Reg. No. : | | | | | | | | | | |

Question Paper Code: 35102

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Civil Engineering

01UCE502 – FOUNDATION ENGINEERING

(Regulation 2013)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The number and disposition of bore holes are varied, depending upon

   (a) Surroundings (b) Strata (c) Subsoil condition (d) Ground water

2. The type of boring, used for making deep excavations is

   (a) Cylindrical augers (b) Percussion boring
   (c) Rotary boring (d) Wash boring

3. Which of the following is a type of shallow footing?

   (a) Spread footing (b) Pile foundation
   (c) Pier foundation (d) Well foundation

4. The Terzaghi's general bearing capacity equation is represented as

   (a) $qf = 5.7\ c + \bar{\sigma}$ (b) $qf = c\ Nc + \bar{\sigma}.\ Nq + 0.5\gamma BN\gamma$
   (c) $qf = c\ Nc + \bar{\sigma}.\ Nq$ (d) $qf = c\ Nc$

5. Terzaghi's bearing capacity factors *Nc*, *Nq* and N_γ 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. In raft footing, if the C.G of the load coincide with the centroid of the raft, the upward load is considered as

   (a) Non uniform pressure (b) Uniform pressure
   (c) Excess pressure (d) None of the mentioned

7. Enlarging the stem of bore hole at the depth, is done by using

(a) Spiral auger (b) Under-reamer

(c) Boring guide (d) None of the mentioned

8. The allowable load which the pile can carry safely is determined on the basis of

(a) Factor of safety (b) Load test

(c) Stability of the pile foundation (d) All of the mentioned

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 (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Explain wash boring method with neat sketch. Also explain how depth of boring and spacing of borehole is decided. (8)

12. A square footing 1.2 x 1.2 *m* rests at a depth of 1 *m* in a saturated clay layer 4 *m* deep. The clay is normally consolidated, having an unconfined compressive strength of 40 kN/m^2. The soil has a liquid limit of 30%, γ_{sat}= 17.8 kN/m^2, w = 28% and G = 2.68. Determine the load which the footing can carry safely with a factor of safety of 3 against shear. Also, determine the settlement if the footing is loaded with this safe load. Use terzaghi's analysis for bearing capacity if the values of Nc = 5.7,Nq = 1, $N\gamma$ = 0. (8)

13. Explain the different types of mat foundation with neat sketches. (8)

14. A 200 *mm* diameter, 8 *m* long piles are used as foundation for column in a uniform deposit of medium clay (q_u = 100 kN/m^2). The spacing between the piles is 500 *mm*. There are 9 piles in the ground arranged in a square pattern. Calculate the ultimate pile load capacity of the group. Assume adhesion factor = 0.9. (8)

15. Derive the expression for active earth pressure for cohesive backfill. Also draw the pressure distribution diagram and explain the salient features. (8)