Code No: 157BV **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, January/February - 2023
GROUND IMPROVEMENT TECHNIQUES
(Civil Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

1.a)	Write the importance of consistency index in soil modification.	[2]
b)	List out any three objectives of ground improvement.	[3]
c)	What is shallow compaction?	[2]
d)	When do you prefer stone column technique?	[3]
e)	What is dewatering?	[2]
f)	Write the importance of vertical drains in improvement of soft clay.	[3]
g)	List out various admixtures used in stabilization of soil.	[2]
h)	Write about ground freezing.	[3]
i)	When do you prefer soil nailing?	[2]
j)	List out the uses of ground anchors.	[3]

PART - B

(50 Marks)

2.a) How do you say a soil is required to be modified? Explain.
b) What is reclaimed soil? What are the characteristics of these soils? [5+5]

OR

3.a) Generally we do conduct grain size analysis and Atterberg limits tests in the laboratory. Discuss their importance in ground improvement.
b) Discuss various strategies developed to optimize the densification process of soil. [5+5]

4. When do you prefer Vibro-Compaction and Dynamic Compaction techniques? Discuss with neat sketches how soil is improved by these methods. [10]

OR

5.a) What is the principle of blasting? Discuss how soil is improved by the blasting method.
b) What are compaction piles? Discuss how soil is improved by the method of compaction piles. [5+5]

6. What are the main functions of Geo-textile and Geo-grid and explain them in brief? Also explain the following:
a) Physical properties of Geo-textiles
b) Burst strength of geo-textile
c) Durability of geo-textile
d) Seam strength of geo-textile. [10]

OR

7.a) Discuss with neat sketches the following pre-drainage methods: i) Well points and ii) Vacuum wells.
b) Discuss any two selection criteria of filler material around drains. [5+5]

8.a) What do you understand soil stabilization by grouting? Explain in detail various field of applications of grouting.
b) Describe the equipment used in grouting technique. [5+5]

OR

9.a) What is bituminous stabilization? Discuss the necessary requirements to achieve best results in soil-bitumen stabilization.
b) Discuss the behavior of liquid limit and plastic limit of clay soil when treated with lime. [5+5]

10.a) Explain the basic mechanisms and applications of soil nailing.
b) Write the applications and advantages of reinforced earth with sketches. [5+5]

OR

11. Stating the assumptions, explain design steps of reinforced earth wall with clear illustrations. [10]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, July/August - 2022
GROUND IMPROVEMENT TECHNIQUES
(Civil Engineering)

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
- - -

1.a) What are difficult soils? List the problems posed by the difficult soils.
b) Explain how you identify a given soil site needs improvement? [7+8]

2.a) Discuss the importance of laboratory compaction and Unconfined Compression Stress tests in the improvement of ground.
b) List out different methods of improvement adopted for soft soils and loose soils. Discuss the practical relevance of SPT test in soil site improvement. [7+8]

3. What is consistency of clay? In what consistency of clay soil, the stone columns are so effective? Discuss installation and load carrying aspects of stone columns in clay. [15]

4.a) Discuss with clear illustrations any one method of improvement of cohesionless soil.
b) Discuss how do you ensure quality control of improved cohesionless soil? [7+8]

5.a) How pore water pressure is reduced in clay by preloading? Explain with neat sketch the preloading technique.
b) Write the principle of electro-kinetic method. Explain its applicability in the ground modification. [7+8]

6. What are the various vertical drains? Discuss the principle of sand drain method and explain the procedure with suitable sketches how the soft soils are improved by sand drains method. In what respects the method of sand wicks differ from sand drains. [15]

7.a) Explaining in brief different grouting techniques, write their suitability for improvement of different soils.
b) Describe the equipment used in grouting technique in soil improvement. [7+8]

8. What is reinforced earth structure? Discuss various materials and their selection criteria which are required for construction of reinforced earth structure. [15]

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Code No: 157BV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, February/March - 2022
GROUND IMPROVEMENT TECHNIQUES
(Civil Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions carry equal marks
- - -

1.a) List the objectives of compacting soil and explain the purpose of compaction.
b) What are the strategies developed for optimizing the densification process of ground? [8+7]

2.a) Discuss the instances when do we recommend ground improvement?
b) Write the objectives and scope of ground improvement. [8+7]

3. Discuss the method of vibroflotation for compacting the granular soils under the head, vibration at depth. In what respects the compaction piles differ from this. [15]

4. What are the in situ conditions which seek ground improvement in clays? Discuss the following ground improvement methods with clear mechanisms:
a) Stone columns b) Lime columns. [15]

5.a) Sand drains, sand wicks and geo-drains are used under similar soil conditions for ground improvement. Compare their relative merits and demerits. Which one do you prefer?
b) What is preloading? Discuss its objective. [9+6]

6.a) Explain the method of improvement of soft soils by preloading along with vertical drains with neat sketches.
b) Explain in detail with neat sketch the electro-kinetic approach of dewatering. [8+7]

7.a) What is grouting? Explain in detail the method of compaction grouting.
b) Explain in detail various field of applications of grouting. [8+7]

8.a) Discuss the practical relevance of (i) Ground anchors and (ii) Rock bolting.
b) Discuss the effectiveness of reinforcement with strip and geogrid reinforced soil. [8+7]

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