KUMARAGURU college of technology
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Register Number: ……..

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

CIVIL ENGINEERING

CEE120**:** Foundation Engineering

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. As per IS:1892-1979, the inside clearance value should be
   a) 0 to 2% b) 1 to 3%
   c) < 10% d) None of the above
2. Undisturbed samples are obtained from
   a) Thin walled tube sampler b) Piston sampler
   c) Split spoon sampler d) Hand trimmed sampler
3. According to Terzaghi, General shear failure occurs in
   a) Stiff clay b) Dense sand
   c) Both (a) and (b) d) None of the above
4. The maximum pressure at which the soil fails in shear is called as
   a) Safe bearing capacity b) Ultimate bearing capacity
   c) Net safe bearing capacity d) Net ultimate bearing capacity
5. For the design of 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 soil pressure
6. In order to avoid high differential settlement, _____ foundation is adopted.
   a) Isolated footing b) Combined footing
   c) Raft foundation d) All the above
7. The negative skin friction on a develops when
   a) The soil in which it is driven is sandy soil b) The soil near the tip is clay
   c) The ground water table rises d) The soil surrounding it settles more than the pile

8. H piles are also said to be

a) High displacement piles b) Low displacement piles

c) Non displacement piles d) None of the above

9. Coefficeint of lateral earth pressure for passive case is

a) $\tan^2(45+\phi/2)$ b) $\tan^2(45-\phi/2)$

c) $\tan(45+\phi/2)$ d) $\tan(45-\phi/2)$

10. If the retaining wall is restrained from yielding, then the condition is said to be

a) Active state b) Passive state

c) At rest d) None of the above

PART B (10 x 2 = 20 Marks)

11. What is meant by significant depth of exploration?
12. Differentiate representative and non-representative samples.
13. Define safe bearing capacity of soil.
14. What are the components of settlement? Give the equation to find the elastic settlement in clay.
15. Define floating foundation.
16. What is contact pressure?
17. What is negative skin friction?
18. Can the group efficiency greater than one? If so when?
19. Differentiate active and passive earth pressures.
20. What are the uses of geotextiles?

PART C (5 x 14 = 70 Marks)

21. a) (i) What are the different boring methods? Explain any one in detail. (6)

(ii) Explain the different soil sampling techniques in detail. (8)

(OR)

b) (i) Outline the objectives of soil exploration. (2)

(ii) Briefly explain the Standard Penetration test with neat sketch and corrections to be applied to find 'N' value. (12)

22. a) A strip footing of 1.2m wide is supported on a soil with its base at a depth of 1m below ground surface. The soil properties are $c'=15kN/m^2$, $\phi'=28°$, $\gamma_t=18kN/m^3$, $\gamma'=10kN/m^3$. Determine the ultimate bearing capacity if (a) water table is at greater depth, (b) water table is at the level of base of the footing; (c) water table is at the ground surface. Use Terzaghi's equation.

(OR)

b) A continuous footing of 2.5m width is founded at a depth of 3m below ground surface. Determine the net ultimate bearing capacity; using (a) Terzaghi's equation, (b) Skempton's equation and (c) IS Code. The soil is clay with $\phi=0°$ and $c=20kN/m^2$. The unit weight of soil is $17kN/m^3$.

23. a) Explain the different types of foundations.

(OR)

b) What is raft foundation? Under what circumstances raft foundation is adopted? Explain Conventional method of design of raft.

24. a) A symmetrical 16 pile group in soft clay with unconfined compressive strength of $40kN/m^2$ and $\alpha=0.9$ is to be used as foundation for column. The piles are 300mm in diameter and 10m long and spaced at 900mm centers. Determine the maximum load the pile group can carry without any shear failure.

(OR)

b) (i) A friction pile 300mm in diameter is proposed to be driven in a layer of uniform cohesive soil. The pile tip is assumed to carry 20 percent of the load. The skin friction between the pile surface and the soil is assumed to be $50kN/m^2$. Determine the length of piling required to carry a safe load of 200kN with a factor of safety of 4. (8)

(ii) A precast pile is driven with a drop hammer weighing 50kN with a fall of 1.5m. The average penetration of the last blow is 5mm/blow. Determine the load carrying capacity of pile according to Engineering News formula. (6)

25. a) (i) State the assumptions made in Rankine and Coulomb's earth pressure theories. (4)

(ii) A retaining wall retains a cohesionless backfill with a height of 6m. The top 3m of the backfill has unit weight of $20kN/m^3$, $\phi=25°$ and lower part of backfill has unit weight of $24kN/m^3$, $\phi=20°$. Obtain pressure distribution diagram and determine the total passive earth pressure and its point of application. (10)

(OR)

b) Explain Culmann's graphical method of earth pressure theory for both active and passive cases.

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