BRANCH : CIVIL ENGINEERING **SEMESTER : 3rd**

Assignment-1 Type of soil, index properties, inter–relationships & Soil characterization

1. What is the scope of geotechnical engineering in the field of civil engineering?
2. What is weathering? Enumerate the type of weathering. Distinguish between physical and chemical weathering.
3. Derive functional relationship between (i) e, Sr, G and W (ii) γ_d, γ_b, W
4. Enlist the various methods of water content determine and explain oven drying method
5. What are the purposes of the soil classification? Discuss the IS classification system.
6. Explain grain size distribution by sieve analysis.
7. Explain sedimentation analysis for determining grain size distribution of fine grained soil in detail.
8. Discuss textural classification of soil.
9. Describe the different types of soil structure in detail.
10. What are the different categories of soil water? Explain in brief.

Assignment-2 Permeability & Seepage

1. Describe various factors affecting permeability of a soil mass.
2. State Darcy's law. What are its limitations?
3. What is Quick Sand Condition? Explain the meaning of critical hydraulic gradient.
4. Explain laboratory procedure for conducting Constant head permeability test with neat sketch
5. Explain the application of flow net in seepage analysis.

Assignment-3 Shear strength of soil

1. Compare the 'Direct Shear Test' and 'Triaxial Compression Test'.
2. Explain the Mohr-Coulomb strength envelope.
3. Explain the principle of the Direct shear test. What are the advantages of this test?
4. Explain the different Triaxial tests which can be performed with the different drainage conditions.
5. Write down merits and demerits of Vane shear test.

Assignment-4 Compaction of soil

1. List and explain the factors affecting compaction.
2. What are the different methods of compaction adopted in the field? How would you select the type of roller to be used?
3. Discuss the effects of compaction on various soil properties.
4. Describe Zero air void line.
5. Describe laboratory compaction test with its specification.

Assignment-5 Consolidation

1. Define consolidation. What are its causes?
2. Define compressibility and consolidation.
3. Explain the phenomenon of consolidation of clay by Terzaghi's spring analogy.
4. What is the coefficient of consolidation? Discuss the Square root time fitting method to determine its value, step-by-step.
5. Differentiate between normally consolidated and over-consolidated soils.
6. Define the following: (1) Coefficient of compressibility (2) Coefficient of Volume change (3) Compression Index (4) Time factor (5) coefficient of consolidation (6) Degree of consolidation.

Assignment-6 Stress distribution

1. Explain construction of Newmark's Influence Chart and its applications.
2. Point out the differences between Boussinesq's and Westergaard's theories.
3. State Assumption made in Boussines theory.
4. Derive an expression for vertical stress under a line load.

Assignment-7 Earth pressure and stability of slopes

1. Briefly explain the conditions of Active earth pressure, Passive earth pressure and Earth pressure at rest.
2. Explain Culmann's graphical method for determination of active earth pressure
3. What are the different types of earth pressure? Give examples.
4. Differentiate between active earth pressure and passive earth pressure.
5. Explain Rankine theory for active earth pressure in cohesive soil.
6. Define Earth pressure at Rest. Show the earth pressure distribution on a retaining wall, assuming that the soil fill is dry.
7. Define Finite and Infinite Slopes.
8. Briefly describe the method of slices for finite slope stability analysis for C-Φ soil.
9. Differentiate between active earth pressure and passive earth pressure.
10. What are the basic modes of failure of earth slopes? Briefly outline the remedial measures that can be undertaken against failure of slopes.
11. Discuss briefly, different types of slope failures.
12. What are different factors of safety used in the stability of slopes? Discuss briefly.
13. Differentiate between infinite and finite slopes. How will you calculate the factor of safety for an infinite slope made of cohesive soil?
14. What is stability number? Explain its uses.

Assignment-8 Introduction to Foundation and Bearing Capacity

1. State the different types of foundation and mention the factors affecting the selection of type of foundation.
2. What are the purposes of foundation?
3. Different between shallow foundation and deep foundation.
4. Define bearing capacity, gross bearing capacity and net bearing capacity.
5. State different types of shallow foundation. Explain any one with neat sketch.
6. The standard penetration test is used to measure the shear strength of _____ (clay, sands)
7. In standard penetration test the weight of _____ kg and _____ cm free fall is Considered. (75 & 65, 65 & 75).