

Registration No.:

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

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RCI6D002

6th Semester Regular/Back Examination: 2024-25
SUBJECT: GROUND IMPROVEMENT TECHNIQUE
BRANCH(S): C&EE, CIVIL
Time: 3 Hours
Max Marks: 100
Q.Code: S082

Answer Question No.1 (Part-I) 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 ground improvement and mention two situations where it is necessary.
- What is the purpose of dewatering in ground improvement works? Name two dewatering methods.
- List any two differences between compaction and consolidation.
- What is a vibroflotation technique, and where is it most effective?
- State the importance of stone columns and mention one limitation.
- What are the desirable properties of an ideal grouting material?
- Mention two advantages of using geosynthetics in reinforced soil retaining walls.
- What is meant by the term 'active zone' in expansive soil treatment?
- Differentiate between geo-textiles and geo-grids with one example each.
- Write two limitations of ground improvement techniques.

Part-II

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

- Explain the principles and procedures of mechanical stabilization of soil. What are its limitations?
- Discuss the method of lime stabilization of cohesive soils. Explain how it affects the engineering properties of soil.
- What are the different types of geosynthetics? Describe the functions and applications of geotextiles and geogrids.
- Explain the working principle, installation method, and applications of stone columns in ground improvement.
- Describe various dewatering techniques used at construction sites. Compare well-point and deep well systems.

- f) What is dynamic compaction? Explain the factors influencing its effectiveness and the types of soils it can be used for.
- g) Describe the behavior of expansive soils and list the methods used for their improvement. Explain the use of moisture barriers.
- h) Classify different types of grouting techniques. Explain the selection criteria for grout material based on soil type.
- i) What are reinforced earth retaining walls? Describe their components and explain the role of geosynthetics in such walls.
- j) Explain preloading and vertical drains as a method of soil improvement. How do they accelerate soil consolidation?
- k) Compare the different ground improvement methods used for cohesionless and cohesive soils. Give examples.
- l) Discuss the applications of ground improvement techniques in infrastructure projects such as highways, embankments, and foundations.

Part-III

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

- | | | |
|-----------|--|-----------------|
| | | (16 x 2) |
| Q3 | Discuss the selection criteria for different ground improvement techniques in various soil types (cohesive, cohesionless, expansive, soft clays). Support your answer with flowcharts and decision-making examples. | (8 + 8) |
| Q4 | Compare and contrast stone column and dynamic compaction methods in terms of mechanism, design approach, equipment, installation, field applications, limitations, and quality control measures. | (16) |
| Q5 | Evaluate the use of geosynthetics in reinforced earth retaining walls. Explain their design, construction steps, advantages over conventional retaining walls, and performance in seismic or flood-prone areas. | (6 + 10) |
| Q6 | Elaborate on the dewatering techniques used in construction projects in water-logged areas. Explain the design, working principle, advantages, and limitations of each method. Also, discuss their impact on adjacent structures and soil. | (5+6+5) |