Total No. of Questions : 8]

SEAT No. :

PB3596

[Total No. of Pages :3

[6261]-1
S.E. (Civil Engineering)
GEOTECHNICAL ENGINEERING
(2019 Pattern) (Semester-IV) (201008)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right indicates full marks.***
4) ***Assume suitable data, if necessary and mention it clearly.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Explain the process of field compaction and its control using Proctor needle. **[6]**

b) Discuss the moisture-density relation graph for standard and modified proctor test. Also explain the significance of ZAV line in the graph. **[5]**

c) Write the equations for stresses in soil for point loading by Boussinesq's and Westergaard's theory and assumptions in these theories. **[6]**

OR

Q2) a) Explain the factors affecting Compaction of soil. **[6]**

b) What is pressure bulb? Explain its significance and draw a neat sketch of pressure bulb for concentrated point load. **[5]**

c) A concentrated load of 300 KN is applied at the ground surface. Compute the vertical pressure: **[6]**

i) At a depth of 6 m below the load.

ii) At a distance of 5 m at the same depth.

Q3) a) Explain the factors affecting shear strength of cohesion less soil and cohensive soil. **[6]**

b) A soil sample fails under and axial stress of 150 kN/m^2 when it is laterally unconfined. The failure makes an angle of 55^0 with the horizontal. Calculate C and Φ. **[5]**

c) What are the different methods to measure shear strength of soil. State merits and demerits of Direct shear test. **[6]**

OR

P.T.O.

Q4) a) The following results were obtained from a triaxial test on two soil specimens, **[6]**

Sample No.	Confining Pressure (kPa)	Deviator Stress at Failure (kPa)	Pore water Pressure (kPa)
1	200	244	55
2	300	314	107

Determine the shear strength parameters of the soil terms of

i) Total stress

ii) Effective stresses

b) Explain in detail Vane shear test. Explain the limitations of Vane Shear test. **[5]**

c) Explain how shear tests are conducted with different drainage conditions. **[6]**

Q5) a) Explain Earth pressure at rest, active earth pressure and passive earth pressure with respect to Wall movement with sketches. **[6]**

b) Explain step by step method of Coulomb's Wedge Theory for determination of earth pressure of retaining wall. **[6]**

c) In a cohesionless soil deposit having unit weight of 18 kN/m^3 and $\Phi = 32^0$. Determine active and passive lateral pressure intensities at depth of 10m. **[6]**

OR

Q6) a) Derive the equation for lateral earth pressure in active state for dry cohesionless backfill with uniform surcharge. **[6]**

b) Explain Culman's method for evaluation of earth pressure. **[6]**

c) A smooth vertical wall retains a level backfill with $\Upsilon = 18$ KN/m^3, $\Phi = 30^0$ and c = 0 to a depth of 8 m. Draw the lateral pressure diagram and compute the total active pressure in dry condition and when water table rises to the GL. Assume Υsat = 22 KN/m^3 **[6]**

Q7) a) Explain landslide causes and remedial measures. **[6]**

b) Explain Taylor's stability number. A slope is of 10 m with stability number equal to 0.055. What is factor of safety? Given $\Upsilon = 20$ kN/m^3, C = 25 kN/m^2, $\Phi = 0$ **[6]**

c) Explain modes of failure of finite and infinite slopes. **[6]**

OR

Q8) a) Explain steps involved in the stability of slopes by method of slices. **[6]**

b) Derive the expression F.O.S for dry infinite slope in sandy soil. **[6]**

c) Write a short note on slope classification. Determine the critical height of excavation of vertical cut in cohesive soil If C = 25 kN/m^2 and unit weight = 17 kN/m^3 $\Phi = 0$. **[6]**