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**Question Paper Code : 51225**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**Seventh Semester**

**Civil Engineering**

**CE 2033/CE 708/10111 CEE 28 – GROUND IMPROVEMENT TECHNIQUES**

**(Regulations 2008/2010)**

**(Common to PTCE 2033 - Ground Improvement Techniques for B.E. (Part-Time)**

**Sixth Semester Civil Engineering - Regulation 2009)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. What is the role of ground improvement in foundation engineering ?
2. List out atleast two geotechnical problems associated with lateritic soils.
3. What are the processes involved in dewatering systems to improve the characteristics of a ground ?
4. Write the working principle for electro osmotic methods of dewatering and name the type of soils in which this method is more suited.
5. What are the factors that need to be considered for the selection of appropriate field compaction procedures for densification of cohesionless soils ?
6. Write various merits of stone column techniques used for ground treatment.
7. What is the concept of reinforcement used for ground treatment ?

8. What are various field applications of earth reinforcement ?
9. Name any two types of grouts used for ground treatment and give one example for each grout.
10. Define the basic mechanisms involved in compaction grouting.

**PART – B (5 × 16 = 80 Marks)**

11. (a) What are the factors that contribute for ground alterations after formation and discuss in details of each factor. (16)

**OR**

- (b) (i) List out the various geotechnical problems in black cotton soil and discuss in detail. (8)
  - (ii) What are the various factors that must be considered in the selection of best suitable ground improvement technique ? Discuss. (8)
12. (a) Discuss in detail the various dewatering systems used for control of ground water in stabilizing of the ground. (16)

**OR**

- (b) (i) A flow net analysis was performed for estimating the seepage loss through the foundation of a cofferdam, results of the flow net analysis gave a number of flow line ' $N_f = 6$ ' and number of drops ' $N_d = 16$ '. The head of water lost during seepage was 5 m. Assume the coefficient of permeability of the soil is ' $k = 4.5 \times 10^{-5}$  m/min. Estimate the seepage loss per meter length of the coffer dam per day. Also estimate the exit gradient if the average length of the last flow field is 0.9 m. (8)
- (ii) What are the various drainage systems adopted to prevent ground water seeping into the existing structure and explain each drainage system in detail. (8)

13. (a) Explain the basis of insitu densification for cohesionless soil with listing of various methods used for the densification and discuss any one method in detail. (3+3+10 =16)

**OR**

- (b) (i) Write a detailed discussion about the soil stabilization using preloading with sand drains and discuss the merits of this method. (7+3=10)
- (ii) Discuss in detail about lime piles installation techniques and name the soil conditions in which this method is more suited. (6)

14. (a) What is the concept of reinforcement used for ground treatment and discuss in detail, various types of reinforcement used in field practice. (16)

**OR**

- (b) (i) Discuss in detail for verifying the internal and external stability of a retaining wall reinforced with Geotextile. (8)
- (ii) Explain the role of Geotextiles in road works. (8)

15. (a) What are the various aspects of grouting used for ground treatment and discuss in details of various grouting materials used for ground improvement purpose. (6+10=16)

**OR**

- (b) Briefly discuss in details of various step by step procedures involved for ground improvement using grouting technique. (16)
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