Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name : SOIL MECHANICS

Subject Code : 2TE04SME1 **Branch :**CIVIL

Semester : IV **Date :**20/11/2015 **Time :** 2:30 To 5:30 **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)**

(MCQ Type of Questions=1 mark*14=14 marks)

a) Pycnometer is used for finding_____ 1
(A) specific gravity (B) water absorption (C) A & B both (D) none of these

b) Soil transported and deposited by gravity are called_____ 1
(A) moorum (B) black cotton soil (C) Clay (D) Colluvial soil

c) What Is the size of gravel as per IS classification of soil? 1
(A) 0.075mm to 4.75mm (B)2.0mm to 4.75mm (C) 4.75 mm to 80mm (D) none of these

d) Ratio of volume of voids to the volume of solids is known as_____ 1
(A) porosity (B) void ratio (C) specific gravity (D) water absorption

e) Velocity of flow is directly proportional to the hydraulic gradient is known as _____ 1
(A) Darcy's law (B) coulomb's law (C) mohr-coulomb theory (D) none of these

f) If the soil is fully saturated, compression of soil occurs due to expulsion of water from the voids under static pressure. This process is known as _____ 1
(A) compaction (B) seepage (C) consolidation (D) percolation

g) Angle of internal friction depends upon, 1
(A) shape of particle (B) roughness of the surface
(C) denseness of soil (D) all of the above

h) Saturated clays are _____ 1
(A) purely cohesive (B) cohesive frictional soil
(C) cohesionless soil (D) none of these

i) Rollers ideally suited for compaction of cohesive soils are 1
(A) smooth wheel roller (B) vibratory roller
(C) pneumatic tyred roller (D) sheep foot roller

j) Which of the following is quick test? 1
(A) UU test (B) CU test (C) CD test (D) none of the above

k) The sum of liquidity index and consistency index is always equal to
(A)1.5 (B) 0 (C)2.5 (D) 1.7

	l)	The net ultimate bearing capacity of a soil is 30t/m^2 and density 1.9 t/m^3. The safe bearing capacity at 1.5 m below ground surface taking FOS = 2.5 will be_____ (A) 12 (B) 14.85 (C) 18 (D) 20.25	1
	m)	According to terzaghi's theory, the net ultimate bearing capacity of clay is given by_____ (A) CN_q (B) CN_c (C) 1.5 CN_q (D) 2.25 CN_c	1
	n)	Raft foundation is not suitable (A) when the structure loads are heavy (B) when columns and walls are close to each other. (C) when there is large variation in the loads on individual columns. (D) none of the above	1

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

Q-2		**Attempt all questions**	**(14)**
	a)	What do you understand about disturbed and undisturbed soil sample? How would you obtain undisturbed sample?	**7**
	b)	Write short note on liquefaction of soil and explain factors affecting to liquefaction	**7**
Q-3		**Attempt all questions**	**(14)**
	a)	Explain plate load test with neat sketch.	**7**
	b)	Write short note on pile driving	**7**
Q-4		**Attempt all questions**	**(14)**
	a)	An undisturbed soil sample has volume 200 cm^3 and weighte 300 gm after oven drying for 24 hours, the weight reduced 280 gm. Find its water content, bulk density and dry density.	**7**
	b)	Derive the functional relation e = $\frac{wG}{S_r}$.	**7**
Q-5		**Attempt all questions**	**(14)**
	a)	Describe the method for determination of plastic limit of a soil	**7**
	b)	What do you mean by consistency of soils ? define following terms liquid limit, plastic limit and shrinkage limit.	**7**
Q-6		**Attempt all questions**	**(14)**
	a)	Explain the method of finding out MDD and OMC with the help of compaction curve.	**7**
	b)	List out factors affect to compaction and explain in details.	**7**
Q-7		**Attempt all questions**	**(14)**
	a)	Following observations are made during the falling head laboratory test. (I) diameter of soil specimen = 100 mm (II) length of the soil specimen = 125 mm (III) initial water head = 120 mm (IV) final water head = 50mm (V) diameter of stand pipe = 12 mm (VI) time for water head to fall = 250 seconds. Calculate coefficient of permeability of soil sample in appropriate SI unit.	**7**
	b)	Describe the spring analogy theory for primary consolidation.	**7**

Q-8		**Attempt all questions**	**(14)**
	a)	Explain Mohr circle method for calculating shear strength envelops for cohesion and un-cohesion soil.	**7**
	b)	Explain advantage and limitations of direct shear test.	**7**