Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Geotechnical Engineering - I

Subject Code : 4TE05GTE1 **Branch: B.Tech (Civil)**

Semester : 5 **Date : 27/03/2018** **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.

Q-1 **Attempt the following questions:** **(14)**

a)	A simple soil sample has porosity of 30 % and Specific gravity 2.7. Find its void ratio.	**(1)**
b)	As per IS classification. Write the size of gravel.	**(1)**
c)	Define Aeolian Soils.	**(1)**
d)	Give the definition of Degree of saturation.	**(1)**
e)	What do you mean by Specific gravity?	**(1)**
f)	What is sensitivity of soil?	**(1)**
g)	What is toughness index?	**(1)**
h)	What is the mass of hammer in standard proctor test?	**(1)**
i)	What is hygroscopic water?	**(1)**
j)	What is Residual soil?	**(1)**
k)	Define seepage.	**(1)**
l)	Define compaction.	**(1)**
m)	Define angle of internal friction.	**(1)**
n)	Define porosity.	**(1)**

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

Q-2 **Attempt all questions** **(14)**

(a)	Define specific gravity, void ratio and establish relation between saturated density, specific gravity, degree of saturation, void ratio and density of water.	**(7)**
(b)	State Stoke's law. What is its use in sedimentation analysis? What are its Limitations?	**(7)**

Q-3 **Attempt all questions** **(14)**

(a)	Write a comparative note on Coarse grained skeleton structure and cohesive matrix structure.	**(4)**

(b) Classify the given soil sample basis on particle size distribution curve. **(3)**

G =20 %

% N	10	20	30	60	90	100
D_{mm}	1.28	2.98	3.07	4.80	4.92	5.25

S = 78 % , F = 02 %

(c) Write a note on Structure of The Soil. **(7)**

Q-4 **Attempt all questions** **(14)**

(a) Describe differences between compaction and consolidation of soil. **(7)**

(b) Explain standard proctor test to determine MDD and OMC in the laboratory. **(7)**

Q-5 **Attempt all questions** **(14)**

(a) Derive Laplace equation for 2-D flow through soil. **(7)**

(b) Enlist the various soil classification systems and explain the textural classification. **(7)**

Q-6 **Attempt all questions** **(14)**

(a) Determine effective and neutral stresses at a depth of 15 m below the ground surface for the following condition: water table 3.0 m below ground surface, G_s= 2.65, e = 0.7, average moisture content = 5%. **(7)**

(b) What is capillary water? Discuss capillary rise in soils. **(7)**

Q-7 **Attempt all questions** **(14)**

(a) Explain field compaction methods. **(4)**

(b) A soil sample has a liquid limit of 25% , plastic limit 15% and flow index of 12.5%. Natural water content of soil is 20%. Determine: **(3)**

i) Plasticity Index

ii) Liquidity Index

iii) Toughness index

(c) State and explain factors affecting permeability. **(7)**

Q-8 **Attempt all questions** **(14)**

(a) During Consolidation test, the void ratio is determined to decrease from 0.95 to 0.55 under the Stress increment of 1.0 kg/cm2 to 2.5 kg/cm2. Compute coefficient of compressibility, coefficient of volume compressibility & compression index. **(7)**

(b) Describe Mohar's strength theory. **(7)**