

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech.

Branch : Civil Engineering

Semester : VI

Subject Code & Name: BTCVC602 (Foundation Engineering)

Max Marks: 60

Date: 17/08/2022

Duration: 3.45 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

Q. 1 Solve Any Two of the following.

- A) What is sample, sampler and sampling, What is inside clearance and outside clearance? Why it is required for the sampler? **Remember** 6
- B) Enlist different soil exploration methods and explain any one in detail. **Understand** 6
- C) Explain seismic refraction method of soil exploration with neat sketch. A sampling tube has inner diameter of 70 mm and cutting edge of 68 mm. its outside diameters are 72 mm and 74 mm respectively. Determine area ratio, inside clearance, outside clearance of the sampler. **Evaluate** 6

Q.2 Solve Any Two of the following.

- A) Explain Terzaghi's Bearing capacity theory in detail with neat sketch. **Apply** 6
- 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, calculate the percent reduction in ultimate bearing capacity of the soil. Assume $N_\gamma = 5.0$ **Evaluate** 6
- C) Explain the Plate load test in details with neat sketch. **Apply** 6

Q. 3 Solve Any Two of the following.

- A) Explain the mechanical and chemical stabilization methods in brief. **Apply** 6
- B) Define Mat/raft footing and explain under what circumstances, a Mat/Raft footing is adopted? **Understand** 6
- C) Design of combined footing for two adjacent column using following details: **Evaluate** 6

Load on each column – 800kN

Size of each column – 500mm X 500mm

c/c spacing of column – 3.0m

SBC of soil - 100kN/m². Justify footing type you use.

Q.4 Solve Any Two of the following.

- A) Define and explain load carrying capacity of group piles. **Remember 6**
- B) A concrete pile is 20 m length and 360 mm x 360 mm in cross section. The pile is fully embedded in sand which unit weight is 16.8kN/m³ and $\phi = 30^\circ$. You are given also $Nq^* = 56.7$. Calculate:
a) The ultimate load (Q_p), by using Meyerhof's method.
b) Determine the frictional resistance (Q_s), if $k = 1.3$ and $\delta = 0.8\phi$.
c) Estimate the allowable load carrying capacity of the pile (Use $FS = 4$).
- C) Explain the IS code method for designing Raft foundation. **Understand 6**

Q. 5 Solve Any Two of the following.

- A) Explain the Swedish Circle method of Analysis of slopes. **Understand 6**
- B) Define a) slope failure b) face failure c) toe failure d) base failure. **Remember 6**
- C) Analyse infinite slope, having following details: **Evaluate 6**

Soil – silt, Slope angle – 25° ($r = 18\text{kN/m}^3, r_{\text{sat}} = 21\text{ kN/m}^3, c = 20\text{ kN/m}^2, \Phi = 30^\circ$), Height of slope – 7m
Water table – 2m below ground level. Seepage is parallel to slope.

***** End *****