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5E5063

Roll No. _____ Total No of Pages: 3

5E5063

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Civil Engineering
5CE3A Geotechnical Engineering-I

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks Back: 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.

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) A 10cm dia, 30cm long sample was extracted from ground weighs 4125gm. A moist specimen of the sample weighing 12.7gm was oven dried and its weight was found 9.2gm. If specific gravity of soil in 2.65 find - [10]

(i) Water content
(ii) Bulk Density
(iii) Dry Density
(iv) Void ratio
(v) Degree of saturation

(b) What do you understand by following classification of soils [6]

(i) CL
(ii) SW
(iii) MH

OR

Q.1 (a) Explain the IS Classification of soils. [10]

(b) The bulks unit weight of soil is 19.10kN/m^2 and water content is 12.5%, specific gravity of soil is 2.67, Determine - [6]

(i) Void ratio

(ii) Porosity

(iii) Degrees of saturation

UNIT-II

Q.2 (a) Explain the structure of cohesive soils. [8]

(b) Explain the structure of montmorillonite mineral. What makes it different from other minerals? [8]

OR

Q.2 (a) What do you understand by permeability of soil. Explain Darcy's law to compute rate of flow through soil. [8]

(b) A soil sample has length of 3.5m and cross-sectional area of 2m^2. If water flows through such soil sample and fluid energy lost is 1650Nm for every cubic meter flow of water, estimate Darcy's velocity and permeability. The time of flow for 1m^3 of water is 26 hours. [8]

UNIT-III

Q.3 (a) Explain total and effective stress taking example of dry and saturated soils. Show the variation of total stress, effective stress and pore water pressure for soil deposit having water table at ground surface. [8]

(b) In the process of an excavation for a wall footing, the water table was lowered from depth of 1.5m to a depth of 4.5m in claying sand deposit. Considering the soil above water table remains saturated at water content 30%, compute the following - [8]

(i) The effective stress at 4m after lowerly water table, take G=2.68.

(ii) Increase in effective stress at depth 5m.

OR

Q.3 (a) What do you understand by 'Piping'? Why it occurs in dams and how it can be prevented? [8]

(b) Show a flow net through an earthen dam and explain the applications of flow net. [8]

UNIT-IV

Q.4 (a) What different drainage conditions are considered in shear strength test of soil. Explain their relevance for actual site conditions. [8]

(b) A specimen of dry sand when subjected to triaxial test, failed at deviator stress 400kN/m^2. It failed with a pronounced failure plane with an angle 24° to the axis of the sample. Compute the lateral pressure which has caused the failure. [8]

OR

Q.4 (a) Explain Mohr-Coulomb shear strength theory. [8]

(b) In a triaxial test on dry sand the sample failed wren major and minor principal stresses were 980kN/m^2 and 280kN/m^2 respectively. What would be shear strength of same sample when tested in direct shear test under a normal stress of 300kN/m^2. [8]

UNIT-V

Q.5 (a) Enumerate the factors affecting compaction and explain how they affect the compaction. [8]

(b) If a proctor mould which has diameter 125mm and height 130.4mm is used for compaction, what would be the number blows to each layer if rammer is used is same as used in standard proctor and compaction is done in three layers. [8]

OR

Q.5 (a) What is a Proctor Needle? How it is used in compaction control in the field? [8]

(b) What do you understand by mechanical stabilization? For what type of soil it will be suitable? [8]

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