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**M.Tech. Civil Engg. EL-I (2016 Batch) (Sem.-2)****COMPUTATIONAL GEOTECHNICS****Subject Code : MTCE-212****M.Code : 74305****Time : 3 Hrs.****Max. Marks : 100****INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE questions.
2. Each question carries EQUAL marks.

1. What is importance of finite difference method in geotechnical engineering? Discuss in detail with suitable example.
2. a) Why Polynomial type of interpolation function is mostly used in FEM? Discuss in detail.  
b) Discuss briefly finite element theory for nonlinear materials.
3. Write in detail the assumptions of porous two phase material analysis.
4. A concrete pile 30 cm square in section is driven 15 m into dense sand. The pile is 1.5 m above the ground level and is subjected to a lateral thrust of 60kN at the top. Determine the lateral deflection of the pile at 1.5 m below ground level when the pile top is fully restrained and water table is close to ground surface.
5. What are steps involved in finite element method to solve a problem? Describe in detail.
6. a) Describe in detail the role of physical and numerical modeling in soil mechanics.  
b) Explain briefly discrete element method.
7. a) Evaluate the following integral using Gauss-Legendre three point formula.

$$\int_0^1 \frac{dx}{1+x}$$

- b) Describe the application of ANA in civil engineering.
8. Write short notes on :
  - a) Load reversal
  - b) Elastoviscoplastic behaviour of soil
  - c) Principle of numerical techniques

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**

