

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2021

Subject Code:3130606

Date:06/09/2021

Subject Name:Geotechnical Engineering

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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Explain three phase of soil. **03**
- (b) Explain soil formation in Geological cycle. **04**
- (c) What is the scope of geotech engineering in the field of civil engineering? **07**
- Q.2** (a) What is particle size distribution? **03**
- (b) A soil has a water content of 10% and a unit weight of 20 kN/m³. If the gravity of soil mass is 2.70, determine the dry unit weight, void ratio and degree of saturation. **04**
- (c) What do you mean by consistency of soil? How is it determined? **07**
- OR**
- (c) Explain the grain size distribution by using sieve analysis method. **07**
- Q.3** (a) What is plasticity index? **03**
- (b) Discuss the IS classification system. **04**
- (c) State and explain factors affecting permeability. **07**
- OR**
- Q.3** (a) Distinguish between free water and held water. **03**
- (b) Describe the spring analogy for primary consolidation. **04**
- (c) Enumerate the factors affecting bearing capacity and explain in detail. **07**
- Q.4** (a) Describe triaxial shear test.. **03**
- (b) In a consolidated drained triaxial test, a specimen of clay fails at a cell pressure of 60 kN/m². The effective shear parameters are $C' = 15$ kN/m², and $\phi' = 20^\circ$, Determine the compressive strength. **04**
- (c) What is Mohr's strength theory? Sketch typical strength envelope for a clean sand **07**

OR

- Q.4 (a) What are the different types of earth pressure? Give examples. 03
(b) Write short note on Earth pressure at rest. 04
(c) Discuss the assumption in the Rankine's theory of earth pressure. 07
- Q.5 (a) Describe the method of locating centre of critical slip circle. 03
(b) What are the different types of the slope failure? 04
(c) Write a short note on 'Swedish circle method'. 07

OR

- Q.5 (a) State different types of the shallow foundation. Explain any one with neat sketch. 03
(b) Write short note on group action and efficiency of pile group. 04
(c) Describe plate load test with neat sketches. 07
