

6E 6032

6E 6032

B.Tech. VI Semester (Main) Examination, May -June 2015

Civil Engg.

6CE2A 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 started clearly.

UNIT - I

1. a) Explain the Westergaard's assumption for stress distribution in soil mass. How it is different from Boussinesq's solution. (8)
- b) A concentrated load of 100t is applied at the ground surface. Compute the vertical pressure
 - i) At a depth of 4m below the load
 - ii) At a distance of 3m at the same depth. Use Boussinesq's equation. (8)

(OR)

1. a) Discuss the basis of the construction of Newmark's chart in detail. What is the role of Influence value (I). How it is used. (8)
- b) A rectangular area 4m×2m is uniformly loaded with a load intensity of 10 t/m² at the ground surface. Calculate the vertical pressure at a point 3 m below one of its corner
 - a) By Equivalent point load method
 - b) By Boussinesq's 2:1 approximation (8)

UNIT - II

2. a) Discuss the Terzaghi's theory of one dimensional consolidation stating the various assumptions and their validity (8)
- b) An undisturbed sample of clay 24 mm thick consolidated 50% in 20 minutes. when tested in the laboratory with drainage allowed at top and bottom. The clay layer from which this sample was obtained is 6m thick in the field. How much time will it take to consolidate 50% with double drainage. If the clay stratum has only single drainage, calculate the time to consolidate 50%. Assume uniform distribution of consolidation pressure. (8)

(OR)

2. a) Explain in detail any one method for determining the coefficient of consolidation of soil. (8)
- b) A layer of soft soil (clay) is 8m thick and lies under a newly constructed building. The weight of sand overlying the clay layer produces a pressure of 3.0 kgf/cm^2 and the new construction increases the pressure by 1.0 kgf/cm^2 . If the compression index is 0.5, compute the settlement. Water content is 40% and specific gravity of grain is 2.70 (8)

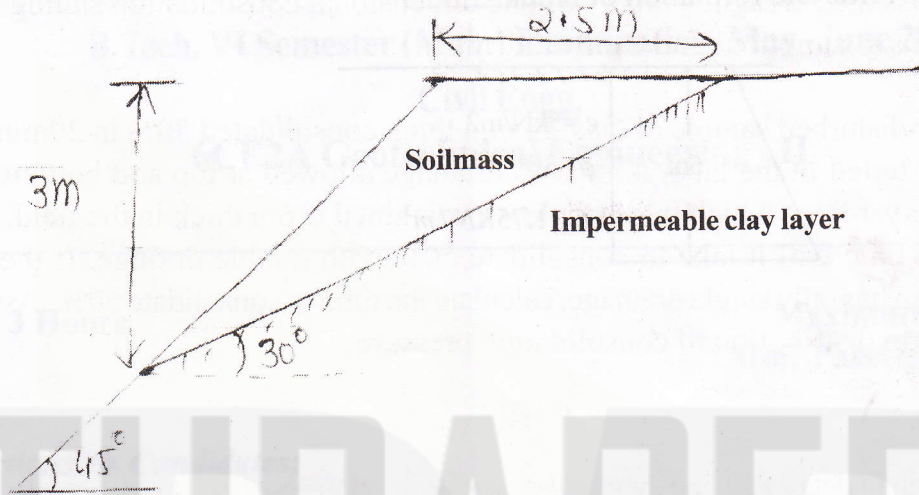
UNIT - III

3. a) What are the different types of slope failure. Derive an expression for the factor of safety of an infinite slope in cohesionless soil (8)
- b) A long natural slope in an over consolidated clay ($C = 1.2 \text{ t/m}^2, \phi = 22^\circ, Y_{sat} = 2 \text{ t/m}^3$) is inclined at 10° to the horizontal. The water table is at the surface and seepage is parallel to the slope. If the plane slip has developed at a depth of 5m below the surface determine the factor of safety. (8)

(OR)

3. a) Describe Culmann's method for the stability analysis of homogeneous slope. What are its limitations. (8)

b)



A soil mass as shown in figure is resting on inclined impermeable clay layer. Determine the factor of safety against wedge failure along the interface. The soil has $C = 0.8 \text{ t/m}^2$, $\phi = 22^\circ$, and $\gamma = 1.7 \text{ t/m}^3$ (8)

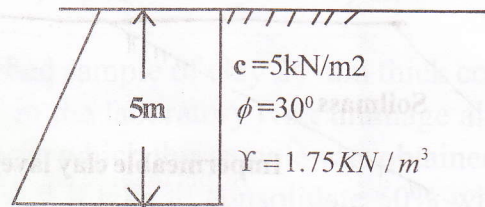
UNIT - IV

4. a) What are the different types of earth pressure. Give examples. Discuss earth pressure at rest. (8)
- b) A retaining wall is 6m high, retains a cohesionless soil, with an angle of internal friction 33° . The surface is level with the top of the wall. The unit weight of the top 3m of the fill is 2.2 t/m^3 and that of the rest is 2.8 t/m^3 . Find the magnitude and point of application of the resultant active thrust. (8)

(OR)

4. a) Discuss the Culmann's method for the determination of active earth pressure. (8)
- b) A 5m high retaining wall is shown in figure below. Determine the Rankine active pressure on the wall - (8)

- i) Before the formation of crack
- ii) After the formation of crack



UNIT - V

5. a) Enumerate the assumption of Terzaghi's bearing capacity theory. How it is different from Meyerhoff theory. (8)

- b) What will be the gross and net safe bearing pressure of sand having $\phi = 36^\circ$ and effective weight 1.8 t/m^3 under (8)

- a) 1m wide strip footing

- b) 1m side square footing. Assume footings are placed at a depth of 1m below ground surface and that the water table is at a great depth Also assume a factor of safety of 3.0 Use Terzaghi's theory. Given for $\phi = 36^\circ$, $N_q = 47$ and $N_y = 43$ (8)

(OR)

5. a) What are the factors that affect the sample disturbance. How are these minimised. Describe split spoon sampler. What is its use. (8)

- b) Discuss in brief various geophysical methods Discuss their limitations and uses. (8)