7E4031

Roll No. : _____ Total Printed Pages : 3

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B. Tech. (Sem. VII) (Main/Back) Examination, December-2012
Civil Engg.
7CE1 Geotechnical Engir eering-I

Time : 3 Hours] [Total Marks : 80
[Min. Passing Marks : 24

*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.
(Mentioned in form No. 205)

1. Graph Papers 2. Nil

UNIT - I

1 (a) A clay sample has water content of 30%, volume 25.5 cm^3 and mass of 43.10 g. Determine void ratio and degree of saturation of the sample, if G = 2.70. 8

(b) a saturated soil sample has a water content of 40% and void ratio of 0.01 Determine shrinkage limit of the soil, if G = 2.70. 4

(c) Define : 4
(i) Density Index
(ii) Consistency Index.

OR

1 (a) Derive the relationship between bulk unit wt. and dry unit wt. 8

(b) Draw plasticity chart for classification of fine grained soil as per IS 1498. 4

(c) Describe any one method of determination of liquid limit. 4

UNIT - II

2 (a) Describe clay minerals. 8

(b) Describe soil structures. 8

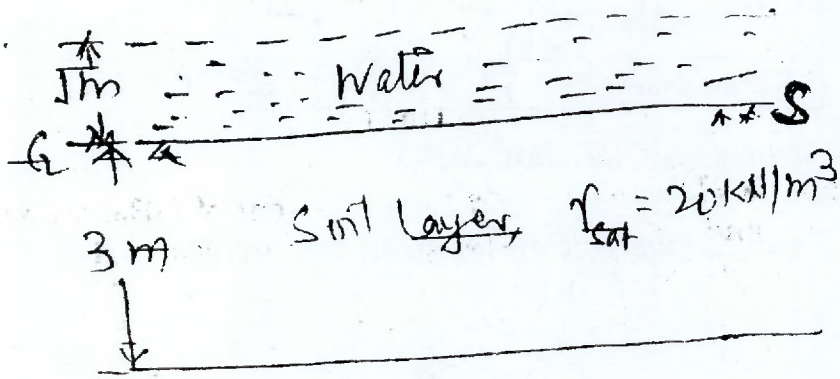
OR

2 (a) Describe Darcy's law of permeability and explain its limitations. 8

(b) Derive the expressions of average coefficient of permeability of stratified soils. 8

UNIT - III

3 (a) Draw the variation of total stress, pure water pressure and effective stress for given soil layer.



8

(b) Explain the influence of capillary rise on effective stress w.r.t. nature rise of water level. 5

(c) What do you understand by "Quick Sand" condition ? 3

OR

3 (a) Derive Laplace's equation of seepage through soil mass. Explain its significance in flow net. Also, draw an sketch of flow net through earthen dam. 16

UNIT - IV

4 (a) Explain unconfined compressive strength test. 8

(b) In a set of triaxial test, following results were obtained for a soil sample at failure. C = 2.5 kN/m^2, $\phi = 20°$, $\sigma_3 = 20\ kN/m^2$. Find σ_1. 8

OR

4 (a) Explain how can you determine shear parameters from Direct-shear test. 8

(b) Explain Mohr-Coulomb's failure envelope for soils. 8

UNIT - V

5 (a) Following are the observations from proctor test :

Bulkdensity (g/cm^3)	1.75	1.91	2.02	2.12	2.18
Water content (%)	8.50	11.80	14.25	16.91	20.05

Determine OMC and MDD. 8

(b) Describe the factors affecting compaction of soil. 8

OR

5 (a) What do you understand by placement water content. How do the properties of clay affected by compaction. Explain with examples where soil is not compacted at optimum water content. 16
