



R20 Regulation

Subject code: 3E7AE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, November 2025

FOUNDATION ENGINEERING

(CE)

Maximum Marks: 70

Date: 28.11.2025

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	List out Various methods of soil exploration?	2M	1	L1
2	Define unsaturated soil sample with example?	2M	1	L1
3	Define finite and infinite slope of earth.	2M	2	L1
4	What are the various causes of slope failure?	2M	2	L1
5	Write assumptions of Rankine's theory	2M	3	L1
6	List out various lateral earth pressures and define them.	2M	3	L1
7	List different types of shear failure in shallow foundation.	2M	4	L1
8	What is the role of stability of retaining walls in Civil engineering construction?	2M	4	L1
9	What is negative friction?	2M	5	L1
10	What are different shapes of well foundation?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) Describe various methods of drilling holes for soil investigation. b) List out factors influence in selection of foundation on soil conditions.	5M 5M	1	L2
OR				
12	a) Write down various factors that affect the sample disturbance? How these effects are minimized? b) Describe in brief various geophysical methods.	5M 5M	1	L2
13	a) Write the assumptions that are generally made in the analysis for stability of slopes? b) What are the different factors of safety used in the stability of slopes?	5M 5M	2	L2
OR				
14	Explain about Taylor's stability number and give equations for different type of footings in cohesive and cohesionless soils.	10M	2	L2
15	A soil mass retaining wall of 6 m height with smooth vertical back. The backfill done by two types of soils in layers. Top 4 m height soil parameters ($c = 10\text{KN/m}^2$, $\phi = 10^\circ$, $\gamma = 18\text{KN/m}^3$) and from 4 m to 6 m soil parameters ($c = 0$, $\phi = 30^\circ$, $\gamma_{\text{sat}} = 22\text{KN/m}^3$) Calculate the total active earth pressure on the retaining wall. Also calculate the line of action of lateral force from the base of the wall.	10M	3	L2
OR				

16	A retaining wall 6 m height retains sand with $\phi = 30^\circ$, $\gamma = 24 \text{KN/m}^3$ upto a depth of 3 m from top. From 3 m to 6m, the material is a cohesive soil with $c = 20 \text{KN/m}^2$, $\phi = 20^\circ$. Unit weight of cohesive soil is 18KN/m^3 . A uniform surcharge of 100KN/m^2 acts on the top of soil. Determine the lateral pressure acting on the wall and its point of application.	10M	3	L2																		
17	A square column foundation is to be designed for a gross allowable total load of 250 KN. If the load is inclined at an angle of 15° to the vertical, determine the width of the square shaped foundation. Take factor of safety of 3.0. Use $\gamma = 19 \text{KN/m}^3$, $\phi = 35^\circ$, $c = 5 \text{KN/m}^2$. Depth of foundation is 1.0 m. Take $N_c = 46.12$, $N_q = 33.30$, $N_\gamma = 48.03$.	10M	4	L2																		
OR																						
18	The following data was obtained from a plate load test carried out on a 60cm square test plate at a depth of 2m below ground surface on a sandy soil which extends up to a large depth. Determine the settlement of a foundation 3.0m x 3.0m carrying a load of 1100KN and located at a depth of 3m below ground surface.	10M	4	L2																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">Load intensity (KN/m^2)</td> <td>50</td> <td>100</td> <td>150</td> <td>200</td> <td>250</td> <td>300</td> <td>350</td> <td>400</td> </tr> <tr> <td style="text-align: left;">Settlement (mm)</td> <td>2</td> <td>4</td> <td>7.5</td> <td>11</td> <td>16.3</td> <td>23.5</td> <td>34</td> <td>45</td> </tr> </table>		Load intensity (KN/m^2)	50	100	150	200	250	300	350	400	Settlement (mm)	2	4	7.5	11	16.3	23.5	34	45			
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19	Write different types of wells. Briefly Discuss the measures for rectification of tilts and shifts in well foundations?	10M	5	L2																		
OR																						
20	Explain various components on well foundation with neat sketch. What are their uses?	10M	5	L2																		