Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech. (Civil / Soil Mechanics & Foundation Engg. / Geo Technical Engg.) (Sem.–1)

GROUND IMPROVEMENT

Subject Code : CESE-9

M.Code : 37214

Date of Examination : 14-01-2023

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. a) What are sand drains? How is it constructed? Explain with the help of neat sketches. Explain drain resistance and smear effect.

   b) Explain the necessity and objective of ground improvement.

2. Explain the procedure of construction of stone columns. In what site conditions, stone columns are preferred? If the soil is very soft clay, would you recommend the stone column methods?

3. An earth dam is to be built in a gorge of trapezoidal shape. The top width of the dam is 15 m and u/s and d/s slopes are respectively IV: 3H and IV: 2.5H. The height of the dam is 80 m including FB of 2 m. The core of the dam extends down to bedrock level through a cutoff trench but the base of the dam rests on loose silty sand which is 12 m deep. Length at the top and at the base is respectively 560 m and 320 m. The density of the stratum is to be increased prior to the construction of the dam in order to avoid liquefaction during earthquake. The cost of insitu densification of the stratum by various methods is as under:

   a) Vibroflotation : Rs. 650/m^3

   b) Blasting : Rs. 90/m^3

   Calculate the total cost of in-situ densification by each of these methods? Which one, you will prefer?

4. a) Write a note on factors affecting bitumen stabilization. Explain how soil- cement mix is designed using British method.

   b) Explain the principle and applications of Soil-Lime stabilization. Discuss methods; you would use to improve the stability of soils.

5. a) Name the stability checks that are to be applied for reinforced earth walls.

   b) What are design principles of reinforced earth walls?

6. a) What are geo-textiles? Discuss the effect on strength, bearing capacity and compaction on behavior of soils on reinforcing with geotextiles.

   b) Write a note on geo-drains.

7. What are different types of grouts available? Discuss their properties. Write note on "*Post grout test*".

8. Write short notes on :

   a) Ground anchors

   b) Vacuum dewatering.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.