

Enrollment No: _____

Exam Seat No: _____

C. U. SHAH UNIVERSITY

Summer Examination-2020

Subject Name : Geotechnical Engineering - I

Subject Code : 4TE05GTE1

Branch: B.Tech (Civil)

Semester : 5

Date : 02/03/2020

Time : 10:30 To 01:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1	Define the following terms:	(14)
	1 Seepage velocity	14
	2 Degree of saturation	
	3 Specific gravity	
	4 Relative density	
	5 Loess type	
	6 Maximum dry density	
	7 Well graded soil	
	8 Sensitivity	
	9 Activity Index	
	10 Calcareous soil	
	11 Shrinkage limit	
	12 Sensitivity	
	13 Flownet	
	14 Aquifuge	

Attempt any four questions from Q-2 to Q-8

Q-2	Attempt all questions	(14)
	(a) What are the factors affecting compaction? Discuss in details.	07
	(b) Write short notes on the following structure with neat sketch:	07
	(i) honeycomb structure (ii) Flocculent structure	
Q-3	Attempt all questions	(14)
	(a) Derive Laplace equation for 2-D flow through soil.	08
	(b) Explain sand replacement method to find field density of soil.	06
Q-4	Attempt all questions	(14)
	(a) Describe the spring analogy theory for primary consolidation. What are the uses of it?	07
	(b) State and explain factors affecting permeability.	07



- Q-5** **Attempt all questions** **(14)**
- (a) Explain, how the results of consolidation test can be used to predict the settlement of a structure caused by the consolidation of clayey soil below foundation. **07**
- (b) Explain Mohr's Coulomb theory. **07**
- Q-6** **Attempt all questions** **(14)**
- (a) The plastic and liquid limit of a soil is 47 % and 33 % respectively. The percentage volume change from the liquid limit to dry state is 44 % of the dry volume. Similarly, the percentage volume change from plastic limit to the dry state is 29 % of the dry volume. Determine the shrinkage limit and shrinkage ratio. **07**
- (b) Write differences between compaction and consolidation. **07**
- Q-7** **Attempt all questions** **(14)**
- (a) Enumerate the various tests for finding the shear strength of soil and explain any one test of shear strength with its sketch. **07**
- (b) Define Particle size distribution curve for different types of soils and also write down the advantages of using semi-log plot for the particle size distribution. **07**
- Q-8** **Attempt all questions** **(14)**
- (a) Enlist the various soil classification systems and explain the textural classification system in details. **08**
- (b) Calculate the value of permeability of a sample of 6 cm height and 50 cm² cross-sectional area, if a quantity of water of 430 cm³ flows down in 10 minutes under an effective constant head of 40 cm. on oven drying the test specimen weighed 498 g. Assume $G=2.65$, calculate the discharge velocity and seepage velocity of water. **06**

