17420

21415

3 Hours / 100 Marks Seat No. | | | | | | | | |

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. a) **Attempt any SIX of the following:** **12**

(i) Define geology and state any one its importance in Civil Engineering.

(ii) State types of rocks based on their genesis.

(iii) Define faults and state any two types of it.

(iv) State importance of structural geology.

(v) Define:

1) Void ratio

2) Porosity

Marks

(vi) State field application of Geotechnical Engineering.

(vii) State salient features of any one earthen dam in Maharashtra.

(viii) State any four methods to find water content of soil sample.

b) **Attempt any <u>TWO</u> of the following:** **8**

(i) State any four types of minerals with properties depending on light and state of aggregation.

(ii) Define:

1) Outcrop

2) Dip

3) Strike

4) Fold

(iii) State importance of soil as construction material in Civil Engineering.

2. Attempt any <u>FOUR</u> of the following: **16**

a) State formation and classification of soil.

b) Classify earthquakes on the basis of focus and origin.

c) State methods of construction of earthquake resisting structures.

d) State any four causes and two effect of earthquake.

e) Explain any two types of weathering.

f) Define any two Atterberg's Limits of consistency of soil.

Marks

3. Attempt any FOUR of the following: **16**

a) Calculate coefficient of Uniformity and coefficient of curvature for soil sample for which D_{10} = 0.430 mm and D_{30} = 0.790 mm D_{60} = 1.300 mm.

b) State the factors affecting permeability of soil.

c) A soil sample was tested in constant head permeameter. Diameter of sample was 4 cm, length was 15 cm. Under constant head of 20 cm. discharge was found to be 75 cc in 10 minutes. Find coefficient of permeability.

d) State advantages and disadvantages of direct shear test.

e) State characteristics of flow net.

f) Define Active and Passive earth pressure with the help of sketch.

4. Attempt any FOUR of the following: **16**

a) State and explain factors affecting bearing capacity of soil.

b) State assumptions made by Rankines theory of earth pressure for non - cohesive soil.

c) Explain mechanical soil stabilization and cement soil stabilization.

d) The following observations were obtained using standard proctor test on a soft soil sample.

Bulk density gm / cc	1.6	1.95	2.15	1.80	1.70
Water content %	20	24	26	31	34

Using graph determine Max. dry density and maximum water content.

e) Define CBR and state any four significance of CBR test.

f) Enlist field identification test on soil and explain any one of them.

Marks

5. Attempt any TWO of the following: **16**

a) Explain with neat sketch stepwise procedure to determine bulk density by sand replacement method.

b) Explain in steps laboratory method to determine plastic limit of soil sample as per IS 2720.

c) Define:

(i) Coefficient of curvature

(ii) Uniformity coefficient

(iii) Effective size of soil

(iv) Well graded and Uniformly graded soil with the help of particle size distribution curve.

6. Attempt any TWO of the following: **16**

a) Explain with neat sketch phreatic line in earthen dam with pressure head at different point and show construction points of this line.

b) Explain with neat sketch plate load test as per IS 1888 with two limitations of this test.

c) Differentiate between compaction and consolidation and state any four factors affecting compaction.

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