

**B.Tech. (Sem.V) (Main) Examination- 2014**  
**Civil Engineering**  
**5CE6.1 Ground Improvement Techniques**

Time : 3 Hours

Total Marks : 80  
 Min. Passing Marks : 24

*Instructions to Candidates :*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

**UNIT-I**

1. (a) Briefly describe different weathering processes. (8)  
 (b) Write comparative account of various types of rocks. (8)

OR

1. (a) Describe standard proctor test. (8)  
 (b) The wet weight of a sample is missing in a proctor compaction test. The oven dry weight of this sample is 18.5N. The volume of the mould is 1000000 mm<sup>3</sup>. If the degree of saturation of the sample is 90%, determine its water content and bulk density. Take  $G = 2$ . (8)

**UNIT-II**

2. (a) Briefly write various methods of ground improvement. (8)  
 (b) Discuss vibrofloatation method of ground improvement. (8)

OR

2. (a) Write design procedure of compaction piles in sand. (8)  
 (b) What is dynamic compaction? Write its suitability with respect to different types of soil. (8)

**UNIT-III**

3. (a) In a highway project the average load on clay layer is expected to increase by 118kN/m<sup>2</sup>. The average effective overburden pressure at the middle of the clay layer is 2kN/m<sup>2</sup>. The height of clay layer is 6m,  $C_c = 0.25$ ,  $e_0$  is 0.9 and  $C_v = 0.36$ m<sup>2</sup>/month. The clay is normally consolidated. Determine the primary consolidation settlement of highway without preload and the surcharge needed to eliminate the entire primary consolidation settlement in 8 months by precompression. (8)  
 (b) Describe preloading method of ground improvement. (8)

OR

3. (a) Describe briefly method of calculating consolidation of preloaded soil with stone column. (8)  
 (b) What are advantage and disadvantages of stone column method? What are applications of stone column? (8)

**UNIT-IV**

4. (a) What is grouting? Describe the process of ground improvement grouting. (8)  
 (b) What are different material used in soil reinforcement? Write with their suitability. (8)

OR

4. (a) What are different failure modes of soil reinforcement? (8)  
 (b) With neat line diagram write about various applications of reinforced soil. (8)

**UNIT-V**

5. (a) Write briefly on stabilization using fly Ash. (8)  
 (b) Briefly describe the cement stabilization process to stabilize which soil. (8)

OR

5. (a) How bitumen is used in ground improvement? Discuss the procedure of bitumens stabilization. (8)  
 (b) Describe mix design procedure for lime stabilization. (8)