

8E4031**8E4031**

B. Tech. VIII Semester (Main/Back) Examination-2014
Civil Engg.
8CE1 Geotechnical Engineering-II

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) State the assumption to be required for the validity of Boussinesq equation for stress - distribution. Write a brief critical note on the concept of pressure bulb and its use in soil engineering practice. (8)
- b) Find the maximum vertical stress at a plane distant 1.0m from a concentrated load of 100t at the ground surface. (8)

OR

1. a) Explain Westergaard's theory for determination of the vertical stress at a point. Discuss various approximate methods for the determination of the vertical stress at a point. What are their limitations? (8)
- b) A rectangular area 4m×6m carries a uniformly distributed load of 10t/m² at the ground surface. Estimate the vertical pressure at a depth of 6m vertically below the centre and also below a corner of the loaded area. Solve the problem by dividing the loaded area in four equal parts and treating the load from each as a point load. (8)

Unit - II

2. a) Write short notes on the log fitting method for evaluation C_v from laboratory consolidation test. What do you mean by precompression in clays. (8)
- b) A layer of soft clay is 6m thick and lies under a newly constructed building the weight of sand overlying the clayey layer produces a pressure of 2.6 kg/cm²

and the new construction increases the pressure by 1.0 kg/cm^2 . If the compression index 0.5, compute the settlement-water content is 40% and specific gravity is 2.6. (8)

OR

2. a) Define the terms "compression index", "coefficient of consolidation" and coefficient of compressibility and indicate their units and symbols. (8)
- b) A layer of clay 2.0m thick is subjected to a loading of 0.5 kg/cm^2 . One year after loading the average consolidation is 50%. The layer has double drainage.
- What is the coefficient of consolidation?
 - If the coefficient of permeability is 3mm/year, what is the settlement after one year. (8)

Unit - III

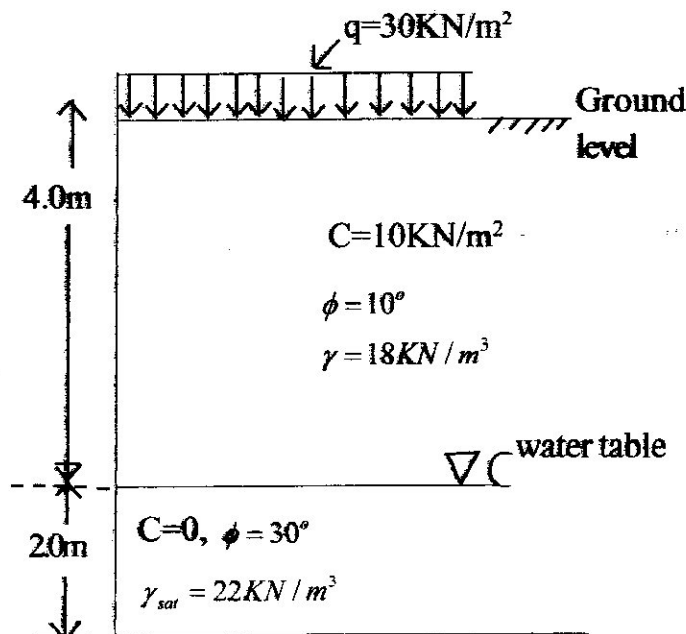
3. a) Describe a suitable method of stability analysis of slopes in
- purely saturated cohesive soil
 - cohesionless sand. (8)
- b) An embankment is inclined at an angle of 35° and its height is 15m. the angle of shearing resistance is 15° and the cohesion intercept is 200 kN/m^2 . The unit weight of soil is 18 kN/m^3 . If the Taylor's stability number is 0.06, Find the factor of safety with respect to cohesion. (8)

OR

3. a) Discuss standard penetration test. What are the various corrections? (8)
- b) How would you decide the depth of exploration and the lateral extent of soil investigation? Describe in brief, various geophysical methods. (8)

Unit - IV

4. a)



using the data given in above figure, calculate the total active earth pressure at a depth of 6.0m. Also calculate the line of action of the lateral force from the base of the wall.

- b) What are the different types of earth pressure? Give examples? (12)
(4)

OR

4. a) Discuss culmann's method for determination of active earth pressure. (8)
b) Calculate the horizontal and vertical components of the total active earth pressure on a retaining wall 3-3m high. Also calculate the line of action of the lateral force from the base of wall. Take the unit weight of the soil is 1800kg/m^3 , the angle of internal friction as 20° and the surcharge angle as 15° . (8)

Unit - V

5. a) A square footing has to carry a load of 100t. Find the size of footing for a factor of safety of 2.5. The depth of foundation is 1.5m. The soil has the following properties $G = 2.60$, $e = 0.56$, $S = 0.50$, $\phi = 30^\circ$ and $C = 1\text{t/m}^2$. for $\phi = 30^\circ$, $N_c = 30$, $N_q = 18.4$ and $N_y = 22.4$. (10)

- b) Define the following terms.

- i) Net safe bearing capacity.
ii) Gross safe bearing capacity.
iii) Allowable soil pressure. (6)

OR

5. a) Describe plate - load test what are its limitation and uses. (8)
b) Describe various types of pill foundations. Also discuss different methods for the installation of piles. (8)