

17420

11819

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

- (a) State four branches of Geology.
- (b) State types of rocks based on their genesis. (mode of origin)
- (c) Define faults and state any two types of it.
- (d) Define :
 - (i) Void ratio
 - (ii) Water content
- (e) Define soil as per IS.
- (f) State any two situation where knowledge of soil mechanics is required.
- (g) Define permeability.
- (h) Define weathering of rocks.
- (i) Define Liquid limit.

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(B) Attempt any TWO of the following :

2 × 4 = 8

- (a) State any four types of minerals with properties depending on light and state of aggregation.
- (b) State any four types of folds and explain any one.
- (c) State and explain any four field application of Geotechnical Engineering.

2. Attempt any FOUR of the following :

4 × 4 = 16

- (a) Explain three phase system of soil.
- (b) Explain the causes of an earthquake.
- (c) Explain formation process of soil and any two types of soil in India.
- (d) Classification of earthquake on the basis of origin and focus.
- (e) Define :
 - (i) Seismology
 - (ii) Focus
 - (iii) Epicentre
 - (iv) Intensity
- (f) Explain procedure for determination of plastic limit of soil.

3. Attempt any FOUR of the following :

4 × 4 = 16

- (a) Explain with neat sketch particle size distribution curve.
- (b) Explain determination of coefficient of permeability by constant head method.
- (c) In a direct shear test following observation were recorded at the failure of the specimen :

Normal stress (N/mm²)	1.0	1.5	2.00	2.5
Shear stress (N/mm²)	0.9	1.15	1.4	1.65

Plot failure envelop and find value of angle of shearing resistance and cohesion.

- (d) State the characteristics of flow-net.
- (e) Explain briefly direct shear test of shear strength of soil.
- (f) Explain effect of water table on bearing capacity of soil.

4. Attempt any FOUR of the following :

4 × 4 = 16

- (a) Explain with sketch active and passive earth pressure of soil.
- (b) State assumption made in Rankine's theory of earth pressure for non-cohesive soils.
- (c) Distinguish between compaction and consolidation of soil (any four points).
- (d) State the any four methods of soil stabilization. Explain any one.
- (e) Explain modified proctor test with sketch.
- (f) Explain the necessity of sub-soil exploration.

P.T.O.

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

- (a) Define specific gravity of soil. Explain the stepwise procedure of determination of specific gravity of soil by pycnometer.
- (b) Explain Atterberg's limits of consistency with neat sketch.
- (c) Explain I.S. classification of soil.

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

- (a) A soil sample 12 cm in diameter and 18 cm long is tested in falling head permeameter. The initial head was 45 cm, which was dropped to 20 cm in 15 minutes. The diameter of burette pipe was 0.5 cm. Find coefficient of permeability in metre/day.
 - (b) Explain methods of improving bearing capacity of soil & state typical values for SBC for Black Cotton soil & Hard Moorum.
 - (c) State the factors affecting compaction. State four equipments used for field methods of compaction. Also state its suitability.
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