

Register No.: ..... Name: .....

**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (R), DECEMBER 2023****CIVIL ENGINEERING****(2020 SCHEME)****Course Code: 20CET421****Course Name: Ground Improvement Techniques****Max. Marks: 100****Duration: 3 Hours****PART A*****(Answer all questions. Each question carries 3 marks)***

1. Make a note on microbial methods of ground improvement.
2. Describe about the role of sand in ground improvement.
3. Describe how to control compaction in field.
4. Explain the principle of stone column.
5. List out the major advantages of vacuum dewatering over other common dewatering methods.
6. Demarcate various soils based on the suitability to introduce a vertical drain.
7. Elucidate on the use of geosynthetics as a separator.
8. Describe the procedure for construction of a reinforced earth wall.
9. Enlist some of the common grouting materials and their applications.
10. Elucidate on the application of temperature as a stabilizing agent.

**PART B*****(Answer one full question from each module, each question carries 14marks)*****MODULE I**

11. a) Briefly discuss the role of ground improvement in foundation design with a suitable example. (7)  
b) Discuss the selection of ground improvement method based on soil conditions. (7)

**OR**

12. a) Enlist some of the emerging trends in ground improvement techniques. How are they superior to traditional soil modification methods? (7)  
b) 'There is no one ultimate method which is the universal answer to all ground improvement problems.' Elucidate on the validity of the statement with examples. (7)

**MODULE II**

13. a) Enlist the merits and demerits of dynamic compaction method. (7)  
b) Describe how vibrocompaction techniques are different from (7)

vibroflotation method. Enlist the advantages of each method.

**OR**

14. a) Describe how a partial replacement technique such as sand pile will be effective solution for stabilizing clayey soils with high water content. Describe the basic design considerations involved. (8)
- b) Make a note on compaction by blasting. (6)

**MODULE III**

15. a) Describe about the various methods of dewatering. Enlist the advantages of well point system over open sump. (8)
- b) Describe the general principle of preloading technique. (6)

**OR**

16. a) Describe about the installation procedure of PVD. In what soil types are PVDs recommended? (8)
- b) Compare and contrast blanket drains and interceptor drains. (6)

**MODULE IV**

17. a) Explain the basic concept and sequence of construction of a soil nail. Outline the various merits of the technique over other earth reinforcement methods. (8)
- b) Explain the applications of geotextile in different construction works. (6)

**OR**

18. a) Prepare a note on the use of geosynthetics as a drainage layer. Enlist the common geosynthetics used for the above purpose. (7)
- b) Enlist the merits and demerits of micropile as a soil reinforcement technique. (7)

**MODULE V**

19. a) Explain the term groutability. Enlist the factors affecting groutability. (6)
- b) Explain the procedure for penetration grouting and displacement grouting with figures. List out the merits of each technique. (8)

**OR**

20. a) Describe the mechanism of lime stabilization in soils. Explain the applicability of the technique in various soil types. (7)
- b) Discuss the mechanism of cement stabilization in soils. List the factors influencing the cement stabilization? (7)

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