Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent institution of MAHE, Manipal)

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**
4B.	Determine the minimum number of wells required for a circular excavation of	**2**	**CO3**

	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.		
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.	**3**	**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**