

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III • EXAMINATION – WINTER • 2014

Subject Code: 2130606

Date: 01-01-2015

Subject Name: Geotechnics and Applied Geology

Time: 02.30 pm - 05.00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What is the scope of geotechnical engineering in the field of civil engineering? **07**
(b) What is weathering? Enumerate the type of weathering. Distinguish between physical and chemical weathering. **07**
- Q.2** (a) A soil sample has a porosity of 40 percent. The specific gravity of solids is 2.70. Calculate (a) void ratio, (b) dry density, (c) unit weight if the soil is 50% saturated and (d) unit weight if the soil is completely saturated. **07**
(b) What is an earthquake? What are the causes of earthquakes? Describe in brief the types of earthquake waves. **07**
- OR**
- (b) How is geology related to civil engineering? Discuss the scope of application of geological knowledge in the planning and execution of engineering works. **07**
- Q.3** (a) Define the following terms: (i) water content (ii) void ratio (iii) porosity (iv) Unit weight of solids (v) Air content (vi) Bulk Unit weight (vii) Specific gravity **07**
(b) Discuss in brief the importance of study of geology for a civil engineer. **07**
- OR**
- Q.3** (a) A soil sample has a liquid limit of 30%, plastic limit 17% and flow index of 13%. Natural water content of soil is 19%. Determine: (i) plasticity index (ii) liquidity index (iii) consistency index (iv) Toughness index **07**
(b) Define laws of stratigraphy. **07**
- Q.4** (a) Enlist the various methods of water content determine and explain oven drying method. **07**
(b) Define the terms: (i) permeability (ii) seepage (iii) coefficient of permeability (iv) Darcy's law (v) flow net (vi) Discharge velocity (vii) Hydraulic gradient (i) **07**
- OR**
- Q.4** (a) Define a mineral describe in brief the various physical properties of minerals which help in their identification. **07**
(b) Explain grain size distribution by sieve analysis. **07**
- Q.5** (a) What are faults? How they are classified? Illustrate with neat and suitable diagram. **07**
(b) What is texture of the soil? **07**
- OR**
- Q.5** (a) What are the purposes of the soil classification? **07**
(b) Write short notes on the following: (i) water table and perched water table (ii) confined aquifer and unconfined aquifer **07**
