ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END (EVEN)SEMESTER EXAMINATION : MAY 2021** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech (Civil Engineering)	**Semester:**	IV
Paper Title :	SOIL MECHANICS	**Paper Code:**	ECE42104
Maximum Marks :	40	**Time duration:**	3 Hours
Total No of questions:	9	**Total No of Pages:**	02
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrollment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. (a) Define void ratio of soil.
   (b) What is coefficient of permeability for soil?
   (c) What is Optimum moisture content in compaction of soil?
   (d) Define coefficient of compressibility of soil.
   (e) Define sensitivity of clay.

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. A soil sample is having a porosity of 40% and the specific gravity of soil solids is 2.65. Calculate void ratio, dry unit weight, unit weight at 50% saturated soil condition and unit weight of completely saturated soil.
3. Explain Falling head permeability test with suitable diagram and mention the expression for calculating coefficient of permeability of soil through this test.
4. A concentrated load of 200 kN acts at the ground surface. (a) Calculate the intensity of vertical pressure at a depth of 10 m below the ground surface and situated on the axis of the loading. (b) What will be the vertical pressure at a point at a depth of 5 m and at a distance of 2 m from the axis of the loading? Use Boussinesq analysis. (2 + 3)
5. What are the assumptions considered in Terzaghi's theory of one dimensional consolidation?
6. Illustrate about Vane shear test for determination of shear strength of cohesive soils.

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. (a) What is Liquidity index of soil?
   (b) Discuss about Quick sand condition and critical hydraulic gradient.
   (c) A coarse-grained soil has a void ratio of 0.75 and specific gravity of 2.65. Calculate the critical hydraulic gradient at which quick sand condition will occur.
   (d) What are the properties of a flow net? (1 + 4 + 2 + 3)
8. (a) Explain the factors affecting compaction of soil with suitable diagrams.
   (b) Illustrate about the Spring analogy for consolidation process of soil. (5 + 5)
9. (a) An undisturbed sample of a clay stratum having 2 m thickness was tested in laboratory and the average value of coefficient of consolidation was found to be 2×10^{-4} cm^2/s. If a structure is built on the clay stratum, how long (in days) will it take to attain half of the ultimate settlement under the load of the structure? Assume double drainage.
   (b) Discuss briefly about Direct shear test for soils.
   (c) What are the disadvantages of direct shear test? (3 + 4 + 3)