

B.TECH
(SEM VIII) THEORY EXAMINATION 2017-18
GROUND IMPROVEMENT TECHNIQUES

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Explain quality control in compaction.
 - b. What are in-situ densification methods?
 - c. Explain ground suitability for vibro floatation.
 - d. What are vertical drains?
 - e. Explain pre loading methods.
 - f. Explain suspension grout.
 - g. What are granular piles?
 - h. What do you mean by ultimate bearing capacity of soil?
 - i. What are the importances of underpinning?
 - j. What are geotextiles?

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. How a soil-cement mix is designed? Describe the stages in construction of soil-cement base with the help of sketches.
 - b. What is the different type of limes used for soil stabilization? What is pozzolanic action of cement? How does it differ from the Chemical action of lime with soil? Compare the stabilization potentials of lime and cements
 - c. Write a note on the factors influencing a soil-bitumen mix. State the known types of soil-bitumen mixes and their utility..
 - d. Comment on the use of vibrator techniques in improving the bearing capacity of cohesive soils in-situ.
 - e. Discuss the use of different vibratory rollers for surface compaction of granular soils. Why is sheep foot rollers not preferred in this case.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) Write a note on Mueller Resonance Compaction and the various factors affecting it. Also write the advantages and limitations of this method.
 - (b) Sand drains, sand wicks and geo-drains are used under similar soil conditions for ground improvement. Compare their relative merits and demerits. Which do you prefer?

- 4. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) State the feasibilities and limitations of various thermal stabilization techniques.
 - (b) State the feasibilities and limitations of various electrical stabilization techniques.
- 5. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) State the principle underlying suspension grouting. Discuss the limitations of suspension grouts with respect to varying soil conditions..
 - (b) Design the size of the steel strip ties to be laid at 1.5 m c/c with a factor of safety of 1.75 against pull – out in a reinforced earth wall with the following particulars : $\gamma = 1.6 \text{ kN/m}^3$ Back-fill soil is GP-Sw with $\phi = 34^\circ$, working stress in steel, $\sigma = 1400 \text{ kN/m}^2$ and height of the wall = 3 m.
- 6. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) With the help of an example; briefly explain the importance for underpinning of foundations. Also describe its methodology in brief.
 - (b) Compare the effectiveness of bio-degradable and non biodegradable materials in soil reinforcement to improve its properties for better performance. (c) Explain the use of geotextiles in erosion.
- 7. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) Explain the use of geotextiles in erosion control, separation, filtration and drainage.
 - (b) Write a note on the importance of grout monitoring and the methods of grout control.