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[5252]-503

**S.E (Civil) (I Sem.) EXAMINATION, 2017**  
**GEOTECHNICAL ENGINEERING**  
**(2015 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6,  
Q. 7 or Q. 8.

(ii) Neat diagram must be drawn wherever necessary.

(iii) Figures to the right side indicate full marks.

(iv) Use of Calculator is allowed.

(iv) Assume suitable data if necessary.

1. (a) What are the major soil deposits of India ? Explain any *two* in brief. [6]
- (b) State how field permeability is determined. Explain any *one* method. [6]

*Or*

2. (a) Define shrinkage limit. A shrinkage limit test gave the following observations. Determine the shrinkage limit. Volume of dry pat = 29.30 ml, Mass of dry pat = 48.32 gm, Initial volume (wet) = 43.50 ml, Initial mass (wet) = 66.66 gm, Find the shrinkage limit. [6]
- (b) Explain flow net construction for seepage below earthen dam. [6]
3. (a) What are the advantages of triaxial compression test in comparison with the direct Shear test ? [6]
- (b) Write a short note on “Proctor needle in field compaction control.” [6]

P.T.O.

Or

4. (a) Define sensitivity and thixotropy. [7]
- A cohesive soil has an angle of shearing resistance of  $15^\circ$  & cohesion of  $35 \text{ kN/m}^2$ . If a specimen of this soil is subjected to a triaxial compression test, find the value of lateral pressure in the cell for failure to occur at a total axial stress of  $300 \text{ kN/m}^2$ .
- (b) Write the equations for stresses in soil for point loading by Boussinesq's and Westergaard's theory and assumptions in these theories. [6]
5. (a) Explain Coulomb's Wedge theory for determination of earth pressure. [6]
- (b) A vertical retaining wall retains the level backfill of sand. The water level stands  $H_1$  metres below the top of the backfill. Draw the pressure distribution diagram for the active conditions. [6]

Or

6. (a) State the assumptions made in Rankine's Earth Pressure theory and derive the relation for earth pressure at rest condition. [6]
- (b) Explain active state of earth pressure condition.
- A wall 6 m high has a smooth vertical back and it retains a non-cohesive level backfill with  $\gamma = 18.0 \text{ kN/m}^3$ ,  $\phi = 30^\circ$ . Determine the total lateral pressure in active state. [6]
7. (a) What is Stabilization-solidification ? How is chemical decontamination carried out ? [6]
- (b) What is infinite and Finite slopes ? Give examples.
- Explain how the stability charts are used in the design of slopes. [7]

Or

8. (a) Derive the critical height of slope for a vertical excavation in a  $c-\Phi$  soil. What is the critical height of vertical excavation that can be made without any lateral support in a cohesive soil having the following properties-  $\gamma = 18 \text{ kN/m}^3$ ,  $c = 14 \text{ kN/m}^2$ ,  $\Phi = 12^\circ$ . [6]
- (b) Write a short note on subsurface contamination and contaminant transport. [7]