

Reg. No. :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

**Question Paper Code : 90289**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Sixth Semester

Civil Engineering

CE 8001 – GROUND IMPROVEMENT TECHNIQUES

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How are ground improvement techniques classified?
2. List atleast four problematic soils.
3. Classify the suitable type of dewatering method for different types of soils considering permeability values.
4. List any four disadvantages of well point dewatering system.
5. List four limitations of sand drains.
6. What are stone columns?
7. Differentiate between reinforced earth and soil stabilization.
8. What is the principle behind the increase in shear strength of soil due to reinforcement?
9. Write atleast four desirable characteristics of grouts.
10. Explain the term "Groutability".

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain briefly about soil distribution in India. (7)  
(ii) What are the factors that contribute to ground alteration? Briefly explain any two factors. (6)

Or

- (b) Discuss in details the various factors that need to be considered in the selection of best ground improvement techniques. (13)

12. (a) (i) With the help of a neat sketch, explain the features of vacuum dewatering system. (7)  
(ii) Briefly discuss the design of dewatering system. (6)

Or

- (b) Explain in detail the well point system of dewatering. (13)

13. (a) With the help of neat sketches, explain stone column installation by vibro-displacement method. (13)

Or

- (b) (i) Where are vertical drains used? Briefly discuss different types of vertical drains. (6)  
(ii) What is meant by compactive effort? Explain the relationship between compactive effort and maximum dry unit weight with the help of graphs. (7)

14. (a) (i) Explain the construction sequences of a reinforced earth wall with vertical faces. (6)  
(ii) With neat sketches, briefly explain the various applications of reinforced earth for ground improvement. (7)

Or

- (b) (i) Is there any strain required for the development of friction in reinforced earth? Will this affect the strength of the reinforced earth and choice of reinforcement? Explain. (6)  
(ii) What are the various steps involved in designing with geosynthetics? (7)

15. (a) (i) With the help of a neat diagram, explain the various steps involved in sleeved pipe grouting. (7)  
(ii) What is the difference between jet grouting and soil fracture grouting? Draw relevant sketches. (6)

Or

- (b) (i) Explain compaction grouting in detail. Write various advantages and disadvantages of this type grout method. (7)  
(ii) Briefly discuss two different types of grouting materials used in ground treatment work. (3 + 3)

PART C — (1 × 15 = 15 marks)

16. (a) Explain in detail pre-loading method of ground improvement. How do vertical drains improve the functioning of pre-loading technique?

Or

- (b) What is meant by deep compaction? Discuss and compare the applicability of the following deep compaction methods. Dynamic compaction and vibroflotation techniques, their design variables, relative merits and demerits.