*R20 Regulation* *Subject code:* **3E7AE**

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech VII Semester Regular/Supplementary Examinations, December2024

## FOUNDATION ENGINEERING

(CIVIL ENGINEERING)

***Maximum Marks: 70*** Date:02.01.2025 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 | What are the limitations of static cone penetration test? | 1 | 1 |
| 2 | What are the functions of drilling mould? | 1 | 2 |
| 3 | Define the factor of safety for an infinite slope? | 2 | 1 |
| 4 | Write the Taylors stability number | 2 | 1 |
| 5 | Why only granular materials are preferred for the backfill of a retaining wall? | 3 | 1 |
| 6 | Write any three assumptions of Rankine's theory? | 3 | 1 |
| 7 | What is allowable bearing pressure? | 4 | 1 |
| 8 | What are the modes of failure of shallow foundations? | 4 | 2 |
| 9 | How piles are classified based on method of installation? | 5 | 2 |
| 10 | What are the factors governing the selection of piles? | 5 | 2 |

### Part-B

| | Answer All the following questions. **(5X10M=50Marks)** | **CO** | **Bloom Tx** |
|---|---|---|---|
| 11 | A) Explain briefly Standard penetration test. (5M)<br>B) Determine the passive pressure by Rankine's theory per unit run for a retaining wall 4m high, with i=150 , Φ′=300 and γ= 19 kN/m3 . The back face of the wall is smooth and vertical. (5M) | 1 | 2<br>2 |
| | OR | | |
| 12 | A) Explain any one boring method with a neat sketch. (5M)<br>B) Explain geographical method of site exploration. (5M) | 1 | 2<br>2 |
| 13 | A) Explain Bishop's simplified method. Derive an expression for the factor of safety. (6M)<br>B) Determine the factor of safety with respect to cohesion, if an embankment of 20 m height and having a slope of 450 is subjected to sudden drawdown. C=20 kN/m2 , Φ=300 , γsat=18 kN/m3 (Take Taylor's stability number = 0.08) (4M) | 2 | 5<br>5 |
| | OR | | |

| | | | |
|---|---|---|---|
| 14 | A) How a slope is analyzed using Swedish circle method? Derive an expression for the factor of safety. (5M)<br>B) An embankment has to be made of a soil with $\gamma$=18kN/m$^3$, cu=22kN/m$^2$, $\Delta u = 20^0$. If factor of safety of 1.5 with respect to shear strength is required for the embankment slope, determine Limiting height of the slope if slope angle is $20^0$ . (5M) | 2<br><br>3 | 2<br><br>3 |
| 15 | Explain about Rankine's theory of active and passive earth pressures with a neat sketch. (10M) | 3 | 3 |
| | OR | | |
| 16 | A) A retaining wall has a vertical back and is 10m high. The soil is sandy loam of unit weight 20 kN/m3 .It shows a cohesion of 12 kN/m2 and $\varphi = 20°$. Neglecting wall friction, determine the thrust on the wall. The upper surface of the fill is horizontal (5M)<br>B) What are the different types retaining wall and explain with neat sketch? (5M) | 3<br><br>3 | 3<br><br>1 |
| 17 | A) Discuss about the Plate load test for determining the bearing capacity of foundation and infer on the estimation of the settlement of a footing on sand using the results of a plate load test. (5M)<br>B) Differentiate between general shear failure and local shear Failure. (5M) | 4<br><br>3 | 3<br><br>3 |
| | OR | | |
| 18 | A) Evaluate the effect of safe on bearing capacity of soil. (5M)<br>B) Determine the depth at which a circular footing of 2 m diameter be founded to provide a factor of safety of 3, if it has to carry a safe load of 1600kN. The foundation soil has c = 10 kN/m$^2$ , $\phi = 30°$ and unit weight = 18 kN/m$^3$ . Use Terzaghi's analysis. (5M) | 4<br><br>3 | 2<br><br>5 |
| 19 | A group of 16 piles of 45cm diameter is arranged with a centre to centre spacing of 1.0m. The piles are 12m long and are embedded in soft clay with cohesion 20 kN/m$^2$ . Bearing resistance may be neglected for the piles. Adhesion factor is 0.7. Estimate the ultimate load capacity of the pile group. (10M) | 5 | 6 |
| | OR | | |
| 20 | A) Discuss the different shapes of wells. (5M)<br>B) Discuss the various methods for the design of well foundations. (5M) | 5<br><br>3 | 4<br><br>4 |