



III B.Tech II Sem Regular End Examination, June 2022

Foundation Engineering
(Civil Engineering)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part – A, answer all questions which carries 20 marks.

3. In Part – B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A**(10*2 Marks = 20 Marks)**

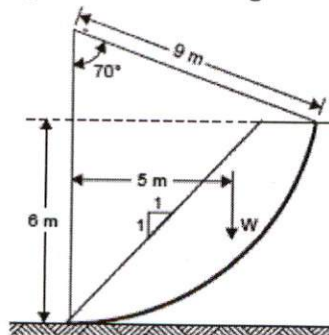
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|---|----|-----|-----|
| 1. a) Define area ratio of sampler | 2M | CO1 | BL1 |
| b) Write drawbacks of wash boring | 2M | CO1 | BL1 |
| c) Write any two reasons of slope failure | 2M | CO2 | BL1 |
| d) What kind of slope failure is noticed when embankment is resting on soft clay? | 2M | CO2 | BL2 |
| e) Compare both Rankine's and Coulomb's theories of earth pressure. | 2M | CO3 | BL2 |
| f) Why strain displacement is more in the passive earth pressure condition? | 2M | CO3 | BL2 |
| g) In which soil general shear failure is common? Write a note on it. | 2M | CO4 | BL2 |
| h) List the types of piles. | 2M | CO4 | BL1 |
| i) Where generally pile foundations are preferred? | 2M | CO5 | BL1 |
| j) How you minimize negative skin friction on piles? | 2M | CO5 | BL2 |

PART- B**(10*5 Marks = 50 Marks)**

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|---|----|-----|-----|
| 2. a) Summarize the objectives of site investigation. | 5M | CO1 | BL2 |
| b) How you execute a site investigation? Discuss. | 5M | CO1 | BL2 |

OR

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|--|-----|-----|-----|
| 3. What is site investigation report? Explain how you interpret soil characteristics in view of construction of well foundation in a river. | 10M | CO1 | BL3 |
| 4. a) How you simplify the number of trial slip circles for estimation of factor of safety against slope failure? Discuss. | 5M | CO2 | BL2 |
| b) Fig.1 shows the details of an embankment made of cohesive soil with $\phi = 0$ and $c = 30$ kPa. The unit weight of the soil is 18.9 kN/m ³ . Determine the factor of safety against sliding along the trial circle shown. The weight of the sliding mass is 360 kN acting at an eccentricity of 5.0 m from the centre of rotation. Assume that no tension crack develops. The central angle is 70° . | 5M | CO2 | BL3 |



- 5 Describe the stability analysis by Swedish slip circle method. 10M C02 BL3
- 6 A retaining wall, 6 m high, retains dry sand with an angle of friction of 30° and unit weight of 16.2 kN/m^3 . Determine the earth pressure at rest. If the water table rises to the top of the wall, determine the increase in the thrust on the wall. Assume the submerged unit weight of sand as 10 kN/m^3 . 10M C03 BL2
- OR**
- 7 A gravity retaining wall retains 12 m of a backfill, $\gamma = 17.7 \text{ kN/m}^3$, $\phi = 25^\circ$ with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of 6 m, how far do the magnitude and the point of application of active pressure changed? 10M C03 BL3
- 8 a) Discriminate Merits and Limitations of Terzaghi's Bearing Capacity Theory. 5M C04 BL3
b) A strip footing, 1.5 m wide, rests on the surface of a dry cohesionless soil having $\phi = 20^\circ$ and $\gamma = 19 \text{ kN/m}^3$. If the water table rises temporarily to the surface due to flooding, compute and compare the percentage reduction in the ultimate bearing capacity of the soil. Assume $N_\gamma = 5.0$. 5M C04 BL2
- OR**
- 9 A loading test was conducted with a 300 mm square plate at depth of 1 m below the ground surface in pure clay deposit. The water table is located at a depth of 4 m below the ground level. Failure occurred at a load of 45 kN. Evaluate the safe bearing capacity of a 1.5 m wide strip footing at 1.5 m depth in the same soil? Assume $\gamma = 18 \text{ kN/m}^3$ above the water table and a factor of safety of 2.5. The water table does not affect the bearing capacity in both cases. 10M C04 BL3
- 10 a) Compare bored pile with driven pile in view of method of installation. 5M C05 BL2
b) A pile is driven with a single acting steam hammer of weight 15 kN with a free fall of 900 mm. The final set, the average of the last three blows, is 27.5 mm. Evaluate the safe load using the Engineering News Formula. 5M C05 BL3
- OR**
- 11 A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of the piles were 30 cm and 9 m respectively. If the unconfined compression strength of the clay is 90 kPa, and the pile spacing is 0.9m centre to centre, Evaluate the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75. 10M C05 C3