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MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
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VI SEMESTER B.TECH. (CIVIL ENGINEERING)
END SEMESTER EXAMINATIONS, APRIL/MAY 2018
SUBJECT: GROUND IMPROVEMENT TECHNIQUE [CIE 4010]
REVISED CREDIT SYSTEM
(26 /04 / 2018)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitably assumed.

Q. No	Question Statement	Marks	CO
1A.	Explain the objectives and need for ground improvement techniques.	3	CO1
1B.	Discuss the factors considered for selection of ground improvement technique.	3	CO1
1C.	In a site it is proposed to construct G+3 storied residential building. The soil investigation reveals that the site has black cotton soil up to 3m depth. List out the possible problems that can be encountered. Discuss each possible alternative with proper reasons to overcome the problems.	4	CO5
2A.	Name and discuss the suitability of static rollers used for shallow compaction.	3	CO2
2B.	Explain vibro-replacement method of soil improvement with the help of a neat sketch. When this method is preferred and what are the limitations?	4	CO2
2C.	Explain the construction sequence used in lime stabilization. Also discuss the effect of lime column on adjacent soil.	3	CO2
3A.	Explain stabilization using i) Chrome lignin ii) Sodium silicate	3	CO2
3B.	Explain the process of dynamic compaction. Differentiate between heavy tamping and dynamic compaction.	4	CO2
3C.	Discuss in brief the different types of ground freezing methods.	3	CO3
4A.	Compute the average degree of consolidation for soft clay after 10months of applying surcharge of 110kN/m ² for the following cases. i) No sand drains ii) Sand drains of diameter 250mm at spacing 2.2m arranged in square pattern Given thickness of soft clay layer is 12m (double drainage case), C _v =0.5m ² /year and C _{vr} = 1.5m ² /year. C _c = 0.75. What is the change in degree of consolidation if the sand drains are arranged in triangular pattern?	4	CO3

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4B.	Determine the minimum number of wells required for a circular excavation of 36m diameter to lower the water level by a minimum of 5m below the existing ground water level. The unconfined water bearing layer is 12m thick and is located above an impermeable stratum. The well radius is 0.15m and permeability of the water bearing layer is 10^{-4} m/s.	2	CO3
4C.	What is the necessity of instrumentation during preloading? List the instruments used and state the purpose of each during preloading.	4	CO3
5A.	Explain ascending and descending stage grouting. Differentiate between one shot and two shot grouting systems.	4	CO4
5B.	With neat sketch explain the components of reinforced earth.	3	CO4
5C.	What are geosynthetics? Explain in detail the application of geosynthetics in road projects.	3	CO4