Roll No. ..... Total Pages : 03

BT-5/D-18 35032

GEOTECHNOLOGY-I

CE-307E

Paper I

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. Suitably assume missing data if any. All questions carry equal marks.

Unit I

1. (a) What is electro-osmosis ? What are its advantages and disadvantages as compared with the conventional drainage systems ? **10**

   (b) Explain the working of a single-stage well point system. What are its limitations ? **10**

2. (a) What do you understand about disturbed and undisturbed soil samples ? How would you obtain undisturbed samples ? **10**

   (b) What are the factors that affect the sample disturbance ? How are these effects minimised ? **10**

Unit II

3. (a) Discuss the effects of submergence on the bearing capacity of a shallow foundation. **10**

   (b) How can you take into account the effect of one-way eccentricity on the bearing capacity of a footing ? **10**

4. A strip footing has to carry a gross lod of 550 kN per meter run. The footing is placed at a depth of 1.2 m below GL in a dry, cohension less deposit. The unit weight and angle of internal friction of the soil are 15.9 kN/m^3 and 28° respectively. Determine the required width of the footing with respect to a factor of safety of 3.0 against shear failure. Given, for Ø = 28°, $N_{c'}$ = 17.3, $N_{q'}$ = 7.2 and $N_{\gamma'}$ = 4.7. **20**

Unit III

5. (a) Draw a neat sketch of an under-reamed pile with double bulbs. Briefly describe the construction procedure of such a pile. In what field conditions would you advise the use of this pile and why ? **10**

(b) A pile of 22 m length and 500 mm diameter is driven in a deep stratum of soft clay having an unconfined compressive strength of 112 kPa. Determine the safe load carrying capacity of the pile with respect to a factor of safety of 3. The adhesion factor may be taken as 0.6. **10**

6. (a) Discuss various dynamic formulae to estimate load carrying capacity of an individual pile. What are their limitations ? **12**

(b) Discuss the uses of penetration tests for the estimation of load-carrying capacity of piles. **8**

Unit IV

7. How would you estimate the load carrying capacity of a drilled pier in :

(a) sand

(b) clay ? **20**

8. (a) Discuss the situations where as well foundation is more suitable than the other types of foundations. **5**

(b) Discuss the various forces acting on a well foundation. **15**