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**Question Paper Code: 45102**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Fifth Semester

Civil Engineering

14UCE502 - FOUNDATION ENGINEERING

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

(IS 6403:1981, IS 8009 (Part 1):1976, IS 8009 (Part 2):1980 and  
IS 2911 (Part 1):1979 are permitted)

PART A - (10 x 1 = 10 Marks)

- The number and disposition of bore holes are varied, depending upon  
(a) Surroundings (b) Strata (c) Subsoil condition (d) Ground water
- For seismic refraction method of soil exploration in which waves travel directly from the shock point along the ground surface and are picked up first by the geophone is.  
(a) primary waves (b) secondary waves  
(c) rayleigh waves (d) love waves
- Expansion of SBC of soil is  
(a) Safe building capacity (b) safe boiling capacity  
(c) safe burying capacity (d) safe bearing capacity
- The Terzaghi's general bearing capacity equation is represented as  
(a)  $q_f = 5.7 c + \bar{\sigma}$  (b)  $q_f = c N_c + \bar{\sigma} N_q + 0.5 \gamma B N_\gamma$   
(c)  $q_f = c N_c + \bar{\sigma} N_q$  (d)  $q_f = c N_c$

5. When two column loads are unequal, which of the possible footing can be provided?
  - (a) Strap footing
  - (b) Raft footing
  - (c) Trapezoidal combined footing
  - (d) Mat footing
6. Floating foundation is quite useful for
  - (a) sandy soils
  - (b) clay soils
  - (c) very weak soils
  - (d) strong soils
7. Under reamed piles are generally
  - (a) driven piles
  - (b) bored piles
  - (c) precast piles
  - (d) all of the above
8. The group efficiency of driven pile in sand at a close spacing may be
  - (a) equal 100%
  - (b) more than 100%
  - (c) 70%
  - (d) 96%
9. Cantilever retaining walls can safely be used for a height not more than
  - (a) 3m
  - (b) 4m
  - (c) 5m
  - (d) 6m
10. The earth pressure at rest is calculated by using
  - (a) Euler's theory
  - (b) Rankine's theory
  - (c) Bending theory
  - (d) Theory of elasticity

PART - B (5 x 2 = 10 Marks)

11. What are the parameters considered for selection of foundation?
12. How the shallow foundation differs from deep foundation?
13. In which circumstances you will select raft foundation?
14. What is meant by group settlement ratio?
15. Write the assumptions of Coulomb's Theory.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain any two methods of site exploration in detail. (16)
- Or
- (b) (i) Write note on guide rules for the depth of exploration. (8)
  - (ii) Explain the types of sampler. (8)

17. (a) (i) Write the expression for a minimum depth of foundation for Rankine's analysis. (8)
- (ii) What are the relation between ultimate bearing capacity, net ultimate bearing capacity, net safe bearing capacity and safe bearing capacity? (8)

Or

- (b) Discuss in detail about the plate load test by reaction truss method with suitable sketch. (16)
18. (a) (i) Explain the different types of foundation. (8)
- (ii) Draw and explain the types of spread footing with their pressure distribution. (8)

Or

- ((b) A building is to be supported on a reinforced concrete raft covering on a area of  $14 \times 21$  meters. The subsoil is clay with an unconfined compressive strength of  $84 \text{ kN/m}^2$ . The pressure on the soil due to weight of the building and loads it will carry will be  $120 \text{ kN/m}^2$ , at the base of the raft. If the unit weight of excavated soil is  $15 \text{ kN/m}^3$  at the depth should be the bottom of the raft be placed to provide the factor of the safety of 3? (16)
19. (a) Explain the pile load test for determining the ultimate load carrying capacity of single vertical pile. (16)

Or

- (b) Explain the method of determining the load carrying capacity of a pile. (16)
20. (a) The depths of soil behind and in front of a rigid retaining wall are 9m and 3m resp., both the soil surfaces are horizontal. The approximate shear strength parameters for the soil are  $C_u = 30 \text{ kN/m}^2$  and  $\Phi = 22^\circ$  and the unit weight is  $20 \text{ kN/m}^3$ . Using Rankine's theory, determine the total, active thrust behind the wall and the total passive resistance in front of the wall. (16)

Or

- (b) Explain in details about the Culmann's graphical method for finding active pressure with a neat sketch. (16)
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