17420

21314

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

(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:** 12

   i) Define 'geology'.

   ii) State classification of rocks based on their genesis.

   iii) Define 'fault'.

   iv) State any two points stating importance of structural geology.

   v) Enlist two methods used to determine bulk density and dry density.

   vi) State IS code definition of 'soil'.

   vii) State any four field applications of geotechnical Engineering.

   viii) Define 'water content'.

Marks

b) **Attempt any <u>TWO</u> of the following:**   **08**

     i)   Explain various types of rocks with respect to their engineering uses.

     ii)   State any four types of folds and explain any one.

     iii)   Explain salient features of earthen dam in Maharashtra. (any two dams)

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

     a)   Classify soil in detail.

     b)   Explain two causes and two effects of earthquake.

     c)   Classify seismic waves in Indian earthquake.

     d)   Explain what do you mean by earthquake resistant structures.

     e)   Define – Focus and epicenter.

     f)   Define – Afterberg's limit of consistency.

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

     a)   A 5 kg soil sample is given to you, explain how will you carryout mechanical sieve analysis as per IS code method.

     b)   Explain Darcy's law of permeability.

     c)   Explain various factors affecting permeability.

     d)   Define preatic line and flow line. Draw neat sketch of flow net.

     e)   Show graphically and state shear strength equation for cohesive and cohesion less soils.

     f)   Define earthpressure. Enlist and define its types.

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

a) Explain effect of watertable on bearing capacity of soil.

b) State any four assumptions of Terzaghi's bearing capacity theory.

c) Differentiate compaction and consolidation with respect to four points.

d) Draw compaction curve and show various properties of soil on it.

e) State various types of compaction equipments with their suitability.

f) Draw neat sketches of hand augers used in sub-soil exploration.

5. Attempt any <u>TWO</u> of the following: 16

a) An undisturbed sample of soil has a volume of 100 cm^3 and mass of 190 gm. on oven drying for 24 hours, the mass is reduced to 160 gm. If the specific gravity of grains is 2.68, determine the water content, voids ratio and degree of saturation of the soil.

b) The following observations were recorded in a liquid - limit test carried out in Casagrande's apparatus. Determine the liquid limit. The weight of container W_3 is 5 gm.

No. of blows	40	30	20	15	10
Wet weight W_1 (gm)	30.67	32.20	31.30	32.75	30.05
Dry weight W_2 (gm)	22.00	23.00	22.35	23.26	21.44

c) Explain well graded soil, coefficient of uniformity, coefficient of curvature. State mathematical relations with meaning of each term.

Marks

6. **Attempt any <u>TWO</u> of the following:** **16**

a) In direct shear test following observations were taken. Plot failure envelope and find angle of internal friction and cohesion.

Normal stress N/cm^2	2	4	6	8	10
Shear stress N/cm^2	3.6	4.4	5.2	6.0	6.8

b) Explain various methods of soil stabilization.

c) Explain Rankine's theory and assumptions made for cohesive soils.

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