KUMARAGURU
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Register Number: ……..

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Sixth Semester

CIVIL ENGINEERING

CEE120: Foundation Engineering

(Use of IS 6403 is permitted)

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. For an undisturbed sample, the area ratio of the samples should be

   a) Zero b) 10% or less

   c) 10% to 20% d) more than 20%

2. If the actual value of the standard penetration number (N) is greater than 15 for fine sands below water table, the corrected value of N is

   a) 15+[(N+15)/2] b) 15-[(N+15)/2]

   c) 15+[(N-15)/2] d) 15+[(15-N)/2]

3. The permissible settlement is the maximum in the case of

   a) isolated footing on clay b) raft on clay

   c) isolated footing on sand d) raft on sand

4. Trapezoidal combined footings are required when

   a) the space outside the exterior column is limited b) the exterior column is heavier

   c) both (a) and (b) d) neither (a) nor (b)

5. If the gross bearing capacity of a strip footing 1.5 m wide located at a depth of 1 m in clay is 400 kN/m^2, its net bearing capacity for γ = 20 kN/m^3 is

   a) 380 kN/m^2 b) 370 kN/m^2

   c) 390 kN/m^2 d) 360 kN/m^2

6. For the design of a strap footing, the following assumption is not made
   a) The strap is perfectly rigid
   b) The soil pressure varies linearly
   c) The interior footing is centrally loaded
   d) The strap is not subjected to any direct soil pressure
7. The negative skin friction on a pile develops when
   a) the soil in which it is driven is sandy soil
   b) the soil surrounding it settles more than the pile
   c) the ground water table rises
   d) the soil near the tip is clay
8. The group efficiency of driven piles in sand at a close spacing may be
   a) 50 to 100%
   b) equal to 100%
   c) well below 100%
   d) greater than 100%
9. The active earth pressure coefficient Ka generally refers to
   a) effective stresses
   b) total stresses
   c) neutral stresses
   d) yield stresses
10. The minimum allowable factor of safety against sliding in the case of a cantilever retaining wall is
   a) 2.0
   b) 3.0
   c) 1.50
   d) 2.50

PART B (10 x 2 = 20 Marks)

11. What is net pressure intensity?
12. Find the area ratio of thin walled tube sampler having an external diameter 6 cm and wall thickness 2.25 mm. Comment on the type of sample obtained.
13. Differentiate disturbed and undisturbed soil sample.
14. What are the factors influencing bearing capacity of soils?
15. What is floating foundation?
16. Define angular distortion.
17. What is negative skin friction?
18. Define Feld's rule.
19. Differentiate active and passive earth pressure.
20. Write the assumptions made in Rankine's theory?

PART C (5 x 14 = 70 Marks)

21. a) Explain in detail about geophysical methods of soil exploration.

(OR)

b) (i) Discuss the features of Bore log report in detail. (6)

(ii) Explain in detail about SPT and SCPT. (8)

22. a) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^3. Unit weight of sand above water table is 16.8 kN/m^3. Angle of shearing resistance is 35°. Determine factor of safety for the following cases:

i) Water table is 4 m below ground surface

ii) Water table is 1.2 m below ground surface

iii) Water table is 2.5 m below ground surface

iv) Water table is 0.5 m below ground surface

v) Water table at ground level.

(OR)

b) (i) A 30 cm square bearing plate settles by 8 mm in the plate load test on cohesion less soil. The intensity of loading on plate is 180 kN/m^2. Estimate the settlement of shallow foundation of 1.6 m^2 under same intensity of loading. (4)

(ii) Determine the diameter of circular footing of 2 m depth from ground surface which rests on the clay deposit. Column load is 600 kN. Factor of safety is 2.5. Unit weight of soil is 20 kN/m^3. Unconfined compressive strength is 250 kN/m^2. (10)

23. a) Discuss the design procedure of rectangular combined footing and trapezoidal combined footing.

(OR)

b) Design a square footing to carry a load of 850 kN. Size of column on footing is 300 mm X 300 mm. Allowable soil pressure is 200 kN/m^2. Permissible stress is 500 kN/m^2. Use Fe 415 steel & M20 concrete. Illustrate the results by reinforcement detailing.

24. a) Explain in detail about the construction of under-reamed pile foundation.

(OR)

b) Determine the settlement of pile group to carry a load of 3000kN with a total depth of 20 m. Length of pile is 10.5 m. Diameter of pile is 0.5 m. Unit weight of soil is 16 kN/m^3. Number of piles is 16. Liquid limit is 60%. Void ratio is 1.

25. a) Explain the coulomb's wedge theory of earth pressure with a neat sketch.

(OR)

b) A retaining wall 6 m high retains sand with an angle of repose 35°, specific gravity 2.69 and porosity 40.5%. The earth surface is horizontal and in level with top of the wall. Determine the magnitude of total active thrust per unit width and locate its point of application, if the backfill is water logged to the level of 2.5m below the top surface.

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