

Hall Ticket Number:

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Code No. : 16138 AS

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD***Accredited by NAAC with A++ Grade***B.E. (Civil Engg.) VI-Semester Advanced Supplementary Examinations, August-2022****Soil Mechanics**

Time: 3 hours

Max. Marks: 60

- Note: i) Answer all questions from **Part-A** and any **FIVE** from **Part-B**  
ii) Candidate may be provided with a graph sheet if required

**Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	"In complete saturated condition, Saturated Unit Weight of a soil is just equal to Bulk (Total) Unit Weight" State if the statement is true or false also describe your reasoning.	2	1	1	1
2.	What do you understand about 'diffused double layer' of clay soil?	2	1	1	1
3.	"Engineering properties of a soil is function of Effective stress, but not function of total stress". State if the statement is true or false also describe your reasoning.	2	2	2	1
4.	Write briefly about 'Critical hydraulic gradient'	2	1	2	1
5.	What is compaction of soil mass? What is the purpose of it?	2	1	3	1
6.	How do you show the contact pressure distribution under rigid footing constructed in sandy soil?	2	1	3	1
7.	What is 'Over Consolidation Ratio'	2	1	4	1
8.	Define 'Compression Index'.	2	1	4	1
9.	Define Critical Void Ratio.	2	1	5	1
10.	"Vane shear test is preferred to conduct tests in sensitive clays to find out shear strength" State if the statement is true or false also describe your reasoning.	2	2	5	1
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Explain IS soil classification system while presenting in flow chart.	4	3	1	1
b)	The liquid limit and plastic limit of a soil are 34% and 26% respectively. When the soil is dried from its state at liquid limit to dry state, the reduction in volume was found to be 35% of its volume at liquid limit. The corresponding volume reduction from the state of plastic limit to dry state was 25% of its volume at plastic limit. Calculate shrinkage limit.	4	4	1	1
12. a)	Explain organization of falling head method to evaluate coefficient of permeability with a neat labelled sketch.	4	2	2	1
b)	A sand deposit consists of three distinct horizontal layers of equal thickness. The hydraulic conductivity of upper and lower layer is $10^{-3}$ cm/sec and that of middle layer is $10^{-2}$ cm/sec. What are the equal values of horizontal and vertical conductivity of 3 layers and what is its ratio?	4	4	2	1,2

13. a)	Differentiate between Boussinesq's and Westergaard's theories of stress distribution.	4	3	3	1
b)	Explain in detail about factors effecting compaction.	4	4	3	1
14. a)	Discuss in detail about Mechanistic model (Spring Analogy) discuss its correlation with consolidation process.	4	2	4	1
b)	A 5m thick saturated soil stratum has a compression index of 0.25 and coefficient of permeability $3.2 \times 10^{-3}$ mm/s. If the void ratio is 1.90 at vertical stress of $0.15 \text{ N/mm}^2$ . Compute the void ratio, when the vertical stress is increased to $0.20 \text{ N/mm}^2$ .	4	2	4	1,2
15. a)	What are the limitations of Direct shear test? Explain in detail.	4	2	5	1
b)	An unconfined compression test was conducted on an undisturbed sample of clay. The sample had a diameter of 38mm and length 76mm. The load at failure was 30N and the axial deformation of the sample 11mm. Determine the undrained shear strength parameters, if the failure plane made an angle of $50^\circ$ with horizontal. Use graphical method it required.	4	3	5	1,2
16. a)	Discuss about Hydrometer Analysis	4	2	1	1
b)	Write short notes on ' Quick sand condition'	4	3	2	1
17.	Answer any <i>two</i> of the following:				
a)	How do you develop a Newmark's Influence Chart for an irregular type of loading? Discuss its utility.	4	3	3	1
b)	What are the assumptions in deriving Terzaghi's one dimensional consolidation equation? Also write the expression and discuss about the presentation of its solution in terms of non-dimensional parameters.	4	2	4	1
c)	Demonstrate about Vane shear Test.	4	3	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	35%
iii)	Blooms Taxonomy Level - 3 & 4	45%

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