301010

Seat No.	

T.E. (Civil) (Semester – II) Examination, 2014
FOUNDATION ENGINEERING
(2008 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer Q. **1** or Q. **2**, Q. **3** or Q. **4**, Q. **5** or Q. **6**, Q. **7** or Q. **8**, Q. **9** or Q. **10**, Q. **11** or Q. **12**.*
*2) Answers to the **two** Sections should be written in **separate** answer books.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) Figures to the **right** side indicate **full** marks.*
*5) Use of calculator is **allowed**.*
*6) Assume suitable data if **necessary**.*

SECTION – I

1. a) Which are the different samplers used for soil sampling ? Explain with sketches. **6**
   b) Explain factors influencing cost of sub-surface investigation. **6**
   c) What are limitations of standard penetration test and which are the corrections to be given to blow count ? **6**

OR

2. a) Calculate the depth of soft strata underlain by hard strata. Use the following data : $v_1 = 600$ m/s and $v_2 = 3000$ m/s and the break in the plot was located at 60 m. **6**
   b) Write short note on the stages involved in site investigation programme. **6**
   c) Explain RQD and recovery ratio. **6**
3. a) Explain with neat sketches, modes of shear failure in soil. **6**
   b) A square foundation is 1.5 m × 1.5 m in plan. The soil supporting the foundation has a friction angle $\phi = 20°$ and C = 52 kN/m^2. The unit weight of soil, $\gamma = 17.8$ kN/m^3. Determine the allowable gross pressure on the foundation with F.O.S. 4. Assume that the depth of foundation is 1 m and general shear failure occurs in soil. Take $N_c = 17.69$, $N_q = 7.44$, $N_\gamma = 3.64$. **6**
   c) Explain Skempton's bearing capacity equation for strip foundation. **4**

OR

4. a) State and explain Hansen's bearing capacity equation. **6**
   b) Explain with a sketch the effect of biaxial eccentric loading on bearing capacity of soil. **6**
   c) In a plate test on sandy soil the test plate of 60 cm × 60 cm undergoes settlement of 5 mm at a pressure of 12×10^4 N/m^2. What will be expected settlement of 3 m × 3 m footing under same pressure ? **4**

P.T.O.

5. a) A clay stratum 5 m thick has the initial void ratio of 1.50. When the sample is subjected to increase in pressure of 120 kN/m^2 the void ratio reduces to 1.44. Determine the coefficient of volume compressibility and final settlement of stratum. 6

   b) Define the terms normal consolidation, over consolidation and preconsolidation pressure. 6

   c) Enlist the causes of foundation settlement. 4

OR

6. a) Explain plate load test with a neat sketch and how the test results are used to find bearing capacity of soil as per IS criteria. 6

   b) Explain with sketches spring analogy method of consolidation process. 6

   c) In a consolidation test void ratio decreased from 0.70 to 0.65, when the load was changed from 50 kN/m^2 to 100 kN/m^2. Compute compression index and coefficient of volume change. 4

SECTION – II

7. a) State and explain with sketches static formula for determining bearing capacity of single vertical pile in C-ϕ soil. 6

   b) Draw a neat sketch of box caisson and explain its construction. Also explain its advantages and disadvantages. 6

   c) A 60 cm diameter pile passing through a clay strata having uniform unconfined compressive strength of 50 kN/m^2 is to carry a load of 500 kN. Assuming F.S. = 2.5, determine the length of pile to carry the load. Assume coefficient of adhesion = 0.90. 6

OR

8. a) What is Caisson disease ? How it is controlled ? 6

   b) Write a short note on 'Micro piles'. 6

   c) Calculate the group efficiency of pile group consisting of 20 piles which are arranged in four rows, if the diameter of pile is 400 mm and spacing is 1 m c/c by using (i) Converse Labbare's formula and (ii) Feld's rule. 6

9. a) Discuss with a neat sketch how you would determine the bearing capacity of single undereamed pile 6

   b) What are the different ground improvement techniques ? Explain any one in detail. 6

   c) State and explain any four different methods of anchorages of sheet piles. 4

OR

10. a) What are the different laboratory methods to determine the swelling potential of expansive soils ? Explain any one in detail. **6**

    b) Write a short note on 'approximate method to calculate the depth of embedment of a sheet pile. **6**

    c) Explain the typical characteristics of black cotton soils by giving examples of laboratory tests. **4**

11. a) Explain the terms : Earthquake, Epicenter, Magnitude, Intensity, Epicentral, Distance, Focal depth. **8**

    b) What are the different functions of geosynthetics in geotechnical engineering ? Explain any five with sketches. **8**

OR

12. a) Draw a neat sketch of reinforced earth retaining wall with wrap-around facing and explain its various components and their functions. **8**

    b) What are the various types of earthquakes ? Explain any four in brief. **8**
