Total No. of Questions—**12**] [Total No. of Printed Pages—**4+2**

Seat No.	

[4757]-105

S.E. (Civil) (First Semester) EXAMINATION, 2015
GEOTECHNICAL ENGINEERING
(2008 PATTERN)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer any *three* questions from Section I and *three* questions from Section II

(*ii*) Answers to the two Sections should be written in separate answer-book.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Use of logarithmic tables slide rule, electronic calculator is allowed.

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

SECTION I

1. (*a*) Clearly explain the use of knowledge of geotechnical in construction of :

(*i*) Earth Dam

(*ii*) Road Construction. [6]

(*b*) Explain soil as a three-phase system. [6]

(*c*) Define the terms : Water content, state different methods to find water content of a given soil. [6]

P.T.O.

Or

2. (*a*) State the different methods to determine field density of soil. Explain any *one* of them. [6]

(*b*) A soil sample 5.20 N in wet condition and 4 N in dry condition. If its volume is found to be 270 ml than what is :

(*i*) Water content

(*ii*) Dry density (ρ_d)

(*iii*) Void ratio (*e*)

(*iv*) Degree of saturation. [6]

(*c*) What is soil exploration and List out the purpose of it. [6]

3. (*a*) Explain with neat sketch falling head permeability test. [6]

(*b*) Calculate the coefficient of permeability of a soil sample, 6 cm in height and 50 cm^2 in cross-sectional area, if quantity of water equal to 430 ml passed down in 10 minutes under an effective constant head of 40 cm. [6]

(*c*) State and explain the factors affecting permeability of soil. [4]

Or

4. (*a*) Explain with neat sketch Constant head permeability test. [6]

(*b*) In a falling head permeability test on a silty clay sample, the following result were obtained : Sample length 120 mm, sample diameter 80 mm, initial head 1200 mm, final head 400 mm, time for fall in head 6 minutes, stand pipe diameter is 4 mm. Find the coefficient of permeability of soil in mm/sec. [6]

(*c*) What are the properties of flow net ? [4]

5. (*a*) State and explain any *four* factors which influence compaction of soil. [6]

(*b*) Draw a moisture density curve and obtained MDD and OMC with the following records : [6]

Bulk wt. Density (kN/m^3)	**Water Content** %
16.50	10
17.80	13
19.50	16.5
19.80	20
18.50	24.5
18.00	29

(*c*) What is pressure bulb ? Explain its use. [4]

Or

6. (*a*) Write a short note on Neutral and effective Stress. [6]

(*b*) Explain the following methods of stress distribution in soil : [6]

(*i*) Equivalent point load method

(*ii*) Approximate stress distribution method.

(*c*) State Boussinesq's equation for analysis for stress distribution in soil due to a concentrated load and meaning of all terms. [4]

SECTION II

7. (*a*) Write a note on Vane Shear Test. [6]

(*b*) What are the advantages and disadvantages of direct share test. [6]

(*c*) The shear strength parameters of a given soil are, C = 0.26 kg/cm^2 and $\phi = 21°$. Undrained triaxial tests are to be carried out on specimens of this soil. Determine deviator stress at which failure will occur if the cell pressure be 2.5 kg/cm^2. [6]

Or

8. (*a*) What are the three standard triaxial shear tests with respect of drainage condition ? [6]

(*b*) What are the factors affecting shear strength of soil ? [6]

(*c*) A Vane 10.8 cm long 7.2 cm in diameter, was pressed in to the soft clay at the bottom of the bore hole. Torque was applied and value at failure was 45 Nm. Find the shear strength of the clay on a horizontal plane. [6]

9. (*a*) State assumption in Rankine's earth pressure theory. [6]

(*b*) What is Taylor's stability numbers ? What is its utility in the analysis of stability of slopes. [6]

(*c*) Define the terms Active Earth Pressure, Passive Earth Pressure with sketches. [4]

Or

10. (*a*) What is 'earth pressure at rest' and state equation for the same. [6]

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

(*c*) Explain effect of wall moment with respect to earth pressure. [4]

11. (*a*) What are different modes of failure of rocks ? [6]

(*b*) Explain durability of rocks. [4]

(*c*) Write short notes on :

(*i*) Porosity of rocks

(*ii*) Permeability of rocks. [6]

Or

12. (*a*) What are different index properties of rocks ? [6]

(*b*) Write short notes on :

(*i*) Geological classification of rocks

(*ii*) Shear strength of rocks. [10]