Roll No. .....
Printed Pages : 2

8421

BT-4 / M–14

SOIL MECHANICS

Paper–CE–208 E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt **five** questions in all, selecting atleast **one** from each unit.*

Unit–I

1. (a) What do you understand by residual soils and transported soils ? 8

(b) Draw the plasticity chart incorporated in IS : 1498 (1970) and give the group symbols of the various regions in the chart. 12

2. (a) How is permeability of soils determined in the field ? 12

(b) A horizontal stratified soil deposit consists of three layers, each uniform in itself. The permeabilities of the layers are 4×10^{-4}, 25×10^{-4} and 7.5×10^{-4} mm/s; their thicknesses are 6, 3 and 12 m, respectively. Find the effective average permeability of the deposits in the horizontal and vertical directions. 8

Unit–II

3. The following data refers to a compaction test as per Indian Standard using light compaction : 20

Water content (%)	8.5	12.2	13.75	15.50	18.2	20.2
Weight of wet sample (kg)	1.80	1.94	2.00	2.05	2.03	1.98

If the specific gravity of soil grains was 2.7,

(i) Plot the compaction curve and obtain maximum dry unit weight and optimum moisture content,

(ii) Plot the 80 per cent and 100 percent saturation lines.

[Turn over

4. (a) What is quick sand ? How would you calculate the hydraulic gradient required to create quick sand conditions in a sample of sand ? 10

(b) Explain the mechanics of piping in hydraulic structures. What methods are used to increase the factor of safety against piping ? 10

Unit–III

5. (a) Discuss the essential differences between Boussinesq's and Westergaard's theories. For which condition do both these theories yield approximately the same value of vertical stress ? 12

(b) How far is it justifiable to adopt Boussinesq's theory for predicting the vertical stress in sand deposits ? 8

6. (a) Differentiate between primary consolidation and secondary consolidation. 8

(b) Discuss Terzaghi's theory of consolidation, stating the various assumptions and their validity. 12

Unit–IV

7. What do you understand by :

(i) UU test

(ii) CU test

(iii) CD test

(iv) UC test 20

Explain with the help of neat sketches.

8. (a) How do tension cracks influence the distribution of active earth pressure in pure cohesive soils ? 8

(b) Discuss Culmann's graphical method to estimate active earth pressure on in inclined wall with positive surcharge. 12