53 (CE 604) FDEN

2019

FOUNDATION ENGINEERING

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Deduce the expression of ultimate bearing capacity according to Terzaghi's bearing capacity theory. 10

   (b) Determine the width of a strip footing for the following data :

   $D_f = 1m$, $c = 1{\cdot}4\,t/m^2$, $\phi = 28°$, $\gamma = 1{\cdot}78\,t/m^3$,

   FOS = 3, load intensity = $90\,t/m$,

   $N_c = 25{\cdot}8$, $N_q = 14{\cdot}7$, $N_\gamma = 10{\cdot}6$. 10

2. *(a)* Explain how the allowable load on a pile group and a single pile is estimated from pile load test as per IS specification. 10

Contd.

(b) In a 16 pile group, the pile diameter is 45*cm* and centre to centre spacing of the square group is 1·5*m*, if $c = 50 kN/m^2$, determine whether the failure would occur with the pile acting individually or as a group. Neglect bearing at the tip of the pile. All piles are 10*m* long. Take adhesion factor (*m*) = 0·7. 10

3. (a) Define the methods of site exploration. Explain the types of samples. 4+2=6

(b) Describe standard penetration test. What are the corrections needed for observed '*N*' value of SPT ? 8+6=14

4. (a) Describe the chemical stabilization methods of ground improvement techniques. 8

(b) Describe the criteria for selection of depth of well foundation. 4

(c) Write Boussinesq equation and draw the pressure distribution diagram in vertical and horizontal plane, if a concentrated load is placed at surface. 8

5. (a) How many types of bearing capacity failure are there ? Explain all types. 10

(b) A concentrated point load of 200*kN* acts at the ground surface. Find the intensity of vertical pressure at a depth of 10*m* below the ground surface and situated on the axis of the loading. What will be the vertical pressure at a point at a depth of 5*m* and at a distance of 2*m* from the axis of loading ? 10

6. Write short notes on : ***(any four)*** 5×4=20

(a) Vibroflotation

(b) Plate Load Test

(c) Design criteria of sampler

(d) Well foundation

(e) Wash boring.
