Roll No……..….. **Total No. of Printed Pages: 1**

Total No. of Questions: [09]

B. Tech Civil Engg. (Semester – 6th)

GROUND IMPROVEMENT TECHNIQUES

Subject Code: BCIED1654

Paper ID: [19110733]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) What are the primary factors influencing soil distribution in India?
b) Define soil compaction and explain its importance in geotechnical engineering.
c) What is the purpose of using vibro-compaction methods in soil treatment?
d) What is the principle of the well-point method in dewatering?
e) Briefly explain the function of well screens in a dewatering system.
f) What is soil consolidation, and why is it important in foundation design?
g) Name two types of grouts used in grouting methods for soil stabilization.
h) What are the main objectives of seepage control in geotechnical engineering?
i) How does lime stabilization improve the properties of soil?
j) What are geosynthetics, and how are they used in soil reinforcement?

Section – B **(5 marks each)**

Q2. Explain the factors affecting the alteration of ground after formation, both natural and man-made.

Q3. Describe the moisture-density relations and compactive efforts in the context of soil compaction.

Q4. What are the key considerations in designing a dewatering system for a construction site? Explain the well-point method and how to compute the discharge in such systems.

Q5. Discuss the principles of grouting and injection methods. What are the different types of grouts, and how do they contribute to soil stabilization and seepage control?

Q6. Explain the chemical methods of soil stabilization. How do lime and cement stabilization differ from the use of admixtures and polymers?

Section – C **(10 marks each)**

Q7. Compare the characteristics of black cotton soils (expansive) and lateritic soils. How does soil type influence the choice of compaction and drainage methods in geotechnical processes?

Q8. Explain the role of vertical drains in accelerating soil consolidation. How do electro osmosis and vacuum compression methods assist in improving soil stability?

Q9. Discuss the mechanical and chemical methods used for soil stabilization. What are the advantages of using stone column piles and thermal slurry trenches in stabilizing weak soils?