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Question Paper Code : 20291

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 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. Name atleast four problematic soil deposits found in India and the associated region.
2. List at least four methods of ground improvement for soft clay deposits.
3. What are the limitations of open sump and ditches methods used for dewatering work?
4. What is the principle behind vacuum method of dewatering?
5. Differentiate between sand drains and stone columns.
6. Draw a cross section of fabric drain and highlight the function of each part.
7. Define the term reinforced earth.
8. Name at least four different types of materials used for soil reinforcement.
9. Write at least four applications of grouting.
10. What is meant by groutability ratio?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the geotechnical problems associated with alluvial, black cotton and lateritic soil and briefly discuss methods to improve these soils. (4+5+4)

Or

- (b) Discuss in detail the suitability of different ground improvement methods based on type of soil. (13)

12. (a) (i) Discuss in details the various steps involved in the design of dewatering system to control ground water during any civil engineering construction. (9)
(ii) Explain the properties of flow net with a simple figure. (4)

Or

- (b) Explain the principle, equipment, installation and operation and precautions to be taken in electroosmotic method of dewatering. (13)

13. (a) How do surcharge preloading with prefabricated vertical drains helps in improving soft clay deposit. Explain in detail with a neat sketch. (13)

Or

- (b) (i) Explain dynamic compaction of cohesion less soil. (6)
(ii) What is vibro-displacement compaction? Give examples for this type of compaction. Also, discuss any one method in detail. (7)

14. (a) What is a Geotextile? Explain in detail the role of geotextiles in road as a separator, filter and drainage material. (2+4+4+3)

Or

- (b) (i) Discuss the application of soil reinforcement in engineering construction with neat sketches. (6)
(ii) Discuss in detail the procedure for verifying the external stability of a retaining wall reinforced with Geotextile. (7)

15. (a) (i) Write a detailed note on stabilisation of soil using cement and chemicals. (4+4)
(ii) Explain how an expansive soil is stabilised. (5)

Or

- (b) (i) Compare the relative advantages and disadvantages of permeation grouting using cement grout and chemical grout. (6)
(ii) Write the sequence to be followed in jet grouting with neat sketch. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Compare suitability, uses, merits and demerits of various dewatering techniques with neat sketches.

Or

- (b) Compare and contrast different features of
(i) Dynamic Compaction
(ii) Vibrofloatation
(iii) Lime Piles and
(iv) Shallow compaction