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25226

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) Assume suitable data, if necessary.
 - (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Solve any FIVE of the following :

5 × 2 = 10

- (a) Define a rock and state one type of it.
- (b) Define specific gravity of soil.
- (c) State any two factors which affect the shear strength of soil.
- (d) Define permeability of soil.
- (e) Define coefficient of curvature.
- (f) State any two field applications where the structure is subjected to earth pressure.
- (g) Name any four field tests done on soil.

2. Solve any THREE of the following :

3 × 4 = 12

- (a) State the importance of geology in Civil Engineering.
- (b) Write step by step procedure for determination of water content by oven drying method as per I.S. Code.



- (c) Draw a neat labelled sketch of particle size distribution curve showing types of soil.
- (d) Enlist factors affecting permeability. Explain how degree of saturation affects the permeability.

3. Solve any THREE of the following :

3 × 4 = 12

- (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) State and explain any four factors affecting compaction of soil.
- (c) State any four compacting equipments along with their suitability.
- (d) Draw a neat labelled sketch of plate load test set-up for gravity loading.

4. Solve any THREE of the following :

3 × 4 = 12

- (a) Differentiate between compaction and consolidation with four points.
- (b) State and explain factors affecting bearing capacity.
- (c) Calculate voids ratio and dry density of soil if porosity is 38% and specific gravity is 2.6. Take density of distilled water = 1 gm/cm³.
- (d) Write four branches of geology and explain any one.
- (e) Enlist the assumptions made in Terzaghi's analysis of soil failure due to poor bearing capacity.

5. Solve any TWO of the following :

2 × 6 = 12

- (a) Explain the direct shear test to determine shear strength of soil with neat sketch.
- (b) The following observations were made using Standard Proctor Test 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

Plot the water content dry density curve and obtain the optimum water content (OMC) and its maximum dry density (OMD).

- (c) (i) Draw a neat labelled sketch of internal structure and composition of earth.
- (ii) Differentiate between Active and Passive Earth Pressure (three points).

6. Solve any TWO of the following :

2 × 6 = 12

- (a) (i) State and define Atterberg's limits of consistency.
 - (ii) Define well graded soil and poorly graded soil and uniformly graded soil.
 - (b) (i) Define soil stabilization.
 - (ii) Define plasticity index.
 - (iii) State any two characteristics of flow net.
 - (c) (i) Explain any three effects of water-table on bearing capacity of foundation soil.
 - (ii) Give $D_{10} = 150 \mu$, $D_{30} = 4.75 \text{ mm}$ and $D_{60} = 20 \text{ mm}$. Find coefficient of curvature for soil particle.
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