

R16

Code No: 137CZ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, December - 2019

GROUND IMPROVEMENT TECHNIQUES

(Civil Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) Why stiff clay has low compressibility? [2]
- b) How do you estimate density index of sand? [3]
- c) What is bottom feed and top feed method of stone column? [2]
- d) Why blasting is common in cohesionless soils? [3]
- e) What are the techniques to reduce pore water from soil? [2]
- f) How do you install wick drains? [3]
- g) Why lime is effective in controlling adverse behavior of swelling soil? [2]
- h) What are the types of grouting? Write any two applications of grouting. [3]
- i) What are the applications of guniting? [2]
- j) Why reinforced earth technology has gained popularity? [3]

PART - B

(50 Marks)

- 2.a) Why soils are required to be modified? List out various ground modification methods. [5+5]
 - b) Why collapsible soils undergo sudden compression upon wetting? Discuss with clear illustrations. [5+5]
- OR
- 3.a) Discuss the applicability of various ground modification methods based on the soil grain size. [5+5]
 - b) Why dynamic compaction is not suggestible to use in modification of saturated sand? Explain the objectives of dynamic compaction. [5+5]
- 4.a) What is shallow and deep compaction? Discuss the cases when deep compaction technique is used for soil modification. [5+5]
 - b) What is compaction control? Discuss any one of the approaches of in-situ compaction control. [5+5]
- OR
- 5.a) Why dynamic compaction is different than vibro compaction? Discuss the limitations of both the techniques. [5+5]
 - b) Discuss in detail the factors affecting shallow compaction. [5+5]

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- 6.a) When you propose electro kinetic dewatering method? Discuss its working principle with illustrations. [5+5]
b) What are the benefits of geosynthetics in dewatering of soil? [5+5]

OR

- 7.a) Preloading alone cannot remove the pore pressure quickly. How you make fast removal of pore pressure from soil. Discuss with neat sketches. [5+5]
b) Discuss the benefits of traditional dewatering methods. [5+5]

- 8.a) Discuss the advantages of grouting techniques in soil modification.
b) What is shotcreting? How you ensure quality control of shotcreting. Discuss. [5+5]

OR

- 9.a) Why different grout materials available in the market? Discuss their applicability.
b) Discuss the instances where Jet grouting is commonly used in ground modification. [5+5]

- 10.a) Why reinforcement is used in ground modification? Discuss the construction of grid reinforced soil.
b) For effectiveness of soil reinforcement discuss the required properties of soil. [5+5]

OR

- 11.a) Discuss various reinforced materials that are used in soil reinforcement and also write their required properties.
b) Write a note on the following in terms of ground modification applications: (i) rock bolting and (ii) rock anchor. [5+5]

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