Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5152]-503

S.E. (Civil) (First Semester) EXAMINATION, 2017

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 side indicate full marks.

(*iv*) Use of calculator is allowed.

(*v*) Assume suitable data, if necessary.

1. (*a*) Explain weathering and distinguish between mechanical and chemical weathering giving examples. [6]

(*b*) Explain in brief *six* factors affecting permeability of soils. [6]

Or

2. (*a*) Define and mention the formulae for the following terms : Void ratio, Porosity, Degree of saturation, Percentage air voids, Water content, Specific gravity. [6]

(*b*) State Darcy's law. Define coefficient of permeability and derive equation for coefficient of permeability used in constant head method. [6]

P.T.O.

3. (*a*) In a standard proctor test the following observations were recorded : [7]

Sample No.	Bulk Density (kg/m^3)	Water Content (%)
1	1310	16.1
2	1515	19.5
3	1875	27.55
4	1860	33.69
5	1775	34.77

Plot the moisture density curve and find MDD and OMC and also draw ZAV line.

(*b*) Explain direct shear test with respect to the drainage and loading conditions [6]

Or

4. (*a*) Write any *four* assumptions made by Boussinesq to evaluate the stress at a point inside the soil mass due to a point load. Also explain in brief stress Isobar. [7]

(*b*) Define total and effective stress. 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 the pore water pressure is 80 kN/m^2. The effective stress shear strength parameters for the soil are c' = 16 kN/m^2 and phi' = 39°. [6]

5. (*a*) Differentiate between Rankine's and Coulomb's theories of earth pressure. [6]

(*b*) Explain Active, Passive Earth Pressure with respect to wall movements with sketches. [6]

Or

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

(*b*) Discuss Culmann's graphical method for the determination of active earth pressure. [6]

7. (*a*) Write short notes on causes and remedial measures of Landslides. [7]

(*b*) Derive the expression for factor of safety for dry infinite slope and submerged infinite slope in sandy soils. [6]

Or

8. (*a*) Discuss sources and types of ground contamination. [6]

(*b*) Explain how soil acts as a geochemical trap and state the various remediation techniques. [7]