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ET-501(A)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

Term-End Examination

00481

December, 2015

ET-501(A) : SOIL MECHANICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions.*

1. (a) What is theory of sedimentation ? How is the gradation analysis of soil done by hydrometer ? Explain briefly. 7

(b) The water content of a soil mass is 11% while its void ratio is 0·63. Determine the quantity of water to be added per cubic metre of the soil to make the water content double. Assume the specific gravity of soil solid as 2·72 and the void ratio is unchanged. 7

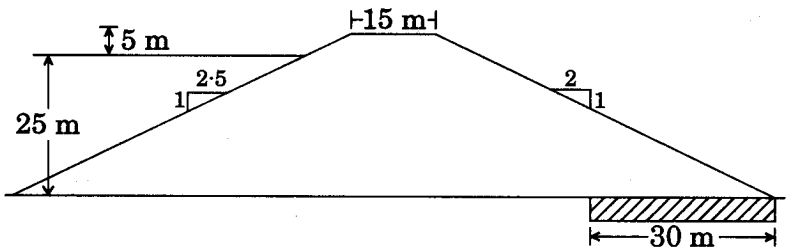
2. (a) How are the fine grained soils classified ? Explain briefly. 7

(b) An oven drying pat of clay weighs 26·2 gm and displaces 190 gm of mercury when fully immersed in it. If the specific gravity of soil solid is 2·7, find the shrinkage limit. 7

3. (a) Discuss how permeability is determined by variable head permeameter. 7

(b) Define total stress, neutral stress, and effective stress. What is the importance of effective stress ? 7

4. A homogenous earthen dam is provided with a horizontal filter drain 30 m long at the toe as shown in the figure. Determine the seepage discharge per unit length, if K = 40 m/day. *14*



5. (a) What do you mean by contact pressure ? What are the factors that affect the contact pressure distribution ? 7

(b) A concentrated load of 2000 kN is applied at the ground surface. Determine the vertical stress at a point M which is 6 m directly below the load. Also calculate the vertical stress at a point N which is at a depth of 6 m but at a horizontal distance of 5 m from the axis of the load. 7

6. (a) What are the assumptions of Terzaghi's theory of consolidation ? 7

(b) A clay stratum 5 m thick has the initial void ratio of 1·50 and effective overburden pressure of 120 kN/m^2. When the sample is subjected to an increase of pressure of 120 kN/m^2, the void ratio reduces to 1·44. Determine the coefficient of volume compressibility and the final settlement of the stratum. 7

7. (a) Explain unconfined compressive strength test. What are the advantages of this test ? Write the revised Mohr-Coulomb equation. How does it differ from the original equation ? 7

(b) A cylindrical soil sample failed at an axial load of 140 kN/m^2 in an unconfined compression test. The failure plane makes an angle of 54° with the horizontal. Determine the soil properties. 7

8. Write short notes on any ***two*** of the following : *2×7=14*

(a) Failure of U/S slope in sudden drawdown condition

(b) Oedometer Test

(c) Field Compaction
