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**Question Paper Code: 41152**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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)

- In soil samplers the area ratio should be greater than \_\_\_\_\_% for soft sensitive soil.  
(a) 22%                      (b) 23%                      (c) 24%                      (d) 25%
- Test pits are useful for conducting field test such as  
(a) Plate bearing tests                      (b) Field density test  
(c) Moisture content                      (d) Dry density test
- Expansion of SBC of soil is  
(a) Safe building capacity                      (b) safe boiling capacity  
(c) safe burying capacity                      (d) safe bearing capacity
- Rise in water table in cohesion less soil up to ground surface reduces the net ultimate bearing capacity approximately by  
(a) 25%                      (b) 50%                      (c) 75%                      (d) 90%
- Terzaghi's bearing capacity factors  $N_c$ ,  $N_q$  and  $N_\gamma$  are functions of  
(a) cohesion only                      (b) angle of internal friction only  
(c) both cohesion and angle of internal friction                      (d) none of the above

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. Rankine's theory of earth pressure assume that the back of the wall is
- (a) Plane and smooth (b) Plane and rough  
(c) Vertical and smooth (d) Vertical and rough
10. If the failure of a finite slope occurs through the toe, it is known as
- (a) slope failure (b) face failure  
(c) base failure (d) toe failure

PART - B (5 x 2 = 10 Marks)

11. What are the parameters considered for selection of foundation?
12. Distinguish between Representative and Non- Representative samples.
13. In which circumstances you will select raft foundation?
14. Define swell potential.
15. How to check the stability of retaining wall?

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss about the different types of foundation and their selection based on soil condition. (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) A rectangular footing is founded on at a depth of 2.5m below ground surface level in a  $c-\Phi$  soil having the following properties . Porosity = 40%, specific gravity = 2.67, cohesion =  $15\text{KN/m}^2$ , and  $\Phi = 30^\circ$ . The water table is close to the ground surface . If the width of the footing is 3.5m, what is the length of the footing required to carry out a gross allowable pressure of  $455\text{KN/m}^2$  with a factor of safety 3. Use Terzhagis theory of general failure . Take  $N_c = 37.2$ ,  $N_q = 22.5$  and  $N_\gamma = 19.7$ . (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) Discuss the various tests used for identification of expansive soils. (16)
19. (a) Explain the pile load test for determining the ultimate load carrying capacity of single vertical pile. (16)

Or

- (b) Design of friction file group to carry a load of 3000 kN including the weight of the pile cap at a site where the soil is uniform clay to a depth of 20 m, underlain by rock. Average unconfined compression strength of clay is  $70\text{ kN/m}^2$  .The clay may be assumed to be of normal sensitive and normally loaded with liquid limit 60 %. A factor of safety of 3 required against share failure. (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 Rankines theory , determine the total, active thrust behind the wall and the total passive resistance in front of the wall. (16)

Or

- (b) Explain Coulomb's wedge theory. (16)

