Total No. of Questions : 8]

SEAT No. :

PA-1184

[Total No. of Pages : 3

[5925]-206
S.E. (Civil)
GEOTECHNICAL ENGINEERING
(2019 Pattern) (Semester - IV) (201008)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat figures must be drawn wherever necessary.***
4) ***Assume suitable data if required.***
5) ***Use of non programmable scientjfic calculator is allowed.***

Q1) a) Discuss in detail Proctor needle in field compaction control. **[6]**

b) State any four assumptions in Boussinesq's theory. Mention the formula for calculation of stress in soil by point load and circular load by Boussinesq's theory, with description of each term. **[6]**

c) Describe the effect of compaction on properties of soil. **[6]**

OR

Q2) a) Differentiate between Standard Proctor Test and Modified Proctor Test. Draw typical compaction curve for both the tests. **[6]**

b) What is pressure bulb? Explain its significance and draw a neat sketch of pressure bulb for concentrated point load. **[6]**

c) A concentrated load of 25 kN acts on the surface of homogenous soil mass of large extent. Find the stress intensity at a depth of 8 m by using Boussinesq's theory at a horizontal distance of 2.5 m. **[6]**

Q3) a) Explain briefly the procedure of conducting Unconfined Compression Test on clayey soil sample. Draw Mohr's circle for the test. **[6]**

b) State and explain factors affecting shear strength of cohesive and cohesionless soil. **[5]**

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c) Two identical soil specimens were tested in a triaxial apparatus. First specimen was failed at a deviator stress of 700 kN/m^2 when the cell pressure was 200 kN/m^2. Second specimen was failed at a deviator stress of 1300 kN/m^2 when the cell pressure was 400 kN/m^2. Determine cohesion of soil and angle of internal friction of soil analytically. **[6]**

OR

Q4) a) Determine the shear strength in terms of effective stress on a plane within a saturated soil mass at a point where the total normal stress is 200 kN/m^2 and pore water pressure is 80 kN/m^2. The shear strength parameters in terms of effective stress are, c' = 16 kN/m^2 and $\Phi' = 39^0$. **[6]**

b) Explain how shear tests are conducted with different drainage conditions? **[5]**

c) Describe the procedure for Vane Shear Test. **[6]**

Q5) a) Explain earth pressure at rest, active earth pressure and passive earth pressure w.r.t. wall movement with sketches. **[6]**

b) Compute the intensity of active earth pressure at a depth of 8 m in dry cohesionless sand with an angle of internal friction 30^0 and unit weight of 18 kN/m^3. **[6]**

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

OR

Q6) a) A wall with a smooth vertical back, 10 m high, supports a purely cohesive soil with c = 9.81 kN/m^2 and γ = 17.66 kN/m^3. Determine total active earth pressure against the wall and position of zero pressure before formation of tension crack. **[6]**

b) Explain Rebhann' s graphical method for determination of earth pressure on retaining wall. **[6]**

c) Derive the expression for the active state of pressure at any point for a submerged cohesionless backfill along with pressure diagram. **[6]**

Q7) a) Explain with neat sketch different modes of slope failure. **[6]**

b) Discuss "Swedish Slip Circle Method" for stability analysis of finite slope. **[5]**

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

OR

Q8) a) Illustrates causes and remedial measures of landslide. **[6]**

b) Discuss "Taylor's Stability Number" for stability analysis of finite slope. **[5]**

c) An infinite slope is made of clay with the following properties: **[6]**

γ_{sat} = 18 kN/m^3, γ' = 9 kN/m^3, c' = 25 kN/m^2 and Φ = 28°.

If the slope angle has an inclination of 350 and height equal to 12 m, determine stability of slope. When,

i) The slope is submerged

ii) There is steady seepage parallel to slope.

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