College of Engineering, Pune
T.Y. B.Tech. Civil Engineering
(CE301)- (Geotechnical Engineering.)
End Semester Examination

1) Solve any **Five** questions   Max. Marks-50

2) Draw necessary diagram wherever necessary   Duration – 3hrs.

Q. 1	A.	Explain "Plasticity Chart"	05
	B.	During soil investigation for residential complex site ,the following observations were taken for insitu unit weight measurement by sand replacement method Weight of excavated soil- 761.25 gm Weight of sand + cylinder (W1) -10500gm Weight of sand + cylinder after pouring in the excavated hole and cone (W2) - 9450 gm Weight of sand + cylinder after poring for the cone only (W3) – 9005 gm Volume of calibrating cylinder – 1000cc Weight of sand in calibrating cylinder after poring from cylinder -1500gm Calculate in situ unit weight of the soil.	05
Q.2	A	Explain **Pumping in** test for determination of permeability in the field.	05
	B	On certain site there are three horizontal soil layers, down to an impervious rock bed the details of which are as follows Layer 1-thickness = 3.5m; $k=2.5 \times 10^{-5}$ m/sec Layer 2-thickness = 1.8m; $k=1.4 \times 10^{-7}$ m/sec Layer 3-thickness = 4.2m; $k=5.6 \times 10^{-3}$ m/sec Calculate the average horizontal and vertical permeability of the soil.	05
Q.3	A	Explain different factors affecting compaction of soil.	05
	B	Compare between standard Procter test and Modified Procter test	05
Q.4	A	Classify shear tests based on drainage conditions. How are these conditions realized in field.	05
	B	An unconfined compression test was conducted on an undisturbed sample of clay. The sample has a diameter pf 37.5 mm and 80 mm long. The load at failure measured by the proving ring was 28 N and axial deformation of	05

the sample at failure was 13 mm. Determine the Unconfined compressive strength and the undrained shear strength of the clay.

Q.5 A   What is earth pressure? Derive an equation for determining the magnitude   05
          of earth pressure for backfill with sloping surface.

     B   The backfill material of retaining wall of 8 m high is sand having $\phi' = 34^0$ 05
          Neglecting wall friction calculate total active thrust on the wall if,
          A) The water table rises upto a height of 4m above the base of the wall
             ($\gamma'sat = 20.5$ kN/m^3)
          B) The water table is below the base of the wall ($\gamma = 16$ kN/m^3)

Q.6 A   Explain "Swidish Circle Method"   05

     B   Derive Westerguard Analysis.   05

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