



R20 Regulation

Subject code:3P5AD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, December 2024

Soil Mechanics (Civil Engineering)

Maximum Marks: 70

Date:03.01.2025

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 which carries 10M.
 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)		CO	Bloom Tx
1	Define activity of clay.	1	L1
2	Define thixotropy and sensitivity of soil.	1	L1
3	What is Darcy's law ? what are it's limitations ?	2	L1
4	What is phreatic line ? explain	2	L1
5	What are the assumptions made in Boussinesq's theory?	3	L1
6	Write short notes on compaction of soil.	3	L1
7	Define recompression index.	4	L1
8	What is time factor ?	4	L1
9	What is liquefaction of sands ?	5	L1
10	State the principles of direct shear test?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	What are different types of soil structures which can occur in nature? Describe in brief. [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	A soil profile consists of a surface layer of clay 4m thick ($\gamma = 19.5 \text{ kN/m}^3$) and a sand layer 2 m thick ($\gamma = 18.5 \text{ kN/m}^3$) overlying an impermeable rock. The water table is at the ground surface. If the water level in the stand pipe driven into the sand layer rises 2m above the ground surface, draw the plot showing variation of total stress, porewater pressure and effective stress. Take $\gamma_w = 10 \text{ kN/m}^3$. Determine the increase in effective stress at the top of the rock when the artesian head in the sand is reduced by 1m. [10M]	2	L2

15	A) Derive an expression for the vertical stress at a point due to a point load, using Boussinesq's theory. [5M] B) A concentrated load of 2000kN is applied at the ground surface. Determine the vertical stress at a point P which is 6m directly below the load. Also calculate the vertical stress at a point R which is at a depth of 6m but at a horizontal distance of 5m from the axis of the load. [5M]	3	L2
	OR		
16	Describe standard proctor test and the modified proctor test. How would you decide whether the soil should be compacted the dry optimum or the wet of optimum? [10M]	3	L2
17	What is primary consolidation. Discuss the spring analogy for primary consolidation. What are its uses? [10M]	4	L2
	OR		
18	How would you determine the time-settlement curve in the field? [10M]	4	L2
19	Describe direct shear test. What are its merits and demerits? [10M]	5	L2
	OR		
20	What is Mohr's circle? Discuss its importance characteristics. [10M]	5	L2