Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. Civil Engg. EL-II (2016 Batch) (Sem.–2)
COMPUTATIONAL GEOTECHNICS
Subject Code : MTCE-212
Paper ID : [74305]

Time : 3 Hrs.   Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :
1. **Attempt any FIVE questions**
2. **Each question carries EQUAL marks.**

1. a) Write in detail about significance of numerical modeling in Civil Engineering. (14)

   b) Give one example each of steady, transient and eigen value problem in reference to geotechnical engineering. (6)

2. Determine to three significant digits, the roots of following pairs of non-linear equations :

   a) $x^3 + 3y^2 - 20.92 = 0$ $(x_0 = 1.30)$

       $x^2 + 2y + 1.958 = 0$ $(y_0 = -2.0)$

   b) $x^2 + 4y^2 = 42.25$ $(x_0 = 2.0)$

       $3.x.y^2 + 2y^3 - 13.5 = 0$ $(y_0 = -2.0)$ (20)

3. a) What are the advantages of Finite Element Method over Finite Difference Method. (10)

   b) Discuss in detail about Discrete Element Method. (10)

4. Analytical and Numerical methods in geomechanics are useful to analyse the response of soil media to applied loads. Illustrate your answer in detail. (20)

5. Discuss importance and applications of Artificial Neural Networks in Civil Engineering. (20)

6. a) Give finite difference form for a beam resting on laterally loaded pile(s). (12)

   b) Write a short note on Elasticity problems in Geomechanics. (8)

7. Explain numerical solution of

   a) 1–D consolidation equation involving distribution of pore pressure with time. (12)

   b) Permeability equation involving factors affecting permeability. (8)

8. Write short notes on :

   a) Critical State Soil Mechanics (10)

   b) Methods to solve Non-linear equations (10)