

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 95302**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Fifth Semester

Civil Engineering

19UCE502 – FOUNDATION ENGINEERING

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. In SPT, we terminate the test for no of blows which are obtained to drive the required 30 cm CO2 -App  
(a) 70 blows (b) 80 blows (a) 70 blows (b) 80 blows  
(c) Piston Sampler (d) Split Spoon sampler
2. The ultimate bearing capacity of a soil, is \_\_\_\_\_ CO2- U  
(a) total load on bearing area (b) safe load on the bearing area  
(c) load at which soil fails (d) load at which soil consolidates
3. Based on the function, piles can be classified into \_\_\_\_\_ types. CO1- U  
(a) 4 (b) 6 (c) 8 (d) 3
4. Gravity type retaining wall type is suitable for retaining backfill up to \_\_\_\_\_ CO4- U  
(a) 3-5 m (b) 3-5 m (c) 4 - 7 m (d) 5-8 m
5. For most soils, the limiting amplitude for low speed machines is usually \_\_\_\_\_ CO5- U  
(a) 0.1 mm (b) 0.2 mm (c) 0.5 mm (d) 1.0 mm

PART – B (5 x 3= 15Marks)

6. A 10-storey building located in cohesive soil area, analyze the method of exploration is adopted for soil exploration process? CO1- U
7. The width of a square footing and the diameter of a circular footing are equal and the footings are placed on the surface of sandy soil, the ratio of ultimate bearing capacity of circular footing to that of square footing will be? CO2- U

8. A timber pile was driven by a drop hammer weighing 30 kN with a free fall of 1.2 m. The average penetration of the last few blows was 5 mm. Examine the capacity of the pile according to Engineering News Formula CO2- App
9. If a retaining wall of 5 m high is restrained from yielding, what will be the total earth pressure at rest per meter length of wall? Given: the back fill is cohesion less soil having  $\phi = 30^\circ$  and  $\gamma = 18 \text{ kN/m}^3$ . CO2- App
10. On construction of well foundation what are all the safety measures ,precaution considered to prevent shifting and tilting CO3- App

PART – C (5 x 16= 80 Marks)

11. (a) Distinguish SPT and SCPT in detail CO3-Ana (16)  
Or  
(b) On site investigation for the construction of airport building ,how will you explore the thickness of stratified layers of the soil without disturbing the soil particles . CO3-Ana (16)
12. (a) Define shallow foundation. Explain its types with neat sketch. CO2-U (16)  
Or  
(b) A strip footing 1.5m wide carries a load intensity of  $500 \text{ kN/m}^2$  at a depth of 1.5 m in sand. The saturated unit weight of sand is  $18 \text{ KN/m}^3$  and unit weight above water table is  $16.8 \text{ KN/m}^3$ . The shear strength parameters  $C=30$  and angle of shearing resistance  $\phi = 35^\circ$ .  $N_c = 57.8, N_q = 41.4$  and  $N_\gamma = 42.4$ . Analyse the factor of safety with respect to shear failure for the following  
1. water table is 3 m below ground level  
2. water table is at ground level  
3. water table is 2.5 m below ground level  
water table is 1 m below ground level CO3-Ana (16)
13. (a) Explain in detail about various types of pile foundation with neat sketches CO1-U (16)  
Or  
(b) A group of 9 piles arranged in a square pattern with dia and length of each pile as 30cm & 12m respectively, is used as a foundation in soft clay deposit. Cohesion  $60 \text{ kN/m}^2$  & the pile spacing as 100cm centre to centre, find the load capacity of the group. Assume the bearing capacity factor  $N_c=9$  and adhesion factor  $=0.60$ . A factor safety of 2.5 may be taken. CO2-App (16)

14. (a) Discuss in details on the method of estimating the active earth pressure on a retaining wall by using the Culmann's graphical method. CO1- U (16)
- Or
- (b) Derive the expression for the rankines theory for the active & Passive earth pressure CO3- Ana (16)
15. (a) Explain about Caissons and their types with neat sketches. CO1- U (16)
- Or
- (b) Discuss the design of foundation of transmission towers in different soils CO1- U (16)

