

# CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18CV62

## Sixth Semester B.E. Degree Examination, June/July 2023 Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. Use of IS:6403 is permitted.*

### Module-1

- 1 a. What is subsurface exploration? Enumerate the objectives of subsurface exploration. (10 Marks)  
b. Explain seismic refraction method with neat sketch. What are its limitations? (10 Marks)

OR

- 2 a. Establish the location of ground water in a Clayey strata, water in bore is bailed out to a depth of 12m below ground surface and rise of water recorded at 24 hr interval are  $h_1 = 60\text{cm}$ ,  $h_2 = 55\text{cm}$ ,  $h_3 = 50\text{cm}$ . (10 Marks)  
b. What are the methods available for dewatering? Explain dewatering by electro osmosis method with neat sketch. (10 Marks)

### Module-2

- 3 a. Derive Boussinesq expression for vertical stress due to concentrated load. When  $r/z$  ratio is zero what is the value of Boussinesq influence co-efficient? (10 Marks)  
b. A concentrated load of 50 kN acts on the surface of a homogeneous soil mass of large extent. Determine the stress intensity at a depth of 5m, directly under the load and at a horizontal distance of 2.5m. Use Boussinesq analysis. (08 Marks)  
c. What is Isobar? (02 Marks)

OR

- 4 a. There is a layer of soft clay 4m thick under a newly constructed building. The overburden pressure at the centre of the clay layer is  $300 \text{ kN/m}^2$ . Compute the settlement if there is an increase in pressure due to construction of  $1000 \text{ kN/m}^2$ . Take  $C_c = 0.5$ ,  $G = 2.7$  and water content  $\omega = 50\%$ . (10 Marks)  
b. Explain the classification of foundation settlement. What are the other causes of settlement? (10 Marks)

### Module-3

- 5 a. What are the causes of slope failure? List and enumerate the types of failure in finite slopes. (10 Marks)  
b. A new canal is excavated to a depth of 5m below group level through a soil having the characteristics as,  $C = 14 \text{ kN/m}^2$ ,  $\phi = 15^\circ$ ,  $e = 0.8$  and  $G = 2.7$ . The slope of banks is 1 in 1. If the Taylors stability number is 0.083, calculate the factor of safety with respect to cohesion when the canal runs full. If it is suddenly emptied, what will be the factor of safety? Take Taylor's stability number as 0.122. (10 Marks)

OR

- 6 a. Explain the procedure of Culmann's graphical method for active earth pressure. (10 Marks)  
 b. A retaining wall with a stratified backfill and a surcharge load is shown in the Fig.Q6(b). Draw the earth pressure diagram. Also estimate the resultant thrust on the wall and its position.

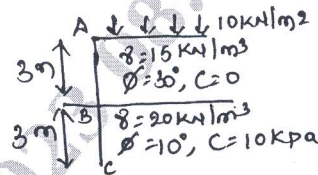


Fig.Q6(b)

(10 Marks)

**Module-4**

- 7 a. Explain standard penetration test and its correction. (10 Marks)  
 b. A strip footing 2m wide carries a load intensity of 400 kN/m<sup>2</sup> at a depth of 1.2m in sand. The saturated unit weight of sand is 19.5 kN/m<sup>3</sup> and unit weight above water table is 16.8 kN/m<sup>3</sup>. The shear strength parameters are  $C = 0$  and  $\phi = 35^\circ$ . Determine the factor of safety with respect to shear failure for the following cases of location of water table.  
 i) Water table is 4 m below Ground Level.  
 ii) Water table is 2.5 m below Ground Level. (10 Marks)

OR

- 8 a. Explain the effect of water table on bearing capacity of soil. (10 Marks)  
 b. A square footing 2.5m  $\times$  2.5m is built on homogeneous bed of sand of density 19 kN/m<sup>3</sup> and having angle of shearing resistance of 36°. The depth of foundation is 1.5m below ground surface. Calculate safe load that can be applied on the footing with factor of safety 3. Take bearing capacity factors as  $N_c = 27$ ,  $N_q = 30$  and  $N_\gamma = 35$ . (10 Marks)

**Module-5**

- 9 a. List the classification of piles based on different criteria. Explain with neat sketch classification of piles based on function. (10 Marks)  
 b. In a 16 pile group, the pile diameter is 45 cm and centre to centre spacing of the square group is 1.5m. If  $C = 50$  kN/m<sup>2</sup>, 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 10m long. Take  $m = 0.7$  for shear mobilization around each pile. (10 Marks)

OR

- 10 Write short notes on:  
 a. Efficiency of pile group  
 b. Negative Skin friction  
 c. Under-reamed pile  
 d. Settlement of pile group

(20 Marks)

\*\*\*\*\*