



Regulation: R18

Subject code: 2P6AB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, January 2023

FOUNDATION ENGINEERING

(CE)

Maximum Marks: 70

10-01-2023

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)

- 1 Define area ratio.
- 2 Write the uses of bore hole log sheet?
- 3 Define Stability Number?
- 4 Write the Taylors stability number.
- 5 Write assumptions of Rankine's theory
- 6 What are the different types of retaining walls?
- 7 Define Safe bearing capacity.
- 8 Write the characteristics of general shear failure.
- 9 List the different shapes of well foundations.
- 10 What is the permissible flit of well foundations?

Part-B

Answer All the following questions.

(5x10M = 50 Marks)

- 11 a) Explain briefly Standard penetration test.
b) Determine the passive pressure by Rankine's theory per unit run for a retaining wall 4m high, with $i=15^\circ$, $\Phi'=30^\circ$ and $\gamma=19 \text{ kN/m}^3$. The back face of the wall is smooth and vertical. [5+5]

OR

- 12 a) Explain the need for soil exploration and Illustrate methods of it.
b) The field 'N' value in a deposit of fully submerged fine sand was 50 at a depth of 8 m. The average saturated unit weight of soil is 19 kN/m^3 . Calculate the corrected 'N' value. [5+5]
- 13 A new canal is excavated to a depth of 5 m below ground level, through a soil having following characteristics: $c = 14 \text{ KN/m}^2$, $\Phi = 15^\circ$, $e=0.8$ and $G=2.70$. The slope of banks is 1 in 1. Calculate the factor of safety with respect to cohesion, when the canal runs full ($S_n = 0.083$). If it is suddenly and completely emptied ($S_n=0.122$), in both cases. [10]

OR

- 14 Explain stability of slopes of earthen dams under different conditions. [10]
- 15 a) State the assumptions in Rankine's theory. Derive an expression for active and passive pressures

b) Describe the principles for the design of retaining wall.

[5+5]

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 18 kN/m^3 . A uniform surcharge of 100 kN/m^2 acts on the top of soil. Determine the lateral pressure acting on the wall and its point of application. [10]

- 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 shape 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 $N_c = 46.12$, $N_q = 33.30$, $N_\gamma = 48.03$. [10]

OR

- 18 What will be the gross and net safe bearing pressure of sand having $\phi = 36^\circ$ and effective unit weight 18 kN/Cum under following cases.

(i) 1m wide strip footing

(ii) 1m x 1m square footing.

Considering the footing is placed at a depth of 1 m from ground surface and water table is at a greater depth. Assume factor of safety of 3. Use Terzaghi's Theory. $N_q = 47$ and $N_\gamma = 43$. [10]

- 19 a) Discuss types and components of pile foundation with neat sketch.
b) Discuss the causes and remedies for tilts and shifts of well foundation. [5+5]

OR

- 20 a) Explain briefly sinking of wells.
b) Discuss the various components of well foundations with neat sketch. [5+5]