

22404

24225

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) 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) State any two engineering uses of sedimentary rock.
 - b) Define soil as per IS 2809 - 1972.
 - c) Define dry unit weight and saturated unit weight.
 - d) State uses of particle size distribution curve.
 - e) Define : Cohesion and internal friction.
 - f) Define safe bearing capacity of soil.
 - g) State any two purpose of compaction.

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- 2. Attempt any THREE of the following :** **12**
- a) Explain the importance of geology in Civil Engineering Construction.
 - b) Explain soil as three phase system with labelled sketch.
 - c) Differentiate between active earth pressure and passive earth pressure.
 - d) Calculate the coefficient of uniformity (C_u) and coefficient of curvature (C_c) for a soil sample for which
 - i) $D_{10} = 0.0019\text{ mm}$
 - ii) $D_{30} = 0.030\text{ mm}$
 - iii) $D_{60} = 0.49\text{ mm}$
- 3. Attempt any THREE of the following :** **12**
- a) Define flow net and state its applications.
 - b) State any four assumptions made in Terzaghi's analysis of bearing capacity of soil.
 - c) If the soil sample weighs 180 gm after drying and 200 gm before drying, calculate its water content. The soil sample has specific gravity of 2.7 and porosity 30%, calculate degree of saturation and voids ratio.
 - d) Draw a neat labelled sketch of plate load test.
- 4. Attempt any THREE of the following :** **12**
- a) Calculate active earth pressure and passive earth pressure at depth of 9m in dry cohesion less soil with an angle of friction of 30° and unit weight of 17 kN/m^3 .
 - b) Explain any four methods of soil stabilization.
 - c) Explain methods of compaction of soil.
 - d) Explain factors affecting permeability.
 - e) Differentiate between purely cohesive and cohesion less soils.

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

- a) Explain the various field applications of geotechnical engineering in detail.
- b) Write step by step procedure for determination of permeability of soil by falling head method permeability test. Explain with neat sketch.
- c) Explain core cutter method with sketch to find dry unit weight of field soil.

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

- a) Explain the direct shear test to determine shear strength of soil.
- b) The following are the test 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 (OMC) and its maximum dry density (MDD).

- c) Differentiate between compaction and consolidation with six points.
