Reg. No. :

Question Paper Code: 41152

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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)

1. In soil samplers the area ratio should be greater than _____% for soft sensitive soil.

    (a) 22%   (b) 23%   (c) 24%   (d) 25%

2. 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

3. In the plate loading test for determining the bearing capacity of soil, the size of square bearing plate should be

    (a) less than 300 *mm*   (b) between 300 *mm* and 750 *mm*
    (c) between 750 *mm* and 1*m*   (d) greater than 1*m*

4. 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%

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. As per IS: 2950-1965 the maximum differential settlement should not exceed _____ in foundation on clay soils.

    (a) 40 *mm* (b) 45 *mm* (c) 50 *mm* (d) 55 *mm*

7. Under reamed piles are generally

    (a) driven piles (b) bored piles (c) precast piles (d) all of the above

8. The ultimate settlement of soil is directly proportional to

    (a) depth of compressible soil strata (b) compressible index
    (c) void ratio (d) both (a) and (b)

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. The coefficient of active earth pressure for a loose and having an internal friction of 30° is

    (a) 1/3 (b) 3 (c) 1 (d) 1/2

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. How the bearing capacity of pile determined?

15. How to check the stability of retaining wall?

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16. (a) (i) Explain in detail about standard penetration test. (12)

    (ii) Briefly explain about Dutch cone test? (4)

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 square footing 1.2 m × 1.2 m rests at a depth of 1m in a saturated clay layer 4 m deep. The clay is normally consolidated having a unconfined compressive strength of 40 kN/m^2 soil has a liquid limit of 30% γ_{sat} = 17.8 kN/m^3, w = 28% G = 2.68. Determine the load which the footing can care safely with the 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 a bearing capacity. (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 × 21$meters$. The subsoil is clay with an unconfined compressive strength of 84 kN/m^2. The pressure on the soil due to weight of the building and loads it will carry will be 120 kN/m^2, at the base of the raft. If the unit weight of excavated soil is 15 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 briefly the pile load test? (16)

Or

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(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 *kN/m²* .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) Explain plastic equlibrium in soil with active and passive states. (16)

Or

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

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