

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RCI6D002

6th Semester Regular / Back Examination: 2022-23

SUBJECT: Ground Improvement Techniques

BRANCH(S): C&EE,CIVIL

Time: 3 Hours

Max Marks: 100

Q.Code: M314

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

Part-I

Q1 Answer the following questions:

(2 x 10)

- Define the coefficient of surcharge.
- Give applications of soil-lime columns.
- How is vacuum consolidation different from preloading and surcharging?
- What are the advantages of preloading methods?
- What is bored compaction?
- Explain what you mean by the depth of the active zone.
- What is dynamic compaction?
- Name various grouting materials.
- Enumerate the major functions of geo-synthetics.
- Define transmissivity of geotextile.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Explain various parameters on which the groutability of soil mass depends.
- Discuss the potential use of vertical drains. What are the commonly adopted methods of installing vertical drains?
- Describe the method of densification of loose cohesionless deposits by compaction pile technique. Give a brief comparison between densification by vibro-flotation.
- How do you estimate the load carrying capacity of stone columns? Explain the different modes of failure in a stone column.
- Explain how the consolidation rate can be accelerated with sand drains. Describe the method of installation of sand drains.
- Discuss using an impact roller to densify the soil to carry the earthquake loads.
- Explain the use of dispersants in soil stabilization. Discuss the effects of dispersants on various soil properties.

- h) Describe the mechanism of force transfer from soil to reinforcement with a neat sketch.
- i) Discuss various soil stabilization techniques in brief.
- j) Discuss the steps for analysis and design of reinforced retaining walls.
- k) Describe the procedure of compacting granular soil by blasting. Also, explain the critical points to be followed while adopting blasting.
- l) Describe Uniaxial and bi-axial geogrids

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 a) What are geotextiles? What design considerations should be kept in mind while using geotextiles in (i) Retaining walls (ii) Slopes (8)
- b) Describe the factors that affect the performance of soil cement. Give the construction sequence of a soil-cement sub-grade. (8)
- Q4 a) Discuss various dewatering techniques used for ground improvement. (8)
- b) The soil from a borrow area, having an average in situ unit weight of 15.5 kN/m^3 and water content of 10 %, was used to construct an embankment (finished volume $6,000 \text{ m}^3$). In half of the embankment, the dry unit weight was slightly lower due to improper control during rolling. If the dry unit weight in the two parts is 16.5 kN/m^3 and 16 kN/m^3 , find the volume of borrow area soil used in each part and the amount of soil used. (8)
- Q5 a) Explain the blasting method of vibro- compaction in detail along with sketches of installation and spacing of explosives. (8)
- b) Explain the separation and filtration function of geotextiles. Mention the applications based on these functions. (8)
- Q6 a) Describe in detail various material composites required in the construction of any reinforced soil structure. Give applications of soil reinforcement for ground improvement. (8)
- b) Explain the thermal methods of soil stabilization (8)