3RD SEM./CIVIL/ 2023(W)NEW

Th-2 Geotechnical Engineering

Full Marks: 80 **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
   a. What is quick sand condition
   b. State Darcy's law.
   c. What do you mean by active and passive earth pressure.
   d. Define Air content & Degree of saturation.
   e. Differentiate between compaction & consolidation.
   f. What are the Index properties of soil.
   g. What do you mean by zero air void line.
   h. Differentiate between shallow foundation & deep foundation.
   i. Write down the relationships between γ_d, γ_w, e, and G.
   j. What is zero air void line.

2. Answer **Any Six** Questions 6 x 5
   a. Describe the phenomenon of quick sand with neat sketch.
   b. Discuss Mohr-Coulomb failure theory.
   c. Discuss the various factors affecting permebility of soil.
   d. What is plasticity chart. Describe in brief the I.S classification of soil.
   e. What do you mean by flow net. What are the proporties of flow net.
   f. A soil sample has a porosity of 40 %.The specific gravity of solids is 2.70. Calculate (a) voids ratio (b) dry density (c) unit weight if the soil is 50% saturated(d) unit weight if the soil is completely saturated.
   g Describe the Assumptions of Rankine's Earth pressure theory.

3 Describe in detail Terzaghi's spring analogy for primary consolidation with neat sketches. 10

4 Explain in detail triaxial shear test of soil with neat sketch. 10

5 What are the types of shear failures? Describe with neat sketches. 10

6 A square footing 2.5m X 2.5m is built in a homogeneous bed of sand of unit weight 20 KN/m^3 and having an angle of shearing resistance of 36^o. The depth of the base of footing is 1.5m below the ground surface, Calculate the safe load that can be carried by a footing with factor of safety of 3 against complete shear failure.Use Terzaghi's Analysis. 10

7 For a soil sample the specific Gravity of soil mass is 1.7 and specific gravity of soil particles is 2.7. Determine the void ratio(i) Assuming the soil sample is dry and (ii) The soil sample has a water content of 12 percent. 10