Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

CE3CO13 Geotechnical Engineering -I

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Which one is not the consistency limit? **1**

(a) Liquid limit (b) Elastic limit

(c) Shrinkage limit (d) Plastic limit

ii. According to IS Classification the range of silt size particle is- **1**

(a) 4.75 to 2.00 mm (b) 2.00 to 0.425 mm

(c) 0.425 to 0.075 mm (d) 0.075 to 0.002 mm

iii. Coefficient of permeability of soil- **1**

(a) Does not depend on temperature

(b) Increases with increase in temperature

(c) Increases with decrease in temperature

(d) None of these

iv. The quantity of seepage of water through soils is proportional to- **1**

(a) Coefficient of permeability of soil

(b) Total head loss through the soil

(c) Neither (a) nor (b)

(d) Both (a) and (b)

v. A soil not fully consolidated under the existing over-burden pressure, is called- **1**

(a) Pre-consolidated (b) Normally consolidated

(c) Under-consolidated (d) None of these

vi. The consolidation time for soils- **1**

(a) Increases with increasing compressibility

(b) Decreases with decreases permeability

(c) Is dependent of the magnitude of the stress change

(d) All of these

P.T.O.

vii. Which one of the following statements is true for Mohr-Coulomb envelope?

(a) Coulomb suggests that the relationship between shear strength and normal stress, is adequately represented by the straight line

(b) The generalized Mohr theory suggests that, though the shear stress depends on the normal stress, the relation is not linear.

(c) Coulomb and Mohr suggest that a definite relationship exists among the principal stress and the angle of internal friction.

(d) All of these

viii. Compression of soil occurs rapidly if voids are filled with- **1**

(a) Air

(b) Water

(c) Partly with air and partly with water

(d) None of these

ix. Pick up the correct definition from the following: **1**

(a) The lateral pressure exerted by the soil when the retaining wall moves away from the back fill, is generally known as active earth pressure of the soil

(b) The lateral pressure exerted by the soil when the retaining wail moves towards the soil, is generally known as 'Passive earth pressure of the soil'

(c) The lateral pressure exerted by the soil when the retaining wall has no movement relative to the back fill, is known as 'earth pressure at rest of the soil'

(d) All of these

x. The angle of internal friction is maximum for- **1**

(a) Angular-grained loose sand

(b) Angular-grained dense sand

(c) Round-grained dense sand

(d) Round-grained loose sand

Q.2 i. What are the various uses of particle size distribution curve? **2**

ii. Define various limits of plasticity. **3**

iii. Explain the three-phase system of soil mass and establish a relation between e, G, w and sr. **5**

OR iv. What is the significance of consistency limits? **5**

Q.3 Attempt any two:

i. Write properties of flow net. Discuss the graphical method to draw flow net. **5**

ii. How to determine coefficient of permeability from falling head method. **5**

iii. Explain effective, neutral and total stresses. **5**

Q.4 i. Write comparison between compaction and consolidation. **3**

ii. Discuss in detail the methods of computing consolidation settlement. **7**

OR iii. A soil stratum is 10 m thick with pervious stratum on bottom only. Determine the time required for 50% consolidation. Given that coefficient of permeability = 10^{-7} cm/s. Coefficient of compression = 0.0003 cm^2/gm. Void ratio = 2; time factor = 0.197. **7**

Q.5 i. What is liquefaction? **2**

ii. A concentrated load of 22.5 KN acts on the surface of a homogenous soil mass of large extent. Find the stress intensity at a depth of 15m. **8**

(a) Directly under the load (b) At a horizontal distance of 7.5m.

Use Boussinesq's equation.

OR iii. Explain the following: **8**

(a) Newmark's influence chart

(b) Contact pressure distribution

Q.6 Attempt any two:

i. Derive an expression for net active earth pressure of cohesive soils using Rankine's theory. **5**

ii. A cantilever retaining wall of 7 m height retains sand. Determine active earth pressure at the base using Rankine's theory when- **5**

(a) Dry (b) Saturated

The properties of sand are: void ratio = 0.5, phi = 30^0 and G = 2.7.

iii. Explain the Taylor's stability numbers and stability curves. **5**

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Scheme of Marking

MEDI-CAPS UNIVERSITY Knowledge is Power	Faculty of Engineering End Sem (Odd) Examination Dec-2020 Geotechnical Engineering -I (T) - CE3CO13 (T) Programme: B.Tech. | | Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	(b) Elastic Limit	**1**
	ii)	(d) 0.075 to 0.002 mm	**1**
	iii)	(b) increases with increase in temperature	**1**
	iv)	(d) both (a) and (b)	**1**
	v)	(c) under-consolidated	**1**
	vi)	(a) increases with increasing compressibility	**1**
	vii)	(d) all the above	**1**
	viii)	(a) Air	**1**
	ix)	(d) All the above	**1**
	x)	(b) angular-grained dense sand	**1**
Q.2	i.	uses of particle size distribution curve – 2 marks	
	ii.	List of various plastic limits – 1 mark Explanation of limits – 2 marks	
	iii.	Definition of three phase system of soil mass – 1 mark Diagram of three phase system of soil mass – 1 mark Relationship – 3 mark	
OR	iv.	significance of consistency limits – 5 marks	
Q.3	i.	properties of flow net – 2 marks Graphical Method – 3 marks	
	ii.	Procedure – 3 marks Diagram – 1 mark Formula – 1 mark	
OR	iii.	Effective stress – 2 marks Neutral stress – 1.5 marks Total stress – 1.5 marks	
Q.4	i.	Comparison – 3 marks	
	ii.	Method – 4 marks Formula – 3 marks	
OR	iii.	570 days	
Q.5	i.	Definition of Liquefaction – 2 marks	
	ii.	(i) Directly under the load = 47.75 N/m^2 (ii) At a horizontal distance of 7.5 metres = 27.33 N/m^2	
OR	iii.	Definition of Newmark's influence chart – 2 marks Equation – 1 mark Diagram of Newmark's influence chart – 1 mark Definition of Contact pressure distribution – 2 marks Diagram of Contact pressure distribution – 2 marks	
Q.6			
	i.	Derivation – 4 marks Diagram – 1 mark	
	ii.	(i) dry = 41.2 kN/m^2 (ii) saturated = 48.76 kN/m^2	
	iii.	Explanation of the Taylor's stability number – 2 marks Equation – 1 mark Diagram – 2 marks	

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