



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Civil Engineering

Semester End Examination; Dec - 2017/Jan - 2018

Ground Improvement Techniques

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Discuss the factors to be considered in the selection of most suitable ground modification technique. 10
- b. What are the different types of mechanical ground modification techniques? Explain the principles adopted for different types of soils. 10
- 2 a. Discuss the effect of compaction on compressibility, liquefaction potential, permeability and relative density of soil. 10
- b. Following are the results of compaction test :
- Volume mould = 1000000 mm³, Weight of mould = 10 N, Specific gravity of soil solids = 27.
- Find optimum moisture content and maximum dry density. Draw zero air void line. 10

Weight of mould + Wet soil (N)	29.25	30.95	31.50	31.25	31.70
Water Constant (%)	10.00	12.00	14.30	16.10	18.20

UNIT - II

- 3 a. Explain the different techniques adopted to accelerate the process of consolidation. 10
- b. List the different methods of dewatering systems. Explain any one of them. 10
- 4 a. What are drains? Discuss the components of drains. 10
- b. Explain the working principles of vertical drains and sand drains. 10

UNIT - III

- 5 a. Explain the significance of flyash in stabilization of ground. 10
- b. Discuss the mechanism, construction procedure and advantages of stabilization of soil with cement. 10
- 6 a. Explain the process of stabilization of soil with lime. Discuss the effect of lime treatment to black cotton soil. 10
- b. Discuss chemical modification of soil using: i) Lignin ii) Bitumin. 10

UNIT - IV

- 7 a. What is compaction grouting? Discuss its advantages and disadvantages. 10
- b. Discuss the grouting procedures to be adopted for improving the performance of rock or natural soil. 10

- 8 a. Discuss the following methods of improving ground : 10
 i) Rock bolts ii) Thermal treatment.
- b. What are gabions? Discuss their applications and advantages. 10

UNIT - V

- 9 a. Discuss the different types of geosynthetic materials and their suitability for different types of applications. 10
- b. List the important engineering properties of geosynthetics. How are geo synthetics tested for assessing these properties? 10
- 10 a. What are the different functions of geosynthetics? Explain. 10
- b. It is desired to construct a retaining structure for a 10 m high retainment of granular soil. Discuss for what applications geo synthetics can be used. 10

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