

22404

12223

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 answer with neat sketches wherever necessary.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (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 Mineralogy.
- b) Define soil as per IS 2809-1972.
- c) Define water content and specific gravity of soil.
- d) Define active earth pressure and passive earth pressure.
- e) State any two compaction equipments used for soil compaction.
- f) Define void ratio and porosity.
- g) State any two field situation where compaction is required.

P.T.O.



2. Attempt any THREE of the following:

- Explain experimental procedure of determination of specific gravity of soil by pycnometer as per IS 2720, part 3.
- A soil sample has porosity 35% and specific gravity of 2.69. Calculate void ratio and dry density.
- Calculate co-efficient of uniformity and co-efficient of curvature for a soil sample for which $D_{10} = 0.230$ mm, $D_3 = 0.600$ mm and $D_{60} = 1.00$ mm.
- State uses of particle size distribution curve.

3. Attempt any THREE of the following:

12

- State and explain the factors affecting permeability of soil.
- State any four assumptions made in Terzaghi's analysis.
- State and explain the methods of improving the bearing capacity of soil.
- State the characteristics of a flow net.

4. Attempt any THREE of the following:

12

- Calculate active and passive earth pressure at depth of 8 m in dry cohesionless soil with an angle of internal friction of 30° and unit weight of 16 kN/m^3 .
- Differentiate between compaction and consolidation.
- Differentiate between standard and modified proctor test as per IS 2720.
- Explain procedure for determination of falling head Permeability Test.
- Following readings were taken in a direct shear test on a soil sample.

Normal stress N/mm^2	0.1	0.2	0.3	0.4
Shear stress N/mm^2	0.120	0.150	0.195	0.240

Determine the value of c and ϕ .

5. Attempt any TWO of the following:

12

- a) State classification of various rocks based on their genesis.
- b) Define flow net and state applications of flow net.
- c) Explain the sieve analysis test for grading of soil with the help of particle size distribution curve.

6. Attempt any TWO of the following:

12

- a) A constant head permeability test gives discharge of 250 ml in 210 seconds under a constant head of 600 mm. Determine the permeability if the soil sample was 100 mm long and 78.5 cm^2 in area.
- b) Calculate the OMC and MDD values for the soil sample having following data using graph paper.

Bulk density in gm/cc	1.2	1.75	1.90	2.30	2.15	2.0
Moisture content in %	5	10	15	20	25	30

- c) State necessity of site investigation and explain in brief the types of exploration.