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M.Tech. (Soil Mechanics & Foundation Engineering/GeoTechnical Engineering) (2016 & Onwards) (Sem.–1)

GROUND IMPROVEMENT

Subject Code : CESE-9

M.Code : 37214

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) List the factors that have to be considered while selecting an insitu densification technique for loose sand. (12)

   b) "Geosynthetic sand drains should be used in preference to sand piles in small works." Give your comments with proper justification. (8)

2. a) Discuss the mechanism of granular columns in order to improve the properties of soil. Illustrate with sketches. (12)

   b) List the alternatives that are available for stabilizing the vertical sides of deep cuts in soils. (8)

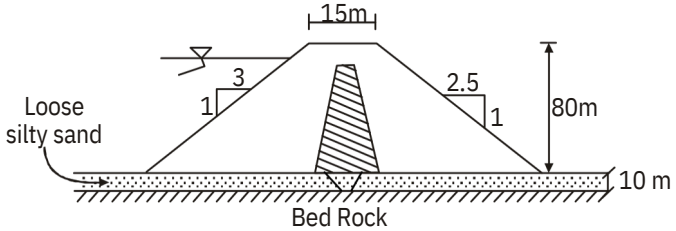
3. An earth dam is to be built in a gorge of trapezoidal shape. Length at the top and at the base is 550m and 300 m respectively. The core of the dam extends down to bedrock level through a cut off trench but the base of the dam rests on loose silty sand which is 10 m deep. The density of the stratum is to be increased prior to construction of the dam so that it does not liquefy during an earthquake. The cost of the in-situ densification of the 10m deep stratum by various methods is estimated as follows : (20)

   a) Vibroflotation Rs. 600/m2

   b) Impact vibration (compaction) Rs. 200/m2

   c) Blasting Rs. 50/m2

   Calculate the total cost of in-situ densification by each method.



Section of Earth Dam

4. a) Compare the disadvantages of Ascending stage and Descending stage grouting. (8)

b) Amongst the grouting methods, which method allows high output, good control over grouted zone around the grout hole and maximum versatility? Would you use this technique for small sized work such as densification of some loose pockets of soil? (12)

5. In which case is requirement of low elongation of reinforcement most important & why?

a) Vertical reinforced soil wall (10)

b) Reinforced soil slope in soft clay (10)

6. a) Can one use a geomembrane as a separator instead of geotextile beneath a road? (6)

b) For a 12m high zoned embankment, the seepage estimated using flownets is 12.5 × 10–7 m2/sec-m for k of 5 × 10–8 m/sec for the core. It is proposed to provide a non-woven geotextile to act as a filter between the shell and the core. The geotextile is 10 mm thick, 2000 gsm geo-synthetic with an allowable permittivity of 0.05 sec–1 and O95 of 0.04 mm. The soil of the core is clayey silt with D85 = 0.03mm. Will the geosynthetic be satisfactory as a filter? (14)

(10)

7. a) Briefly discuss the factors affecting Mechanical Stabilization.

(10)

b) Write a note on soils amenable to Lime stabilization.

(8)

8. a) What are different types of chemicals used in stabilization?

(12)

b) Give principle and types of ground anchors in detail.

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.