Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2130606 **Date: 09/06/2017**

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	What is Alluvial soils?	
	2	Define Specific Gravity of soils.	
	3	Which soil is practically impermeable?	
	4	What is the effective size of soil?	
	5	In which type of soil honeycomb structure is observed.	
	6	State the Darcy's law.	
	7	Give the size of sand particles.	
	8	What is capillary water?	
	9	When slope of the deposit is less than 10° , the deposits are called_____.	
	10	What is the thickness of mantle?	
	11	Give the examples of colourless minerals.	
	12	What is Aquifer?	
	13	The smallest clay mineral is_____.	
	14	Give the method for finding bulk density of cohessionless soils.	
Q.2	**(a)**	Derive $\gamma_d = \gamma_b/(1+w)$	**03**
	(b)	Sample of sandy soil has 33% porosity. Find density index if maximum and minimum dry unit weight of sample is respectively 18 kN/m^3 and 14 kN/m^3. Take specific gravity of soil as 2.6.	**04**
	(c)	What is the scope of geotechnical engineering in the field of civil engineering?	**07**
		OR	
	(c)	With schematic diagram explain different types of soil structures.	**07**
Q.3	**(a)**	Discuss the IS classification system.	**03**
	(b)	Soil sample has a liquid limit of 30%, plastic limit 17% and flow index of 13%. Water content of soil is 19%. Determine (i) Plasticity Index, (ii) Liquidity Index, (iii) Consistency Index, and (iv) Toughness Index.	**04**
	(c)	Explain Activity, Sensitivity and Thixotropy of soils.	**07**
		OR	
Q.3	**(a)**	Define the following terms: (i) Gravitational Water (ii) Structural Water (iii) Adsorbed Water	**03**
	(b)	A soil sample of height 60 mm and cross sectional area of 100 cm^2 was subjected to falling head permeability test. In a time interval of 6 minutes, the head dropped from 60 cm to 35 cm. If the cross sectional area of the stand pipe is 2 cm^2, compute the coefficient of permeability of the soil sample. If the same sample is subjected to a constant head of 20 cm, calculate the total quantity of water that will be collected after flowing through the sample.	**04**
	(c)	State and explain factors affecting permeability of soils.	**07**
Q.4	**(a)**	Enlist the different causes of earthquakes.	**03**
	(b)	Define Weathering and discuss the process involved in chemical weathering.	**04**

	(c)	What is an earthquake? Describe the types of earthquake waves.	**07**
		OR	
Q.4	**(a)**	Write short note on agents of metamorphism.	**03**
	(b)	Explain ‘rock cycle’.	**04**
	(c)	Describe the applications of geology in civil engineering.	**07**
Q.5	**(a)**	Define aquifer? How are they formed and classified?	**03**
	(b)	Explain permeability and porosity of rocks.	**04**
	(c)	Give the classification of faults based on apparent movements.	**07**
		OR	
Q.5	**(a)**	What are landslides? How they are caused?	**03**
	(b)	What are the limitations of GIS.	**04**
	(c)	What is remote sensing? Explain the application of remote sensing in engineering geology.	**07**

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