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Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Applied Geotechnical Engineering

Time: 3 hrs. Max. Marks: **80**

Note: *Answer any FIVE fidl questions, choosing ONE full question from each module.*

Module-1

1 a. What is Stabilization of bore holes? Mention various methods and explain any one method. (06 Marks)

b. With the help of neat sketch, explain Seismic Refraction method of soil exploration. Using this method, determine the velocity of waves in soil layers and thickness of the top stratum. for the following details

Time (s) :	0.1	0.2	0.3	0-4	0.45	0.50	0.55
Distance (m) :	40	80	120	160	200	240	280

Geophones are placed at a spacing of 40m in a straight line and the time taken for the last wave to be received at each geo — phone is given. (10 Marks)

OR

2 a. List and explain types of soil samples. (06 Marks)

b. Explain the determination of ground water level by Hvorslev's method. Using this method estimate the ground water table level for the following data :
Depth up to which water is boiled out = 15m ; Water rise on first day = 0.80m
Water rise on second day = 0.70m ; Water rise on third day = 0.60m. (10 Marks)

Module-2

3 a. Explain types of settlements with formulae. (06 Marks)

b. Define Isobar. Using Boussenesq's equation construct isobar of intensity 0.25 Q (25% isobar), where Q is point load acting on the surface. (10 Marks)

OR

4 a. A circular area 6m diameter carries a uniformly distributed load of 10kN/m^2, determine the vertical stress at a depth of 2m, 4m and 8m. Plot the variation of vertical stress with depth. (06 Marks)

b. A square footing 1.2m x 1.2m rests on a saturated clay layer 4 deep. WL = 30% , y_{sat} = 17.8kNim W = 28% and G = 2.68. Determine the settlement if the footing carries a load of 300kN (10 Marks)

Module-3

5 a. Explain Fellinious method of obtaining centre of critical slip surface in the case of stability analysis of C — soil. (06 Marks)

b. A retaining wall of height 10m supports cohesionless soil with the following properties. G = 2.65 , e = 0.65 and (I) = 30°, Water table lies at 3m depth. Surface of back fill is horizontal and carries surcharge of intensity 14kN/m^2. Draw lateral active earth pressure distribution diagram. Determine total active earth pressure and its point of application. (10 Marks)

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6 a. Derive equations for the earth pressure coefficients K_a and K_p by considering back fill with horizontal surface. Use Rankine's theory. (06 Marks)

b. An embankment is to be constructed with a soil having C = 20kN/m^2 , = 10° and y = 19kN/m^3. The desired factor of safety with respect to cohesion as well as friction as 1.5. Determine i) Safe height of the desired slope if slope is 2H to 1V.
ii) Safe angle of slope if the desired height is 15m. For (I) = 10° ; Taylor's stability numbers are as follows : (10 Marks)

Stability No :	0.04	0.08
Slope angle (i) :	20	30

Module-4

7 a. With the help of sketches, explain effect of water table and eccentric loading on bearing capacity soil. (06 Marks)

b. A square footing located at a depth of 1.3m below the ground has to carry a load of 800kN. Find the size of footing, if the desirable factor of safety is 3. The soil has the following properties. Void ratio = 0.55 ; degree of saturation = 50% , Specific gravity = 2.67 , Cohesion = 8KPa , Angle of shearing resistance = 30° , = 37.2 , N_q = 22_5 and N_y = 19.7. (10 Marks)

OR

8 a. Explain Standard Penetration test with suitable corrections. (06 Marks)

b. A rectangular footing has a size of I .8m x 3m has to transmit the load of a column at a depth of 1.5m. Calculate the safe load which the footing can carry at a factor of safety of 3 against shear failure. Use IS code method. The soil has following properties : n = 40% ; G = 2.67 ; W = 15% ; C = 8kN/m^2 and (1) = 32.5°. Marks)

Module-5

9 a. With the help of sketch, explain negative skin friction. (06 Marks)

b. A 200mm diameter, 8m long piles are used as foundation for a column in a uniform deposit of medium clay having unconfined compressive strength of 100kN/m^2. The spacing between the piles is 500mm. There are 9 piles in the ground arranged in a square pattern. Calculate the ultimate load capacity of the group. Assume adhesion factor = 0.9 and Nc = 9. (10 Marks)

OR

10 Write short notes on any four of the following :
a. Efficiency of pile group.
h. Group capacity of piles.
c. Pile load test.
d. Settlement of piles.
e. Under reamed piles.
f. Single loaded pile capacity. (16 Marks)