

Total No. of Questions—8]

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[5352]-503

S.E. (Civil) (I Sem.) EXAMINATION, 2018
GEOTECHNICAL ENGINEERING
(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

- N.B. :—** (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4,
Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
(ii) Neat diagrams must be drawn wherever necessary.
(iii) Figures to the right indicate full marks.
(iv) Use of calculator is allowed.
(v) Assume suitable data, if necessary.

Q1) a) Describe briefly the procedure for conducting liquid limit test as per I.S. 2720. [6]
How the result of this test are plotted. Draw the typical sketch of the plot.

b) What is flow net? Write down the characteristics and application of flow net. [6]

OR

Q2) a) Derive the relation between γ_d , G and e. [6]

b) Explain with neat sketch variable head permeability test. Derive the expression [6]
for coefficient of permeability of soil for the variable head method.

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

b) A concentrated load of 25 kN acts on the surface of homogeneous soil mass of [6]
large extent. Find the stress intensity at a depth of 8.0 meters by using
Boussinesq's theory at a horizontal distance of 2.5m

OR

Q4) a) In case of Direct shear test ,the value of normal stress and corresponding shear [6]
stress are given as;

$$\sigma = 75 \text{ KPa}, \tau = 61.3 \text{ KPa}$$

$$\sigma = 125 \text{ KPa}, \tau = 90.168 \text{ KPa}$$

$$\sigma = 175 \text{ KPa}, \tau = 119.036 \text{ KPa}$$

Determine cohesion and angle of internal friction of soil.

P.T.O.

- b) Differentiate between light compaction test and heavy compaction test. Draw typical compaction curve for both tests. [6]
- Q5) a) Explain Rankine's lateral stress distribution theory for active, passive and at rest state with the assumptions involved. [6]
- b) A wall with a smooth vertical back, 10m high, supports a purely cohesive soil with $c = 9.81 \text{ kN/m}^2$ and $\gamma = 17.66 \text{ kN/m}^3$. Determine total Rankine's active pressure against the wall and the position of zero pressure [7]
- OR**
- Q6) a) Derive the relation for passive earth pressure using Rankine's theory for dry, cohesionless backfill. [7]
- b) Explain Rebhann's graphical method for determination of earth pressure on retaining wall [6]
- Q7) a) What is stability number ? Determine the critical height of excavation of a vertical cut in a cohesive soil, if $c = 30 \text{ kN/m}^2$ and $\gamma = 18 \text{ kN/m}^3$. [6]
- b) Discuss sources and types of ground contamination [7]
- OR**
- Q8) a) State classification of slopes based on different criteria. Explain with neat sketch the different modes of slope failure. [7]
- b) Write down the effects of subsurface contamination [6]