

17420

16117

3 Hours / 100 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. a) Attempt any SIX of the following: 12
- (i) Define petrology and rock.
 - (ii) Enlist any four physical properties of minerals.
 - (iii) Define Dip and strike.
 - (iv) Draw neat sketch of:
 - 1) Recumbent fold
 - 2) Overturned fold
 - (v) State any four methods to find water content of soil sample.
 - (vi) State salient features for any one dam in Maharashtra state.
 - (vii) State importance of soil as a foundation bed for structures in Civil Engineering.
 - (viii) Define void ratio, porosity, degree of saturation, water content.

P.T.O.

- b) **Attempt any TWO of the following:** **8**
- (i) Explain crust, mantle and core with a neat sketch.
 - (ii) Define fault and state its classification.
 - (iii) Explain any four field applications of Geotechnical Engineering.
2. **Attempt any FOUR of the following:** **16**
- a) Explain formation process of soil. State various types of soil available in India.
 - b) State two causes and effects of earthquake.
 - c) State method of construction of earthquake resisting structure.
 - d) State constituents of soil and any two physical properties of soil.
 - e) Define:
 - (i) Epicenter,
 - (ii) Focus
 - (iii) Seismology
 - (iv) Seismic waves.
 - f) Define plasticity index and classify soil on its basis.
3. **Attempt any FOUR of the following:** **16**
- a) Explain I.S. classification of soil as per IS 1498.
 - b) Define permeability and coefficient of permeability.
 - c) Explain with neat sketch phreatic line in earthen dam with pressure head at different point and show construction points of this line.
 - d) State any four factors which affect shear strength of soil.
 - e) Explain vane shear test to determine shear strength of soil specimen in laboratory with neat sketch.
 - f) Define:
 - (i) Active earth pressure
 - (ii) Passive earth pressure
 - (iii) Earth pressure at rest
 - (iv) Coefficient of earth pressure

4. Attempt any FOUR of the following:**16**

- a) State the effect of water table on bearing capacity. Explain.
- b) Suggest typical values of S.B.C. for following soil types:
- Sand gravel mixture
 - Black cotton soil
 - Hard Moorum
 - Soft Moorum
- c) State different methods of soil stabilization and explain any one.
- d) Mention criteria for deciding the locations and number of trial pits and bore holes as per (IS 1892-1972)
- e) The following observations were made using S.P.T. on soil sample.

Bulk density gm/cc	1.65	1.95	2.1	2.2	2.15	2.05
Water content	5	10	16	22	25	30

Determine OMC and M.D.D.

- f) Define C.B.R and state the significance of C.B.R. value.

5. Attempt any TWO of the following:**16**

- a) A saturated clayey sample weighing 1540 gm, weighs 1120 gm after oven drying. If its dry density is 1350 kg/m^3 , determine its water content, void ratio, porosity and degree of saturation. Assume $G = 2.70$ and $\gamma_w = 10 \text{ kN/m}^3$.
- b) Following observations were recorded in a liquid limit test. Determine liquid limit. Weight of container $W_3 = 6 \text{ gm}$.

No. of blows	40	30	20	15	10
Wet wt W_1 (gm)	30.67	32.20	31.30	32.75	30.05
Dry wt W_2 (gm)	22.00	23.00	22.35	23.26	21.44

- c) Explain laboratory procedure for mechanical sieve analysis of soil.

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[4]

Marks

6. Attempt any TWO of the following:

16

- a) In a constant head permeameter diameter of a soil sample was 4 cm and length was 14 cm under a constant head of 25 cm. The discharge was found to be 80 cc in 10 minutes. Calculate coefficient of permeability.
 - b) Explain plate load test and draw a load settlement curve.
 - c) Explain dry strength and Dilatancy test on soil.
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