Seat
No.

[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 15º & cohesion of 35 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 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 γ = 18.0 kN/m^3, ϕ = 30º. 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]

8. (*a*) Derive the critical height of slope for a verical excavation in a c-Φ 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- γ = 18 kN/m^3, c = 14 kN/m^2, Φ = 12º. [6]

(*b*) Write a short note on subsurface contamination and contaminant transport. [7]