Code No: RT31011   **R13**   SET - 1

III B. Tech I Semester Supplementary Examinations, October/November -2018
GEOTECHNICAL ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1	a)	Explain the compaction curve.	[4M]
	b)	Draw the gradation curves separately of a well graded soil and gap graded soil.	[4M]
	c)	Explain quick sand condition.	[3M]
	d)	What is the purpose of a Newmark's chart?	[4M]
	e)	Write the relationship between the time factor and degree of consolidation, when the degree of consolidation is greater than 60%?	[4M]
	f)	How is the torque determined in a vane shear test?	[3M]

PART -B

2	a)	Write a note on clay minerals.	[6M]
	b)	The moist unit weight of a soil is 16.50kN/m^3. Given that the water content= 15% and specific gravity of soil solids = 2.70, find the dry unit weight, porosity, degree of saturation the mass of water that must be added to reach full saturation.	[10M]
3	a)	Explain the consistency limits.	[6M]
	b)	A certain soil has 99% by weight finer than 1.0mm, 80% finer than 0.10mm, 25% finer than 0.01mm, 8% finer than 0.001mm. Sketch the grain-size distribution curve and determine the percentage of sand, silt and clay fractions as per IS nomenclature.	[10M]
4	a)	What are the characteristics and uses of flow nets?	[8M]
	b)	The discharge of water collected from a constant head permeameter in a period of 15 minutes is 400ml. The internal diameter of the permeameter is 6.0cm and the measured difference in heads between the two gauging points 15.0cm apart is 40.0cm. Calculate the coefficient of permeability?	[8M]
5	a)	Explain in detail the construction of Newmark's chart with an influence value of 0.002.	[8M]
	b)	A ring foundation is of 3.0 m external diameter and 2.0 m internal diameter. It transmits a uniform pressure of 90.0 kN/m^2. Calculate the vertical stress at a depth of 1.50 m directly beneath the centre of the loaded area.	[8M]

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6 a) Define pre consolidation pressure. Describe a suitable procedure for determining the pre consolidation pressure. [8M]

   b) A clay layer 5.0m thick has double drainage. It was consolidated under a load of 127.50kN/m^2. The load is increased to 197.50kN/m^2. The coefficient of volume compressibility is 5.79 x 10^{-4} m^2/kN and value of k = 1.60 x 10^{-8} m/min. If the test sample is 2cm thick and attains 100% consolidation in 24 hours, what is the time taken for 100% consolidation in the actual layer? [8M]

7 a) Explain the shear characteristics of sand and normally loaded clays? [8M]

   b) The following results were obtained from a direct shear test on a sandy clay sample. [8M]

Normal load (N)	Shear load providing ring reading (division)
360	13
720	19
1080	26
1440	26

   If the shear box is 60 mm square and the proving ring constant is 20 N per division, estimate the shear strength parameters of the soil. Would failure occur on a plane within this soil at a point where the normal stress is 320 kN/m^2 and the corresponding shear stress is 138 kN/m^2?

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