

17420

16172

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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX of the following :

6 × 2 = 12

- (a) Explain the use of soil as a foundation material.
- (b) Define water content and void ratio of soil.
- (c) Draw 3-phase diagram for fully saturated soil.
- (d) State 4-field applications of Geo-Tech Engg.
- (e) State any 2-types of faults.
- (f) define the terms porosity.
- (g) State classification of rocks on their mode of origin.
- (h) Enlist types of joints.

(B) Attempt any TWO of the following : **2 × 4 = 8**

- (a) Define Outcrop, Dip, Strake and fold of rocks.
- (b) Explain different types of forms occurring in rock minerals.
- (c) Explain any four field of applications of Geotechnical engineering knowledge.

2. Attempt any FOUR of the following : **4 × 4 = 16**

- (a) Enlist various types of seismic waves and explain one.
- (b) Define terms focus and epicentre related to earthquake.
- (c) State types of earthquake based on their focus and Richter scale.
- (d) State the types of consistency limits and define any one.
- (e) Enlist two causes and two effects of earthquake.
- (f) Explain the procedure of determination of liquid limit of soil.

3. Attempt any FOUR of following : **4 × 4 = 16**

- (a) Explain step-by-step procedure for determination of water content of soil by oven dry method.
- (b) State different characteristics of a flow-net.
- (c) Define with a sketch active and passive earth pressure.
- (d) State the advantages of Direct Shear Test and its any two limitations.
- (e) A soil sample was tested in constant head Permeameter, dia. of sample is 4 cm and length is 10 cm under constant head of 15 cm discharge was found to be 70 cc in 10 mins. Find coefficient of permeability.
- (f) Calculate coefficient of uniformity and coefficient of curvature for a soil sample for which $D_{10} = 0.430$ mm, $D_{30} = 0.790$ mm and $D_{60} = 1.300$ mm.

4. Attempt any FOUR of following :

4 × 4 = 16

- (a) Enlist assumptions of Terzaghi's bearing capacity theory.
- (b) Differentiate between compaction and consolidation.
- (c) State effect of water table on bearing capacity of soil.
- (d) State four methods of soil stabilization and explain any one.
- (e) State necessity of soil exploration.
- (f) Draw shear strength envelope for purely cohesive and cohesionless soil with sketch.

5. Attempt any TWO of the following :

2 × 8 = 16

- (a) Calculate shrinkage limit for a given soil sample from the following data :
 - (i) Mass of empty container $w_1 = 13$ gm
 - (ii) Mass of container with wet soil $w_2 = 43$ gm
 - (iii) Mass of container with dry soil $w_3 = 32.3$ gm
 - (iv) Vol. of wet soil $v_1 = 20.7$ cm³
 - (v) Vol. of dry soil $v_2 = 10.3$ cm³
- (b) Explain core cutter method with sketch to find dry unit weight of field soil.
- (c) Draw particle size distribution curve. Explain mechanical sieve analysis for grading of soil with a sketch.

P.T.O.

6. Attempt any TWO of the following :

2 × 8 = 16

- (a) (i) Explain phreatic line in earthen dam with a sketch.
- (ii) Explain different methods of field compaction of soil.
- (b) A retaining wall with a vertical back of ht = 7.2 m supports cohesionless soil of dry unit wt 18.5 kN/m^3 and angle of repose 27° , the surface of soil is horizontal. By Rankine's concept find the thrust per m length of wall when the soil is absolutely dry.
- (c) Explain the step-by-step procedure for determination of plate load test with neat sketches.
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