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)**

a) Define ground improvement and mention two situations where it is necessary.
b) What is the purpose of dewatering in ground improvement works? Name two dewatering methods.
c) List any two differences between compaction and consolidation.
d) What is a vibroflotation technique, and where is it most effective?
e) State the importance of stone columns and mention one limitation.
f) What are the desirable properties of an ideal grouting material?
g) Mention two advantages of using geosynthetics in reinforced soil retaining walls.
h) What is meant by the term ‘active zone’ in expansive soil treatment?
i) Differentiate between geo-textiles and geo-grids with one example each.
j) 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)**

a) Explain the principles and procedures of mechanical stabilization of soil. What are its limitations?
b) Discuss the method of lime stabilization of cohesive soils. Explain how it affects the engineering properties of soil.
c) What are the different types of geosynthetics? Describe the functions and applications of geotextiles and geogrids.
d) Explain the working principle, installation method, and applications of stone columns in ground improvement.
e) 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)**