

314315

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 Rocks.
- (b) Define a soil as per I.S.
- (c) Define void ratio and porosity.
- (d) State two uses of phase diagram.
- (e) Define permeability of soil.
- (f) Enlist any two methods of soil stabilization.
- (g) Define optimum moisture content and maximum dry density.



- 2. Attempt any THREE of the following : 12**
- (a) Define Geology and enlist the different branches of geology.
  - (b) Explain the experimental procedure for the determination of specific gravity of soil by Pycnometer method.
  - (c) State and explain factors affecting on Bearing capacity.
  - (d) Define the following terms :
    - (i) Seepage velocity
    - (ii) Seepage pressure
    - (iii) Disturbed soil sample
    - (iv) Undisturbed soil sample
- 3. Attempt any THREE of the following : 12**
- (a) Calculate voids ratio and dry density of soil if porosity is 40% and specific gravity is 2.7. Take density of distilled water = 1 gm/cm<sup>3</sup>.
  - (b) Give the suitability of the following :
    - (i) Rammers
    - (ii) Vibrators
    - (iii) Smooth wheel roller
    - (iv) Rubber tyred roller
  - (c) State and explain factors affecting on permeability of soil.
  - (d) Draw a neat labelled sketch of the experimental set-up of plate load test using gravity loading.
- 4. Attempt any THREE of the following : 12**
- (a) Find Coefficient of uniformity ( $C_u$ ) and Coefficient of curvature ( $C_c$ ) for a soil particles of  $D_{10} = 0.3$  mm,  $D_{30} = 0.9$  mm,  $D_{60} = 3$  mm. Also classify and grade the soil.
  - (b) Draw shear strength envelope (Stating its equation) for,
    - (i) Purely cohesive soil
    - (ii) Cohesionless soil.
  - (c) Draw phase diagram for,
    - (i) Partially saturated soil with labelled sketch.
    - (ii) Two phase diagram for dry soil with labelled sketch.

- (d) Write the meaning of following :
- (i) Bearing capacity of soil.
  - (ii) Ultimate bearing capacity
  - (iii) Boring in the soil
  - (iv) Toughness test on soil.
- (e) Differentiate between Active Earth Pressure and Passive Earth Pressure.

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

**12**

- (a) The density of soil sample is  $2000 \text{ kg/m}^3$  and its water content is 20%. Determine its dry density, void ratio, porosity and degree of saturation.

Assume  $G = 2.6$ ,  $Y_w$  density of water =  $1 \text{ gm/cc}$

- (b) (i) Differentiate between compaction and consolidation of soil (only three points).
- (ii) What do you mean by well graded, Gap graded, Uniformly graded soil ?
- (c) In direct shear test the following observations were made :

Normal Load (N)	50	100	150	200	250
Shear Load (N)	90	110	130	150	170

Size of shear box  $60 \text{ mm} \times 60 \text{ mm}$ . Plot the failure envelope for the soil and find the value of angle of shearing resistance and cohesion.

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

**12**

- (a) Explain the vane shear test on determine shear strength of soil.
- (b) Describe stabilization of soil in terms of following :
- (i) Mechanical soil stabilisation
  - (ii) Advantages of Mechanical soil stabilisation method (any two points)
  - (iii) Disadvantages of Mechanical soil stabilisation method (any two points)
- (c) (i) Explain in brief the procedure of Dry Strength test Field identification test on soil.
- (ii) State the six branches of Geology.

