REGISTRATION NUMBER | | | | | | | | | | |

SRINIX COLLEGE OF ENGINEERING

2nd INTERNAL EXAMINATION-2021-22

Subject-**GTE** Semester-**5th** Branch-**CE**

Full Mark-**100** Time-2.30 Hrs

TYPE A –ANSWER ALL QUESTIONS **[2×10=20]**

1. What is consolidation? How the total settlement of the soil will be calculated?
2. What is compressibility? On which factors compressibility is dependent?
3. Define pre consolidated, normally consolidated and under consolidated soil?
4. Describe compression index, coefficient of compressibility and coefficient of volume compressibility with respective formulae.
5. What are the drawbacks of direct shear test?
6. What is soil liquefaction and how does it occur?
7. Show the pressure distribution diagrams for real elastic material, cohesion less sand and intermediate soil?
8. What is isobar and pressure bulb?
9. How does failure of slopes take place?
10. Describe different types of slopes.

TYPE B:ANSWER ALL QUESTIONS **[6×8=48]**

1. Describe primary and secondary consolidation of soil ? A lab test on clay sample of 25mm thick drained at top only 50% consolidation occurred in 11 minutes. Find the time required for corresponding clay layer in field, 2m thick draining at top and bottom both. 70% degree of consolidation given that $(T_v)_{50}$=0.196 and $(T_v)_{70}$=0.405.
2. What are the assumptions of Bossinesq equation? Write down the equilibrium and compatibility equations of a three dimensional elastic body.
3. A direct shear test on aremoulded sample of sand use the following observation at failure.
   Normal load= 288 kN
   Shear load = 173 kN
   Crossectional area = 36 cm^2
   Determine the angle of internal friction, magnitude and direction of principal stresses in the zone of failure.
4. Briefly describe the vane shear test of a clay sample with neat sketches.
5. With neat sketch define Atterberg's limit. How can you determine the liquid limit in the laboratory, what is activity of soil and explain its value?
6. Laboratory sieve analysis was carried out on a soil sample using a complete set of standard IS sieves. Out of 600gm of soil used in the test, 240gm was retained on IS 600µ sieve, 300gm was retained on IS 500µ sieve and the remaining was retained on 425µ

sieve. Find out the coefficient of uniformity of the soil and find out the classification of soil?

7. A layer of saturated clay 5m thick is over lain by a sand 4m deep. The water table is 3m below the top surface. The saturated unit weight of clay and sand are 18KN/m3 and 20KN/m3 respectively. Above water table, the unit weight of sand is 17KN/m3. Find out the effective pressure on a horizontal plane at a depth of 9m below the ground surface and what will be the increase in the effective pressure at 9m if the soil gets saturated by capillary, up to a height of 1m above the water table?
8. Describe the factors those are affecting compaction. Derive the laplace equation of two dimensional flow under seepage pressure condition.

TYPE C:<u>ANSWER ALL QUESTIONS</u> **[16×2=32]**

1. Describe the experimental procedure of direct shear test in the laboratory. Draw the mohr's circle obtained from this test.

   Different samples of clay of 5 m thick were tested in lab and following results were obtained.

   Initial void ratio (e_o)= 0.9

   Pre consolidation stress ($\bar{\sigma_c}$)=120 kN/m^2

   Recompression index (C_r)= 0.03

   Compression index (C_c)= 0.27

   Estimate the consolidation settlement if present average overburden stress of the layer is 70 kN/m^2 and the increase in average stress in the layer is 80 kN/m^2.
2. Briefly write the testing procedure of triaxial shear test. Draw the mohr's envelope obtained from this test.

   A long natural slope of cohessionless soil is at 12° to the horizontal. Taking Ø= 30°, determine the factor of safety of the slope. If the slope is completely submerged, what will be the change in the factor of safety.