

Code No: 07A70109

R07

SET-1

B.Tech IV Year I Semester Examinations, December-2011
GROUND IMPROVEMENT TECHNIQUES
(CIVIL ENGINEERING)

Time: 3 hours**Max. Marks: 80**

Answer any five questions
All questions carry equal marks

- 1.a) List various well point dewatering systems and explain their suitability for different soils.
- b) Discuss briefly the important points to be considered in design of dewatering systems. [8+8]
- 2.a) Describe in detail the grouting with 'soil-cement mixes', 'cement', and 'lime' grouts.
- b) Explain any three engineering applications of grouting which proves to be effective. [8+8]
- 3.a) Discuss the principles of ground improvement in cohesive and cohesionless soils.
- b) Discuss the effectiveness of both vibroflotation and compaction piles for compacting the granular soils. [8+8]
4. Discuss the various characteristics of problematic soils. Explain working principles and soil improvement mechanism using 'Rammed Stone Column' and 'Vibro-Replacement' methods. [16]
5. Discuss the chemical reactions that take place in lime treated soils and write the benefits of lime stabilization in soil. Explain the engineering benefits of cement stabilization. [16]
6. Explain the basic mechanism of reinforced earth. Discuss the various design formulae in reinforced earth wall. [16]
- 7.a) What are geotextiles? Write a note on common nomenclature of geosynthetics.
- b) Discuss with clear illustrations how geotextiles are useful in earth dam construction. [8+8]
8. Discuss the problems associated with expansive soils on building foundations. Explain how swelling pressure is estimated using constant volume method and from consolidation test. [16]

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SET-2

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Answer any five questions
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- 1.a) Explain in detail about the dewatering techniques used in cohesive soils.
- b) Discuss the salient points in foundation drains and blanket drains. [8+8]

2. List the various grouting techniques depending upon the stabilizer used. Explain compaction grouting, penetration grouting and fracture grouting with the neat sketches. [16]

- 3.a) Explain with the neat sketches mechanism and principle of Dynamic Compaction Techniques.
- b) Discuss the important formulae used in the improvement of soft clay deposits using stone columns. [8+8]

4. With neat sketches explain in-situ densification methods in cohesive soils. Discuss how the stress history of a soil deposit affects its suitability for preloading with vertical drains. [16]

5. What do you understand about the bituminous stabilization? Explain how the Engineering Properties of soil are changing by the process of bituminous stabilization. Discuss how calcium chloride and sodium chloride modify the soil characteristics. [16]

6. What is soil reinforcement? List various materials to be used in soil reinforcement. Discuss the internal stability aspects of reinforced earth walls. [16]

7. List the types of geotextiles. Explain with clear illustrations, the philosophy involved in geo-textile material as reinforcement for improving the bearing capacity of soil. [16]

8. Discuss the field conditions that favor the swelling of soils and write its consequences. Write a note on load carrying mechanism of under-reamed pile. [16]

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SET-3

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Time: 3 hours

Max. Marks: 80

Answer any five questions
All questions carry equal marks

- 1.a) What is dewatering? Explain its importance in civil engineering works.
- b) Discuss in detail with suitable examples the field conditions which necessitate dewatering in soil. [8+8]
- 2.a) What do you understand about soil stabilization by grouting? Explain in detail various field of applications of grouting.
- (b). Describe the equipment used in the grouting technique. [8+8]
3. What are the various vertical drains? Discuss the principle of sand drain method and explain the procedure with suitable sketches how the soils are densified by sand drains method. [16]
- 4(a). Discuss the practical situations which necessitate the ground modification and write the objectives of ground modification.
- (b). Discuss in detail with neat sketches any one of the treatment techniques for improvement of reclaimed soils containing soft clay for deeper depths. [8+8]
5. What are the various admixtures used in stabilization of soil? Discuss the principles and typical gradation specifications of mechanically stabilized bases and surfacing. [16]
- 6.a) What do you understand about the Gabions and explain the applications of Gabions in civil engineering?
- (b). Discuss with neat sketches the components of reinforced earth wall and list the various advantages of reinforced earth structures. [8+8]
- 7.a) List the various applications and functions of geotextiles in Civil engineering works.
- b) Explain the following:
 - (i). Physical properties of geo-textiles
 - (ii) Burst strength of geo-textile. [8+8]
- 8.a) Explain the causes of swelling and shrinkage of soils and discuss the effects of expansive soils on civil engineering structures.
- b) Discuss the un-drained pile construction and its ultimate load carrying capacity aspects. [8+8]

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SET-4

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(CIVIL ENGINEERING)

Time: 3 hours**Max. Marks: 80**

Answer any five questions
All questions carry equal marks

- 1.a) Explain the purpose of 'preloading' and 'vertical drains' with neat sketches.
b) With neat sketches compare and discuss how the dewatering is done using single and multistage well point systems. [8+8]
- 2.a) Write a note on suspension and solution grouting techniques and their effectiveness in improving the in-situ soil conditions.
b) Discuss post grout quality control tests. [8+8]
- 3.a) Explain in detail, how the heavy tamping technique can be used to improve the ground. In what type of soil and ground conditions you recommend this technique.
b) What are the various field compaction equipments? Discuss their suitability for different soils. [8+8]
- 4.a) An expressway is planned to be constructed at a site, where the soil conditions are of soft in nature and the SPT N values are in the order of 2 to 4 for a depth of 10 m from the ground surface. Do suggest the possible treatment technique and explain it clearly.
b) Discuss how field quality control is checked for deep treated clay soils. [8+8]
- 5.a) Discuss the gradation limits for soil – cement stabilization and explain its construction procedure.
b) Explain the Engineering benefits of lime stabilization of soil. [8+8]
- 6.a) Write the advantages and applications of reinforced earth structures with neat sketches.
b) Discuss the external stability aspects in the design of reinforced earth wall. [8+8]
- 7(a). What is the main difference between geo-grid and geo-textile? Explain the field applications of geo-grid and geo-textiles.
(b). Discuss the load transfer mechanism of geo-textile reinforced soil in embankment application. [8+8]
- 8.a) What are the different design considerations of foundations on expansive soils?
b) Discuss the specifications of a soil as cohesive non swelling (CNS) material. [8+8]
