Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–III (NEW) EXAMINATION – WINTER 2020

Subject Code:3130606 Date:09/03/2021

Subject Name:Geotechnical Engineering

Time:10:30 AM TO 12:30 PM Total Marks:56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What are the three phase of soil?	**03**
	(b)	What is the scope of geotechnical engineering in the field of civil engineering	**04**
	(c)	Derive the following relationship: Yd= G Yw / 1 +e.	**07**
Q.2	**(a)**	Explain grain size distribution by sieve analysis.	**03**
	(b)	Define: 1.Toughness Index, 2.Thixotrophy.	**04**
	(c)	What are different types of soil structure which can occur in nature? Describe in brief.	**07**
Q.3	**(a)**	What is negative skin friction ? What is its effect on the pile ?	**03**
	(b)	Discuss the IS classification system of soil.	**04**
	(c)	What is quick sand condition ? How would you calculate the hydraulic gradient required to create quick sand conditions in a sample of sand?	**07**
Q.4	**(a)**	What are the different methods of compaction adopted in the field?	**03**
	(b)	Describe the spring analogy for primary consolidation	**04**
	(c)	Differentiate between compaction and consolidation.	**07**
Q.5	**(a)**	Write different Shear tests based on Drainage conditions.	**03**
	(b)	Explain Modified Mohr-Coulomb theory.	**04**
	(c)	Explain in detail the construction of Newmark's influence chart. How is it used ?	**07**
Q.6	**(a)**	Distinguish between active earth pressure and passive earth pressure.	**03**
	(b)	Determine the factor of safety against sliding for slip surface passing through the toe of a finite slope of height of 11m and slope angle 1V:1H has c= 15kPa, Ø = 32^0,γ_t =18 kN/m^3.The radius and the central angle of slip circle is 17.4m and 87^0 respectively. Take ΣN = 1902.74kN and ΣT= 941.15 kN .Use Swedish circle method.	**04**
	(c)	Explain Rankine theory for active earth pressure in cohesive soil.	**07**
Q.7	**(a)**	What are different types of slope failures?	**03**
	(b)	Write short note on Swedish circle method.	**04**
	(c)	A retaining wall of height 8.0m has a horizontal sandy soil as a backfill (C= 0.0, Ø = 30^0,γ_t =18kN/m^3) A surcharge of 50 kPa is acting over the backfill. Draw the active pressure distribution and calculate the total active thrust acting on the wall.	**07**
Q.8	**(a)**	State different types of shallow foundation.	**03**

(b) Enumerate the factors affecting bearing capacity and explain in detail. **04**

(c) Describe plate load test with neat sketches. **07**

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