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	Water Content
3	(kg/m³)	(%)
	1310	16.1
	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/m² and the pore water pressure is 80 kN/m². The effective stress shear strength parameters for the soil are c' = 16 kN/m² and phi' = 39°.

- 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]
- 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]