



R18 Regulation

Subject code:2P4AE

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

## B.Tech IV Semester Supplementary Examinations, December 2025

### SOIL MECHANICS (CE)

Maximum Marks: 70

Date: 29.12.2025

Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

#### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define void ratio, porosity and derive relation between "e" and "n".	2M	1	L1
2	Define Shrinkage Ratio.	2M	1	L1
3	What is a flow net?	2M	2	L1
4	Define seepage velocity, actual velocity.	2M	2	L1
5	Write down the Westergaard's equation for the vertical stress for a point load?	2M	3	L1
6	Define compaction.	2M	3	L1
7	What is initial consolidation?	2M	4	L1
8	What is time factor?	2M	4	L1
9	What is shear strength of soil?	2M	5	L1
10	State the principles of direct shear test?	2M	5	L1

#### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	In a compaction test on a soil, the mass of wet soil when compacted in the mould was 1.855 kg. the water content of the soil was 16%. If the volume of the mould was 0.945 liters, determine the dry density, void ratio, degree of saturation and percentage air voids. Take $G = 2.68$ .	10M	1	L2
OR				
12	What is the use of classification of soils? Discuss Indian standard classification system.	10M	1	L2
13	Describe pumping-out methods for the determination of the coefficient of permeability in the field. What are their advantages and disadvantages? What are Dupits's assumptions?	10M	2	L2
OR				
14	Explain the mechanics of piping in hydraulic structures. What methods are used to increase the factor of safety against piping?	10M	2	L2
15	What are the different methods of compaction adopted in the field? How would you select the type of roller to be used?	10M	3	L2
OR				

16	Discuss the basis of the construction of Newmark's influence chart. How is it used?	10M	3	L2
17	What are the methods for the determination of coefficient of consolidation? Explain square-root of time method in brief?	10M	4	L2
	OR			
18	Describe the consolidometer test. Show how the results of this test are used to predict the rate of settlement and the magnitude of settlement.	10M	4	L2
19	Explain in detail the determination of shear strength using unconfined compression test.	10M	5	L2
	OR			
20	Explain in detail the determination of shear strength using direct shear test.	10M	5	L2