53 (CE 604) FDEN

2017

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)* How can you differentiate deep foundation with shallow foundation ? Classify deep foundations. 2+6=8

   (b) A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of piles were $30cm$ and $9m$ respectively. If the unconfined compression strength of clay is $9t/m^2$ and pile spacing is $100cm$ centre to centre. What is the capacity of the group ? Assume factor of safety = 2·5, Adhesion factor = 0·75. 12

2. *(a)* What is the necessity of soil exploration ? Explain different methods of soil explorations ? 2+4=6

(b) What do you mean by bore hole log ? 6

(c) Determine the ultimate bearing capacity of a strip footing, $1{\cdot}5m$ wide, with its base at a depth of $1m$, resting on a dry sand stratum. 8

Take, $\gamma_d = 17 kN/m^3$,

$\phi' = 38°, C' = 0, N_q = 60$, $N_r = 75$.

3. *(a)* Describe vibroflotation technique of ground improvement. 8

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

(c) A concentrated point load of $200kN$ acts at the ground surface. Find the intensity of vertical pressure at a depth of $10m$ below *GL* and situated on the axis of loading. What will be the vertical pressure at a point at a depth $5m$ and a distance of $2m$ from the axis of loading. 4

4. *(a)* Explain Terzaghi's analysis of bearing capacity. Deduce the equation of bearing capacity of shallow foundation ? 12

(b) Design a strip footing to carry a load of $750 kN/m$ at a depth of $1{\cdot}6m$ in a $c-\phi$ soil and having $\gamma = 18 kN/m^3$ and shear strength parameters as $C = 20 kN/m^2$ and $\phi = 25°$. Determine width of footing, using a FOS 3 against shear failure. Use Terzaghi's equation. 8

5. *(a)* Draw and explain the parts of a wall foundation ? What are the forces act on a wall foundation ? 5+5=10

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

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

(a) Standard Penetration Test

(b) Pile load Test

(c) Design feature of a sampler

(d) Design critaria of machine foundation

(e) Efficiency of pile group.
