

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III(New) • EXAMINATION – WINTER 2016

Subject Code:2130606

Date:09/01/2017

Subject Name:Geotechnics & Applied Geology

Time:10:30 AM to 01:00 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 Short Questions 14**

- 1 The soil transported by water is called \_\_\_\_\_.
- 2 Define the term: Degree of saturation
- 3 If the void ratio of a soil sample is 20%, the porosity is \_\_\_\_\_.
- 4 What is the value of plasticity index for a sandy soil?
- 5 A soil having particles of nearly same size is called \_\_\_\_\_
- 6 In IS soil classification system, what is the symbol for well graded sand?
- 7 Which corrections are applied in hydrometer analysis?
- 8 Which clay mineral has the maximum swelling property?
- 9 For which type of soil, falling head permeability test is performed?
- 10 Define the term: Cleavage.
- 11 Which mineral has the minimum and maximum hardness on a Mohr's scale?
- 12 Define the epicenter of an earth quake.
- 13 Define the term : Run off.
- 14 What are the side effects of an earth quake?

**Q.2 (a) The porosity of a soil sample is 35% . Calculate its void ratio, dry density, saturated density and submerged density. Take  $G = 2.7$ . 03**  
**(b) Explain grain size distribution by sieve analysis. 04**  
**(c) Describe various factors affecting permeability of a soil mass. 07**

**OR**

**(c) Describe the different types of soil structure in detail. 07**  
**Q.3 (a) What is a quick sand? Explain the meaning of critical hydraulic gradient. 03**  
**(b) Explain total stress, effective stress and neutral stress. 04**  
**(c) Explain the characteristics of flow net with any two applications. 07**

**OR**

**Q.3 (a) Derive the functional relationship between bulk density, dry density and moisture content,  $\gamma_d = \gamma / (1+w)$ , 03**  
**(b) Write a short note on the adsorbed water. 04**  
**(c) Calculate the plasticity index, liquidity index and consistency index of a soil mass for a given data. Natural water content : 50%, Liquid limit : 55%, Plastic limit 25%. What would be the type of soil on a plasticity chart? 07**

**Q.4 (a) What is the importance of geology for civil engineering? 03**  
**(b) Explain the agents which are responsible for metamorphic changes. 04**

**(c) Enlist the different engineering properties of rocks and explain them. 07**

**OR**

- Q.4** (a) Define and explain the process of chemical weathering. **03**  
(b) Write a short note on seismic zoning of India. **04**  
(c) Explain different laws of stratigraphy. **07**
- Q.5** (a) Write a short note on types of land slides. **03**  
(b) Explain uses of minerals. **04**  
(c) What are the application of remote sensing in geological investigation? **07**
- OR**
- Q.5** (a) Explain hydrological cycle with figure. **03**  
(b) Explain geological investigation during planning of a building. **04**  
(c) Define the term joint and write a short note on types of joints. **07**

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