable data wherever necessary.
 - (4) Diagrams and Chemical equations should be given wherever necessary.
 - (5) Illustrate your answers wherever necessary with the help of neat sketches.
 - (6) Use pen of Blue/Black ink/refill only for writing the answer book.
-
1. (a) Develop stiffness matrix for bar element. 8
(b) What is meant by 'Finite Element Analysis' ? What are the uses in Geotechnical Engineering ? 8
 2. (a) Explain in detail :
 'Rayleigh-Ritz Method'. 8
(b) Explain in detail :
 'Galerkin's Method'. 8
 3. (a) Derive the expression for shape-functions for a constant strain triangular element. 8
(b) Define :
 (i) Plane Stress Analysis
 (ii) CST Element
 (iii) LST Element
 (iv) QST Element. 8

4. (a) Write short note on :
 'Hierarchical shape functions'. 8
- (b) State the properties of Stiffness Matrix. 8
5. (a) How will you use FEM for slope stability analysis ? Explain with figure. 8
- (b) Explain the application of FEM modeling in pile foundation analysis with suitable example. 8
6. (a) Draw mesh for stability analysis of slope and flow chart for solving simultaneous equations. 8
- (b) How is seepage analysis carried out using finite element analysis ? 8