Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Geo Technical Engineering)/(Soil mechanics & foundation engineering) (2013 & Onwards) (Sem.–1)

ANALYSIS OF SETTLEMENTS OF SOIL AND FOUNDATION

Subject Code : CESE-5

Paper ID : [E1002]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.
3. Assume missing data suitably.

Q1. a) A sample is subjected to uniaxial loading. Deduce the expression for (i) volumetric strain (ii) maximum shear strain. (6)

b) Define Rod velocity, Shear velocity and Dilatational velocity. (6)

c) "*The shear modulus of soil finds its widest use in connection with foundation vibration problems and is generally evaluated through measurement of shear wave velocity*". Discuss in detail. (8)

Q2. a) You are interested to determine Poisson's Ratio for a soil specimen. Which test you will perform to compute the value? Explain the procedure in detail. (10)

b) List the various assumptions made in Terzaghi's 3-Dimensionat Consolidation equation. (10)

Q3. a) Define critical void ratio and explain its significance. (7)

b) The consolidation settlement of a new structure founded on a 5 m thick layer is estimated as 75 mm. The structure was found to have settled by 30 mm in 8 months after the completion of construction. If the clay layer is underlain by rock and overlaid by a layer of coarse sand, determine (i) time required for 50% consolidation to occur, (ii) The amount of settlement which will take place in next 10 months. (13)

Q4. a) How would you determine the settlement of a pile group in cohesion-less soil? (10)

b) Write any two empirical formulae for estimating the efficiency of a pile group. (10)

Q5. a) What are sand drains? How these are installed in the field? Explain the functions of sand drains. (12)

b) What is Negative skin friction? Explain its significance. (8)

Q6. What is mat foundation? Discuss circumstances, under which mat foundation is resorted to. Discuss codal recommendations and design details of a Mat Foundation. (20)

Q7. Foundation of a bridge is to be designed. Describe about the loads for which you, as a Geotechnical engineer, will design the foundation? (20)

Q8. Write short notes on :

a) Under-reamed pile foundation. (10)

b) Skempton-Bjerrum's Theory. (10)