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Question Paper Code : 51257

B.E/B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fifth Semester

Civil Engineering

CE 2305/CE 54/10111 CE 505 – FOUNDATION ENGINEERING

(Regulations 2008/2010)

(Common to PTCE 2305 – Foundation Engineering for B.E. (Part-time) Fourth semester Civil Engineering – Regulations 2009)

(IS 6403 – 1981 Design Chart Tables are permitted)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is the objective of site exploration ?
2. What is site reconnaissance ?
3. What factors determine whether a foundation type is shallow or deep ?
4. Why are hearing capacity equations for clay usually the undrained shear strength ?
5. Draw the centac pressure distribution of rigid footing founded on clay and sand deposits.
6. List the different type of raft foundation. Which type of raft is commonly used ? Why ?
7. What are friction piles ?
8. When does negative skin friction occurs in piles ?
9. State the direction and magnitude of wall movement required for the mobilization of active and passive earth pressure respectively.
10. If the ratio between coefficient of passive earth pressure and that of active earth pressure is 9, find the angle of internal friction of the soil.

PART – B (5 × 16 = 80 Marks)

11. (a) Explain any two Geophysical methods of site exploration. **(16)**

OR

(b) Explain any two types of soil samplers. **(16)**

12. (a) (i) Differentiate:Safe Bearing Capacity, Allowable Bearing Capacity, Allowable Bearing pressure. **(6)**

(ii) A circular concrete pier of 3 m diameter carries a gross load of 3,500 kN. The supporting soil is a clayey sand having the following properties : $C = 5\ kN/m^2$, $\phi = 30°$ and $\gamma = 18.5\ kN/m^3$. Find the depth at which the peer is to be located such that a factor of safety of 3.0 is assumed. The bearing capacity factors for $\phi = 30°$ are $N_c = 30.1$, $N_q = 18.4$ and $N_\gamma = 22.4$. **(10)**

OR

(b) (i) Draw Terzaghi's bearing capacity failure surface with all details. **(4)**

(ii) The results of a plate load test conducted on a 300 mm square plate at a depth of 1 m on a dry sand is given below.

Unit applied pressure (kN/m^2)	50	100	150	200	250	300	350
Settlement (mm)	3	5	98	13	19	28	65.0

Determine the ultimate bearing capacity the safe bearing capacity (F.S = 3). The size of square footing to be placed at the same depth and to carry a load of 2500 N and the settlement of the footing. **(12)**

13. (a) Explain the conventional method of design of raft foundation. **(16)**

OR

(b) Explain the design procedure of Trapezoidal combined footing. **(16)**

14. (a) Explain with neat sketches about pile load test method of determination of load carrying capacity of piles. **(16)**

OR

(b) Determine the group efficiency of a pile group consists of 16 piles of each 20 m long and diameter with c/c distance on both directions equal to 1.0 m which are embedded on a clay deposit having cohesive strength of 35 kN/m^2 by static method, Feld's rule and converse Labara formula.

Take adhesion factor as 0.6. **(16)**

15. (a) (i) State the assumptions made in Rankine's earth pressure theory and hence discuss its limitations. **(8)**

(ii) The height of a retaining wall with smooth vertical back is 6 m. The cohesionless backfill has a horizontal top surface and carries uniformly distributed surcharge of 30 kPa. The angle of internal friction of the soil is 30° and the water table is at a depth of 3 m below the top of the fill. Draw the active earth pressure diagram if the unit weight of the soil above and below water table is 18 kN/m^3 and 19.81 kN/m^3 respectively. **(8)**

OR

(b) A retaining wall with a vertical back is 8 m high and retains a cohesionless soil of angle of internal friction and unit weight of 30° and 18 kN/m^3 respectively. The angle of wall friction is 20°. The backfill surface is horizontal. By Culmann's graphical method, find the total active thrust, when there is

(i) No surcharge **(6)**

(ii) A surcharge of 36 kPa. **(10)**