

**III-SEM/CIVIL//2019(W)/(New)**  
**TH-2-GEOTECHNICAL ENGINEERING**

Full Marks: 80

Time : 3 Hours

Answer any Five Questions including Q No. 1 & 2

Figures in the right hand margin indicates marks

1.	Answer ALL the questions: a) What do you mean by zero air void line? b) What is coefficient of curvature? c) Define safe bearing capacity. d) What is passive earth pressure? e) Define quick sand condition. f) Define OMC & MDD. g) What do you mean by index property of soil? h) What is density index? i) Write the expression for shear strength as per coulomb's theory. j) What is group index?	(2x10)
2.	Answer any SIX questions: a) Describe about textural classification of soil. b) Explain Mohr-Coulomb's failure theory. c) Derive the relation between e, G, W & S. d) Write down the difference between compaction & consolidation. e) Define Darcy's law. What are the factors affecting permeability? f) Discuss about passive earth pressure. g) What is flow net? State the properties of flow net.	(5x6)
3.	Calculate the coefficient of permeability of a soil sample 6cm in height and 50cm <sup>2</sup> in sectional area, if a quantity of water equal to 430 cc passed down in 10minutes under a constant head of 40cm. On oven drying, the specimen weighed 4.98N. Taking G= 2.65, calculate the seepage velocity.	10
4.	What do you mean by wet mechanical analysis? Give a brief description about pipette method.	10
5.	A clay layer, whose total settlement under a given load is expected to be 250mm, settles by 50mm in 15 days after the application of a load increment. How many days will be required for it to reach a settlement of 125mm? How much settlement will occur in 300 days? The layer has double drainage.	10
6.	What will be the net safe bearing capacity and gross safe bearing capacity of sand having $\phi = 36^\circ$ and effective unit weight 1.8 tonnes/m <sup>3</sup> under following cases: <a href="http://www.sctevtonline.com">http://www.sctevtonline.com</a> (i) 1m wide strip footing (ii) 1m x 1m square footing Consider the footings are placed at a depth of 1m from ground surface and water table is at greater depth. Assume a factor of safety of 3.0. Use Terzaghi's theory and take $N_q = 47$ and $N_r = 43$ .	10
7.	What are the types of shear failures? Describe with neat sketches.	10

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