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**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, Dec, 2017**



**Program Name: Btech Civil Engg.**

**Course Name : Ground Improvement Techniques**

**Course Code : CEEG441**

**No. of page/s: 2**

**Semester – VII**

**Max. Marks : 100**

**Duration : 3 Hrs**

**SECTION-A (4×5 = 20 Marks)**

**All questions are compulsory to attempt**

- Q.1.** Discuss how heating and freezing methods are used to improve ground. (CO1) (5)
- Q.2.** Discuss in detail the various applications of grouting (CO3) (5)
- Q.4.** Discuss following terms  
(a) soil nailing, (b) geotextile, (c) geogrid, (d) geonet, (e) geomembranes (CO2, 5)(5)
- Q.3.** Write a brief note on geosynthetics as reinforcement (CO5) (5)

**SECTION-B (4×10= 40 Marks)**

**All questions are compulsory to attempt**

- Q.5.** Explain how stone columns are useful for improving the properties of soil. (CO2)(10)
- Q.6.** Discuss the various geotechnical problems faced with black cotton soil, laterite soil and alluvial soil deposit. (CO1) (10)
- Q.7.** Explain how preloading technique is useful for improving the properties of soil. (CO4) (10)
- Q.8.** Define dewatering. Discuss the need for drainage and dewatering. Also explain in detail with neat sketches the method of dewatering using sumps and ditches. (CO2)(10)

**SECTION-C (2×20 = 40 Marks)**

**All questions are compulsory to attempt**

- Q.9.** Discuss in detail the principle, operation and application of vibro compaction method of ground improvement. (CO2) (20)

**Q.10** Explain grouting. Discuss in detail the principle of grouting. Also discuss compaction grouting with its advantages and disadvantages. **(CO3) (20)**

**OR**

Explain reinforced earth and discuss its principle and application in ground improvement. Also discuss the design principle of reinforced earth wall. **(CO4)(20)**