

DEPARTMENT OF CIVIL ENGINEERING
GOVERNMENT POLYTECHNIC ,BALASORE
SUBJECT-GEOTECHNICAL ENGINEERING
SEMESTER -3RDSEM (CIVIL ENGG.)

BY-GAYATRI JENA

QUESTION BANK

SHORT QUESTIONS:-

1. Define Geotechnical engg.
2. What is alluvial soil?
3. What is residual soil?
4. Define lacustrine and glacial soil.
5. What is the condition of soil in three phase soil system?
6. Define unit weight and density.
7. State porosity and degree of saturation?
8. What is the relationship between e and n ?
9. Write down the formula of dry unit weight in terms of γ and w ?
10. Define density index.
11. What are the methods are there to calculate the water content of soil?
12. Which method is a quick method to calculate water content in laboratory?
13. What are the methods to calculate the specific gravity of soil?
14. What is CGS unit of density?
15. What are the classifications of soil?
16. What is plasticity index of soil?
17. What are the the Atterberg's limits.?
18. What are the Atterberg's indices?
19. Define consistency index.
20. State permeability?
21. What is Darcy's law?
22. What is Stokes law?
23. Write down the formula of K by constant head permeability test?
24. Write down the formula of K by falling head permeability test?
25. What is quick sand condition?
26. Define pore water pressure.
27. Write the relation between total stress,
28. What is the relation between total stress , effective stress and pore water pressure?

29. Define compaction.
30. What is optimum moisture content?
31. Define zero air void line.
32. Write four factors affecting compaction?
33. What is consolidation?
34. Define shear strength of soil.
35. Write down the assumptions made for coulomb theory of failure?
36. What is active earth pressure?
37. What is passive earth pressure?
38. What is the formula to calculate active earth pressure constant?
39. Define footing.
40. What are the different types of foundation?
41. Write two points about deep foundation and shallow foundation?
42. What are the types of failure?
43. Write down the Terzaghi's formula for calculate the bearing capacity of square footing?
44. What is standard penetration test?
45. What is plate load test?
46. What is punching shear failure?

LONG QUESTIONS:-

1. Describe briefly the formation of soil.
2. Explain the types of soil deposit on the basis of formation.
3. Describe briefly the two-phase and three-phase soil system.
4. What are important terms of geotechnical engineering ,briefly describe?
5. Write down the following terms a-water content b-porosity c-specific gravity.?
6. Derive the relation between unit weight , sp. Gravity, void ratio and unit weight of water.
7. A cum of wet soil weights 20KN.Its dry unit weight is 18KN. Sp. Gravity of soil solid is 2.67. Determine the water content, porosity, void ratio and the degree of saturation .Draw a phase diagram.
8. A soil sample with specific gravity of solids 2.70 has a mass specific gravity 1.84. Assuming the soil to be perfectly dry, determine the void ratio?
9. Briefly explain the classification of soil.
10. Write down the method of calculating water content by oven drying method.
11. Describe the procedure of calculating sp. Gravity by pycnometer method.
12. Differentiate between hydrometer method and pipette method.
13. Describe the factors affecting permeability.
14. Derive the formula of K(coefficient of permeability) by falling head permeability test.
15. A sand sample of 35 sq. cm cross sectional area and 20cm long was tested in a constant head permeameter. Under a head of 60 cm, the discharge was 120 ml in 6 min. The dry weight of sand used for the test was 1120gm, $G_s=2.68$. Determine (a)

the hydraulic conductivity in cm/sec, (b) the discharge velocity, and(c)the seepage velocity.

16. What is seepage pressure and derive the formula critical hydraulic gradient?
17. Differentiate between compaction and consolidation.
18. What are the laboratory test for compaction? Describe briefly.
19. Describe factors affecting compaction?
20. Briefly explain the equipments/rollers used for field compaction.
21. Describe the Terzaghi's model spring analogy.
22. Describe normally consolidated soil, under consolidated soil and over consolidated soil.
23. Explain Mohr-Coulomb failure theory.
24. Describe the direct shear test?
25. Describe tri-axial shear test.
26. What is the function of foundation?
27. Describe briefly the classification of foundation.
28. Describe briefly the classification of shallow foundation.
29. What is mat or raft footing and strap footing?
30. Describe the classification of deep foundation.
31. What is shear failure, describe its type?
32. What are the difference between local shear failure and general shear failure?
33. State safe bearing capacity, net ultimate bearing capacity, and net safe bearing capacity of soil?
34. Describe the procedure of standard penetration test.
35. What are effect of water table on bearing capacity of soil, describe briefly?
36. Briefly explain vane shear test.

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