21819

3 Hours / 70 Marks   Seat No.

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) 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 branches.

(b) Define soil as per IS.

(c) Define void ratio and bulk density.

(d) State any four factors affecting permeability.

(e) Define : Cohesion and internal friction.

(f) Define : Ultimate and safe bearing capacity of soil.

(g) State various methods of site investigation.

2. **Attempt any THREE of the following:** 12

   (a) State formation and classification of soil.

   (b) Give step-by-step procedure to determine specific gravity of soil by pycnometer in laboratory.

   (c) Draw phase diagram of soil when soil is :

   (i) Moist, (ii) Fully saturated

   label the diagrams.

   (d) Calculate coefficient of uniformity and coefficient of curvature for a soil sample for which $D_{10} = 0.430$ mm, $D_{30} = 0.790$ mm and $D_{60} = 1.300$ mm.

3. **Attempt any THREE of the following :** 12

   (a) Explain the procedure for determination of plastic limit of soil.

   (b) A soil sample is tested in constant head permeability, diameter of sample is 4 cm and length is 10 cm under constant head of 15 cm discharge was found to be 70 cc in 10 mins. Find coefficient of permeability.

   (c) Draw shear strength envelope for purely cohesive and cohesionless soil with sketch.

   (d) Differentiate between compaction and consolidation.

4. **Attempt any THREE of the following :** 12

   (a) State the different characterastics of flow-net.

   (b) Define with a sketch Active earth pressure and Passive earth pressure.

   (c) State any four assumptions in the theory of Terzaghi's analysis of bearing capacity.

   (d) Draw a neat leablled sketch of plate load test set-up for gravity loading.

   (e) Give four compaction equipments along with their senitability.

5. Attempt any TWO of the following : 12

(a) Explain the various field applications of geotechnical engineering in details.

(b) Draw particle size distribution curve. Explain mechanical sieve analysis for grading of soil with a sketch.

(c) Explain the direct shear test to determine shear strength of soil with neat sketch.

6. Attempt any TWO of the following : 12

(a) Following observations were made using standard proctor test on a soil sample :

Bulk Density (gm/cc)	1.75	1.95	2.10	2.20	2.15	2.05
Water content (%)	5	10	15	20	25	30

Determine OMC and MDD by plotting compaction curve on graph.

(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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