

17420

14115

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.

Marks

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

6 × 2 = 12

- State any four physical properties of minerals.
- State any two engineering uses of igneous rock.
- Define outcrop and fold of rock.
- What do you mean by normal and reverse fault ?
- Define water content and voids ratio of soil.
- Define soil as per IS.
- Explain the use of soil as foundation material.
- Draw three phase diagram for fully saturated soil.

(B) Attempt any TWO of the following :

2 × 4 = 08

- Explain different types of forms occurring in rock minerals.
- Explain different types of folds occurs in rocks.
- Explain any four field applications of geotechnical engineering knowledge.



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

- (a) Explain the formation process of soil. State various types of soils available in India.
- (b) Define the terms related to earthquake :
 - (i) Focus
 - (ii) Epicenter
 - (iii) Intensity
 - (iv) Seismograph
- (c) State any two causes and effects of an earthquake.
- (d) Enlist various types of seismic waves. How it can be recorded ?
- (e) State the types of earthquakes based on focus and Richter scale.
- (f) Explain the determination of plastic limit of given soil sample.

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

- (a) Calculate coefficient of uniformity and coefficient of curvature if $D_{10} = 0.43$ mm, $D_{30} = 1.78$ mm and $D_{60} = 2.39$ mm.
- (b) Explain any four factors affecting permeability of soil.
- (c) Explain the procedure to determine coefficient of permeability by constant head method.
- (d) Explain direct shear test carried out on given soil sample.
- (e) Draw shear strength envelope for purely cohesive and cohesionless soil with its equations.
- (f) State any four assumptions made in Terzaghi's analysis of bearing capacity of soil.

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

- (a) Draw the experimental set up of plate load test using gravity loading.
- (b) Define active and passive earth pressure using necessary sketches.
- (c) Differentiate between compaction and consolidation with minimum four points.
- (d) Define soil stabilization. State any three points of necessity of soil stabilization.
- (e) Explain standard proctor test to obtain OMC and MDD values for given soil.
- (f) Explain dry strength and dilatency tests on soil in brief.

5. Attempt any TWO of the following : 2 × 8 = 16

- (a) Define dry unit weight of soil. Explain core cutter method to determine dry unit weight of field soil using necessary sketches.
- (b) Define liquid limit. Explain the experimental procedure to determine liquid limit of soil using suitable sketches.
- (c) What is particle size distribution curve ? Explain the procedure of mechanical sieve analysis for grading of soil using sketches.

6. Attempt any TWO of the following : 2 × 8 = 16

- (a) A soil sample 10 cm in diameter and 15 cm long is tested in falling head permeameter. The initial head was 45 cm, which was dropped to 25 cm in 12 minutes. The diameter of burette pipe was 0.5 cm. Find coefficient of permeability in metre/day.
 - (b) Define safe bearing capacity and ultimate bearing capacity. Explain the effect of ground water table on bearing capacity of soil.
 - (c) Define California Bearing Ratio. Explain CBR test with sketches. State its application of CBR test.
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