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.   What is Consistency Index and Liquidity index?
c.   State Darcy 's Law.
d.   Differentiate between Compaction and Consolidation.
e.   What is Active Earth Pressure?
f.   What do you mean by Zero air void line?
g.   Differentiate between Shallow foundation and Deep foundation.
h.   Define Air content and Degree of Saturation.
i.   Define Effective Stress.
j.   What is Density Index?

2.   **Answer Any Six Questions**   6 x 5
a.   Describe different types of failure in case of foundation.
b.   In a falling head permeability test, the head causing fall was initially 90 cm, and it drops
     6cm in 15 minutes. How much time is required for the head to fall to 45 cm.
c.   Describe different methods of compaction.
d.   A soil sample has wet density of 20 kN/m^3 and dry density of 18 kN/m^3. If the specific
     gravity of soil is 2.67, calculate the void ratio, porosity, moisture content and degree of
     saturation. Assume unit weight of water is 10 kN/m^3.
e.   Explain Mohr-Coulomb's failure theory.
f.   Define Optimum Moisture Content and also describe the factors affecting Compaction.
g   Describe different factors affecting permeability .

3   Explain in detail Triaxial shear test of soil with neat sketch.   10
4   (a)   A square footing 3m by 3m is built in a homogenous bed of sand of unit weight 21 KN/m^3 07
           and having an angle of shearing resistance of 36°.The depth of the base of footing is 1.8
           m below the ground surface. Calculate the safe load that can be carried by a footing with
           a factor of safety of 3 against complete shear failure. Use Terzaghi's analysis.(N_c=65.4,
           N_q=49.4, N_y=54)
     (b)   Write down different types of shallow foundation   03
5   Describe in detail Terzaghi's spring analogy for primary consolidation with neat sketches. 10
6   What is wet mechanical analysis. Explain briefly Pipette method with neat sketch.   10
7   (a)   Define Consistency of soils and Atterberg limits.   04
     (b)   A sampler with a volume of 60 cm^3 is filled with saturated soil sample. The specific   06
           gravity of soil solid is 2.65. When the oven dry soil is poured into a graduated cylinder
           filled with water, it displaces 40 cm^3 of water. What is the natural moisture content and
           dry unit weight of soil?

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TH-II Geo Tech. Engg

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 block diagram? What is its use?
   b. What is Density Index?
   c. Define Uniformity Coefficient.
   d. State Darcy's Law.
   e. Differentiate between compaction and consolidation of soil.
   f. State Mohr- Coulomb's equation of shear failure.
   g. Differentiate between active and passive earth pressure.
   h. Define MDD and OMC.
   i. What is Zero air void line?
   j. What is bearing capacity of soil?

2. Answer **Any Six** Questions   6 x 5
   a. Explain the origin and formation of Soil.
   b. Derive the relation between Void ratio and porosity.
   c. What is Consistency of Soil? Explain different types of Atterberg indices.
   d. Discuss about Plasticity Chart.
   e. Write short note on Quick sand condition.
   f. Compute the active and passive earth pressure force at a depth of 8m in a dry cohesionless sand with angle of internal friction 30 degree and unit weight 18 KN/m^3.
   g How many cubic meter of earth fill can be constructed at a void ratio of 0.67 from 190000 m^3 of borrow material that has a void ratio of 1.1?

3 What do you mean by sedimentation analysis? Give a brief description about pipette method.   10

4 In a consolidation test void ratio decreased from 0.70 to 0.65 when the load was changed from 50 KN/m^2 to 100 KN/m^2. Compute compression index and coefficient of volume change.   10

5 The mass and volume of a saturated clay specimen were 29.8 gm and 17.7 cm^3 respectively. On oven drying the mass got reduced to 19 gm and volume to 8.9 cm^3. Calculate shrinkage limit, shrinkage ratio and volumetric shrinkage. Also compute G of soil.   10

6 A cylindrical mould of diameter 7.5 cm contains 15 cm long sample of sand. When water flows through the soil under constant head at a rate of 55 cc/minute, the loss of head between two point 8 cm apart is found to be 12.5 cm. Determine the coefficient of permeability of soil.   10

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