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Question Paper Code : 91305

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth Semester

Civil Engineering

CE 6502 – FOUNDATION ENGINEERING

(Regulations 2013)

(Also Common to PTCE 6502 – Foundation Engineering for B.E. (Part-Time) –
Fifth Semester – Civil Engineering – (Regulations – 2014))

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Differentiate disturbed and undisturbed samples.
2. What are the limitations of Static Cone Penetration test ?
3. What are the allowable maximum settlement of shallow foundation resting on clay and sand stratum ?
4. What is the ultimate bearing capacity of a circular footing of 1.5 m diameter resting on the surface of a saturated clay of unconfined compressive strength of 100 kN/m^2 . Take $N_c = 5.7$, $N_q = 1$, $N_\gamma = 0$, $D = 0$.
5. Where mat foundation is used ?
6. What are the assumptions made in combined footing ?
7. Give the classification of piles based on their functions.
8. How does a pile group behave in cohesionless and cohesive soils ?
9. Write the assumptions of Coulomb's Theory.
10. Calculate the active earth pressure given that $c = 20 \text{ kN/m}^2$ and unit weight of the soil being 20 kN/m^3 for a vertical cut of depth 3 m. The soil is clay soil.

PART – B

(5×13=65 Marks)

11. a) Explain in detail about the different methods of boring with neat sketch.
(OR)
- b) Write short notes on :
 - i) Selection of Foundation based on soil condition. (7)
 - ii) Salient features of bore log report. (6)



12. a) Explain Terzaghi's analysis of bearing capacity of soil in general shear failure with assumptions.

(OR)

- b) Explain plate load test along with the analysis of data with neat sketch.

13. a) i) A trapezoidal footing is to be provided to support two square columns of 30 cm and 50 cm sides respectively. Columns are 6 m apart and the safe bearing capacity of the soil is 400 kN/m^2 . The bigger column carries 5000 kN and the smaller 3000 kN. Design a suitable size of the footing so that it does not extend beyond the faces of the columns. (8)

- ii) Explain with neat sketch different types of shallow foundations. (5)

(OR)

- b) Explain the conventional method of proportioning of raft foundation.

14. a) A square group of 25 piles extends between depths of 3 m and 10 m in a deposit of 20 m thick stiff clay which is underlined by rock. The diameter of the pile is 0.5 m and the c/c spacing of piles is 1 m. The undrained shear strength of clay at the pile base level is 150 kPa and the average value of the undrained shear strength over the depth of the pile is 100 kPa. Calculate the capacity of the pile group if $N_c = 9$, $\alpha = 0.70$ and factor of safety is 3.

(OR)

- b) Write explanatory notes on the following :

i) Under-reamed piles. (8)

ii) Drag down phenomenon. (5)

15. a) Explain the Culmann's graphical method of calculating active earth pressure with neat sketch.

(OR)

- b) i) A retaining wall is 5 m high. Its back is vertical and it has got sandy backfill up to its top. The top fill is horizontal and carries a uniform surcharge of 80 kN/m^2 . Determine the active earth pressure on the wall per meter length of the wall. Water table is 1.5 m below the top of the fill, $\gamma_d = 18.5 \text{ kN/m}^3$. Moisture content above water table is 13%, $\phi = 30^\circ$, $G = 2.6$ and $n = 30\%$. The wall friction may be neglected. (10)

- ii) Write a short notes on type of retaining wall. (3)

PART - C

(1×15=15 Marks)

16. a) Explain Standard Penetration Test. Also discuss about the corrections to be applied for field 'N' value.

(OR)

- b) Explain about various types of samplers used for collecting undisturbed samples with neat sketch.