

Code No: C8709

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**M.Tech I - Semester Examinations March/April-2011****GROUND IMPROVEMENT TECHNIQUES****(HIGHWAY ENGINEERING)****Time: 3hours****Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1. a) Explain in detail about the dewatering techniques used in cohesive soils.
 b) Write the salient points in the selection criteria of fill material around drains. [6+6]

2. a) Explain any three engineering application of grouting which proves to be effective.
 b) Describe in detail the grouting with 'soil-cement mixes', 'cement', and 'lime' grouts. [6+6]

3. a) What are the various ground improvement techniques for densifying the loose granular soils existing for deeper depths?
 b) Explain with neat sketches mechanism and principle of Dynamic Compaction Techniques. [6+6]

4. It is proposed to construct a highway project. The soil investigation carried out at this site show that there exist almost uniform strata for the entire proposed construction area. For the soil data presented below, state whether ground treatment is required or not. If so required explain any one of the suitable ground improvement techniques with neat sketches.

Depth (m)	0 to 2 m	2 – 5 m	5 – 15 m	15 – 30m
Natural Water Content (%)	45	35	35	10
Liquid Limit (%)	50	50	60	28
Plastic Limit (%)	25	25	30	12

[12]

5. a) What are the various soil stabilization techniques? Write their suitability with respect to the sub grade type.
 b) Discuss the gradation limits for soil – cement stabilization and explain its construction procedure. [6+6]

6. a) What is soil reinforcement? List various materials to be used in soil reinforcement.
 b) Write the applications and advantages of reinforced earth for highway embankment construction with neat sketches. [6+6]

7. a) What are geotextiles? Write a note on common nomenclature of geosynthetics.
 b) List the various applications and functions of geotextiles in highway engineering works. [12]

8. What is swelling pressure? Explain how swelling pressure is estimated using constant volume method and from consolidation test. Discuss the problems associated with expansive soils in highway construction. [12]