



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

(An Autonomous Institution affiliated to VTU, Belagavi)

**Second Semester, M.Tech - Civil Engineering (MCAD)**

**Semester End Examination; June - 2017**

**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. What are the objectives of soil improvement? Explain the different types of classification of ground improvement techniques. 10
- b. What are the factors to be considered in selection of best soil improvement? Explain briefly mechanical modification. 10
2. Explain the following :
  - i) Principles and densification
  - ii) Effect of compaction on engineering properties of soil 20
  - iii) Field compaction
  - iv) Shallow and deep compaction.

### UNIT - II

- 3 a. Explain any two methods of lowering the water table. 10
- b. Discuss the principles and advantages of ground improvement by :
  - i) Pre-Loading 10
  - ii) Electro Osmosis.
- 4 a. What are the factors to be considered in the design of dewatering system? 10
- b. Discuss the principles and advantages of ground improvement by
  - i) Sand drain 10
  - ii) Electro Kinetic dewatering.

### UNIT - III

- 5 a. What are the requirements of stabilization? Explain briefly mechanical stabilization. 10
- b. Explain the cement stabilization under the following headings :
  - i) Mixing, Moisture content and Compaction conditions 10
  - ii) Age and curing, Admixtures for soil cement and construction of soil cement.
- 6 a. Explain the mechanism, stability, process and limitations of stabilization with time. 10
- b. Explain the mechanism, stability, process and limitations with asphalt. 10

**UNIT - IV**

- 7 a. Explain the following in detail :
- i) Suspension grouts 10
  - ii) Solution grouts.
- b. Explain the following :
- i) Grout Holes pattern 10
  - ii) Grout characteristics.
- 8 a. Briefly explain the mechanism and usefulness of :
- i) Rock Anchors 10
  - ii) Rock Bolts.
- b. Explain the following application of Grouting :
- i) Seepage Control 10
  - ii) Soil Solidification and Stabilization.

**UNIT - V**

- 9 a. Explain the different engineering properties of geosynthetics necessary for improving ground using geosynthetics. 10
- b. Discuss the functions of geosynthetics. 10
- 10a. Explain the mechanism, construction, procedure and advantages of soil nails. 10
- b. Explain the test to be carried out for assessing the stability of geosynthetics. 10

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