TED (21)4011
(Revision – 2021)

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Reg. No……
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2024

GEOTECHNICAL ENGINEERING

[Maximum Marks: **75**] [Time: **3** Hours]

PART-A

I. Answer '*all*' the following questions in one word or one sentence. Each question carries *'one'* mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	A clayey soil sample has liquid limit = 51 % and plastic limit =33%. In what state of consistency is this soil at a moisture content of 44%?	M1.04	A
2.	The biggest size of clay particle is……	M1.05	R
3.	Define permeability of soil.	M2.01	R
4.	For which type of soil will you do the falling head test to find the permeability of soil?	M2.02	R
5.	Write down the shear strength equation for a purely cohesive soil.	M2.03	U
6.	Define optimum moisture content.	M3.01	R
7.	List the different stages of consolidation.	M3.04	R
8.	Define gross safe bearing capacity.	M4.04	R
9.	Write down the Terzaghi's equation for finding the ultimate bearing capacity of a strip footing.	M4.05	U

PART-B

II. Answer any '*eight*' questions from the following. Each question carries *'three'* marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Explain the procedure to determine the water content by oven drying method.	M1.03	U
2.	Explain Mohr-Coulomb failure theory.	M2.03	U
3.	Draw the failure envelops for ϕ - soil, C - soil and C-ϕ soil.	M2.03	U
4.	In an in-situ vane shear test on saturated clay, a torque of 0.035 Nm was required to shear the soil. The diameter of the vane was 50 mm and length 100 mm. Calculate the undrained shear strength of the clay.	M2.04	A
5.	Draw the compaction curves for cohesive and cohesionless soil	M3.01	U
6.	Discuss the suitability of different types of rollers in different types of soil.	M3.03	U
7.	Comment on the effect of compaction on permeability of soil.	M3.02	A
8.	List any three types of shallow foundations with neat figures.	M4.08	R
9.	Define Ultimate bearing capacity, Safe bearing capacity and Allowable bearing pressure.	M4.04	R
10.	List the objectives of site investigation.	M4.01	R

PART-C

Answer '*all*' questions from the following. Each question carries '*seven*' marks.

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Explain in detail the procedure for determination of particle size distribution by sieve analysis.	M1.05	U
	OR		
IV.	Explain the Indian Standard classification of soil	M1.05	U
V.	A soil specimen has a water content of 10% and a wet unit weight of 20 kN/m^3. If the specific gravity of the solid is 2.7, compute the dry unit weight, void ratio and degree of saturation. Take γ_w = 10 kN/m^3.	M1.02	A
	OR		
VI.	Explain the procedure for determining the shrinkage limit of a soil sample.	M1.04	U
VII.	A 20 cm long, 8 cm diameter coarse sand sample was tested in a constant head permeability test. After 15 minutes of constant water flow under 1 m head, the volume of discharged water was found to be 1200 cc. Calculate the coefficient of permeability of soil.	M2.02	A
	OR		
VIII.	Explain in detail the procedure for constant head permeability test.	M2.02	U
IX.	Differentiate between standard and modified proctor test.	M3.01	U
	OR		
X.	Explain the factors affecting compaction.	M3.02	U
XI.	Differentiate between disturbed and undisturbed soil samples.	M4.02	U
	OR		
XII.	Detail the different methods of boring suitable in different types of soil.	M4.03	U
XIII.	A strip footing below a wall is placed at ground level, with a width of 2m. The soil is dry sand with a unit weight of 19 kN/m^3 and angle of internal friction 40°. Calculate the ultimate bearing capacity of the footing. Given: Nq = 81.3 and Nγ= 100.4.	M4.07	A
	OR		
XIV.	Elaborate the procedure for standard penetration test.	M4.06	U

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