

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination Dec. 2018
B. Tech in Civil Engineering, Semester VII

Roll No.....

CE835: Ground Improvement Techniques

Time: 3 hours

Max. Marks: 80

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Assume suitable data wherever required and mention it clearly.
 3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever required are an integral part of the answer.
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Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

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- i. The depth (D), to which tamping is effective, depends on
(i) Mass of falling weight (w) (ii) Height of fall (H)
(a) Only (i)
(b) Only (ii)
(c) Both (i) and (ii)
(d) None
- ii. Vibro-replacement is best suited for
(a) Sandy soils
(b) Clayey soils
(c) Silts and fine grained soils
(d) Mine soils and silty sands
- iii. Dynamic compaction can be used for compaction of soils for depths up to:
(a) 10 m
(b) 20 m
(c) 30 m
(d) 40 m
- iv. Which of the following factors affect the compaction of a soil for standard proctor test:
1. Moisture content 2. Type of soil 3. Compaction effort 4. Porosity
(a) 1, 2 & 3
(b) 1, 2 & 4
(c) 2, 3 & 4
(d) 2 & 3
- v. Minimum size of the particles of silt soil, is:
(a) 0.002 mm
(b) 0.04 mm
(c) 0.06 mm
(d) mm
- vi. Compaction by impact roller is not effective for:
(a) Wet sand

- (b) Dry sand
 - (c) Rubble fill
 - (d) Unsaturated clay
 - vii. The factors controlling the characteristics of lime treated clay:
 - (a) Curing time
 - (b) Clay Mineral
 - (c) Both a and b are correct
 - (d) Only b is correct
 - viii. Vibro-Replacement method for installation of Stone column is:
 - (a) Dry bottom feed method
 - (b) Wet bottom feed method
 - (c) Wet top feed method
 - (d) Dry top feed method
 - ix. Main functions of Geosynthetics are:
 - (a) Fluid Transmission
 - (b) Reinforcement
 - (c) Both a and b are correct
 - (d) Only b is correct
 - x. Identify most commonly used solution grout:
 - (a) Sedoheptulose
 - (b) Glycosaminoglycans derivatives
 - (c) Carboxymethyl Cellulose
 - (d) Lignosulphite Derivatives
- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- Explain the following briefly:
- (a) Open sumps and Ditches
 - (b) Vacuum Dewatering System
 - (c) Dynamic Replacement
 - (d) Compaction Piles
- Q.3A Write down the following: 05
- i. Enlist the various application of stone column
 - ii. Failure modes of Stone column
- Q.3B Enlist and briefly explain the classification of ground improvement techniques. 05
- Q.4A Explain in detail the various applications of soil reinforcement. 05
- Q.4B List out the important characteristics of Geotextiles. 05
- Q.5A Discuss in detail the various factors to be considered in the selection of the best ground improvement technique. 05
- Q.5B Explain the mechanism of lime stabilization to improve the characteristics of fine grained soil. 05
- Q.6A Write short note on the following: 05
- i. Vibratory Roller
 - ii. Sheep Foot Roller/ Tamping Roller

Q.6B Enlist the various applications of Grouting in both temporary and permanent works. 05

OR

Q.6B What are the challenges that geotechnical engineers have in the use of nano-technology ? 05

Q.7 Explain the following: 10

- i. Solution Grouts
- ii. Compaction Grouting

Q.8 Explain in details the various functions of Geotextiles. 10

OR

Q.8 What are the challenges in geotechnical engineering and Ground Improvement techniques to build sustainable environment ? 10