INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad -500 043

CIVIL ENGINEERING

ASSIGNMENT QUESTIONS

Course Name	**:**	**GROUND IMPROVEMENT TECHNIQUES**
Course Code	**:**	**A60127**
Class	**:**	**III B. Tech II Semester**
Branch	**:**	**Civil Engineering**
Year	**:**	**2017 – 2018**
Course Coordinator	**:**	**Dr. Kavita Singh, Associate Professor, Civil Engineering.**
Course Faculty	**:**	**Dr. Kavita Singh, Associate Professor, Ms. J. Hymavathi, Assistant Professor, Civil Engineering**

OBJECTIVES

The objectives of this course are to impart knowledge and abilities to the students to:

I. Apply knowledge on ground improvement techniques such as reinforced earth, drainage and dewatering and grouting techniques on stabilization of expansive soils.
II. Impart knowledge of mechanical modification techniques such as deep compaction, blasting, vibro-compaction, dynamic tamping and compaction Piles.
III. Design of dewatering system which is treated as one of the ground improvement technique.
IV. Familiarize with different ground improvement techniques for cohesive and granular soil.
V. Understand the concept of reinforced earth, geosynthetics and soil reinforcement in ground improvement.

S. No.	QUESTION	Blooms taxonomy level	Course Outcomes
	UNIT - I **INTRODUCTION TO GROUND MODIFICATION**		
1	Explain in detail the role of ground improvement in foundation engineering	Remember	1
2	What are the objectives of ground improvement Technique?	Remember	1
3	What are the various geotechnical problems faced with black cotton soil, laterite soil and alluvial soil deposits?	Understand	1
4	What are the factors influencing the selection of ground improvement techniques?	Remember	2
5	Classify ground improvement Technique and explain them in detail?	Remember	2
6	Explain in detail mechanical modification techniques along with their merits and demerits?	Understand	2
7	Explain in detail hydraulic modification techniques along with their merits and demerits?	Remember	2
8	Explain in detail physical and chemical modification techniques along with their applications?	Understand	2
9	What are the various laboratory and field tests to characterise problematic soils? Explain them in detail?	Remember	2
10	What are the applications of mechanical and hydraulic modifications techniques?	Understand	2

UNIT - II MECHANICAL MODIFICATION			
1	Compare and contrast the various methods of in-situ densification techniques.	Understand	3
2	Discuss with a neat diagram installation of explosives for ground improvement techniques	Understand	4
3	Explain in detail dynamic consolidation of cohesive soil.	Understand	4
4	What is stone column? What are the methods of installing a stone column?	Understand	4
5	Discuss in detail the procedure of the vibro compaction and its application?	Understand	4
6	What are compaction piles? Discuss the installation procedure of compaction piles	Understand	4
7	Explain in detail with a neat diagram the method of dynamic tamping?	Understand	4
8	Explain in brief about the installation and working of a vibro-replacement stone column.	Understand	4
9	How does a sand compaction pile improve the soil? Write a detailed note on its installation and functioning.	Understand	4
10	Explain impact at depth method of soil densification	Understand	4
UNIT-III HYDRAULIC MODIFICATION			
1	Explain in detail with a neat sketch the method of dewatering using sumps and ditches stating its advantages and disadvantages.	Remember	5
2	Explain in detail the well point system of dewatering?	Remember	5
3	Explain in brief the various steps for designing a dewatering system	Understand	5
4	Discuss in detail electro-kinetic dewatering technique with neat sketch?	Remember	7
5	Explain the design of dewatering system in hydraulic modification of the ground.	Understand	5
6	Explain in detail about the dewatering techniques used in cohesive soils.	Remember	6
7	Explain in detail the advantage of using vertical drains along with preloading?	Understand	8
8	Compare the various dewatering systems suitability, uses, merits and demerit.	Understand	6
9	Explain in detail various types of geosynthetics & their applications?	Understand	6
10	How do geosynthetics function as a filter? How does it differ in its function for drainage? Explain in detail with sketches.	Remember	6
UNIT-IV PHYSICAL AND CHEMICAL MODIFICATION			
1	Write short notes on: (a) Pre-grout investigation (b) Grout holes pattern (c) Selection of grout characteristics	Remember	9
2	Explain about the jet grouting with neat sketch.	Remember	9
3	What is the procedure for cement grouting of cracks in concrete structures?	Understand	10
4	Describe in detail chemical stabilization of the soil with the help of an example.	Understand	10
5	Explain in detail difference between compaction and jet grouting?	Understand	9
6	Discuss Shotcrete Vs Gunite in detail.	Understand	9
7	Describe in detail the various applications of grouting?	Understand	9
8	Describe in detail chemical stabilization of the soil with the help of an example.	Understand	10
9	Explain in detail principle of ground modification at depth by grouting?	Understand	9

10	Explain in detail how expansive soils are stabilized.	Understand	10
UNIT-V MODIFICATION BY INCLUSIONS AND CONFINEMENT			
1	What are the various types of geosynthetics & explain in detail four major applications of geosynthetics ?	Understand	12
2	Describe in detail about soil nailing and rock bolting when is it adopted?	Remember	12
3	Geosynthetics can be used as soil reinforcement – Justify in detail with supporting sketches.	Understand	12
4	Write short note on: a) Soil nailing b) Rock bolting c) Ground Anchor d) Reinforced Earth	Remember	12
5	Define ground anchors. What are the different types of ground anchors and its applications?	Remember	12
6	Explain in detail the use of geosynthetics as reinforcement.	Understand	12
7	Explain the design principles of reinforced earth walls.	Understand	12
8	What do you understand by reinforced earth? Enumerate various applications of reinforced earth.	Remember	12
9	Explain the procedure of soil nailing and rock bolting.	Understand	12
10	Explain the difference between ground anchor and soil nailing.	Understand	12

Prepared By:

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