

22404

12526

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following :** **10**
- a) Define Geology and state its Importance.
 - b) Write IS definition of soil.
 - c) Define –
 - i) Degree of Saturation
 - ii) Porosity.
 - d) Define Active Earth Pressure and Passive Earth Pressure.
 - e) State various methods of site investigation.
 - f) Draw a phase system for Partially saturated soil.
 - g) Define plasticity Index with respect to soil.

P.T.O.

- 2. Attempt any THREE of the following : 12**
- a) Find coefficient of uniformity and coefficient of curvature for a soil sample for which $D_{10} = 0.2$ mm, $D_{30} = 1.2$ mm and $D_{60} = 2$ mm.
 - b) Explain soil as three phase system with labelled sketch.
 - c) Explain the stepwise procedure of Mechanical Sieve Analysis.
 - d) State and explain IS classification of soil.
- 3. Attempt any THREE of the following : 12**
- a) Explain Darcy's law of Permeability of soil.
 - b) State and explain the factors affecting permeability of soil.
 - c) State any four assumptions made in Terzaghi's analysis.
 - d) State any four characteristics of Flow net with neat sketch.
- 4. Attempt any THREE of the following : 12**
- a) Draw strength envelope for purely cohesive and cohesionless.
 - b) Draw a neat labeled sketch of plate load test set-up for gravity loading.
 - c) State effects of water table on bearing capacity when –
 - i) water table is below foundation base
 - ii) water table is above foundation base
 - d) Explain field application of geotechnical engineering.
 - e) In a constant head permeameter diameter of a soil sample cc was 4 cm and length was 14 cm under a constant head of 25 cm. The discharge was found to be 80 cm^3 in 10 minutes. Calculate coefficient of permeability.

5. Attempt any TWO of the following :**12**

- a) State –
- Ultimate Bearing Capacity
 - Safe Bearing Capacity.
- b) Describe Mohr's theory of shear failure of soil with sketch.
- c) Explain the criteria for deciding the location & number of pits and bores for the construction of various civil engineering structure.

6. Attempt any TWO of the following :**12**

- a) The following are the results of standard compaction test performed on a sample of soil

Water content(%)	5	10	15	20	25	30
Bulk Density (gm/cc)	1.77	1.98	2.10	2.18	2.16	2.12

Plot the water content dry density curve and obtain the Optimum Water Content and its Maximum Dry Density.

- b) State the methods of soil stabilization. Explain any one.
- c) State field identification test on soil and explain any one.
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