FACULTY OF ENGINEERING

B. E. 4/4 (Civil) II – Semester **(New) (Main)** Examination, June 2010

Subject : **Ground Improvement Techniques**
(Elective – II)

Time : 3 Hours} {Max. Marks: 75

Note: Answer **all** questions of Part - A and answer any **five** questions from Part-B.

PART – A (25 Marks)

1. State the basic difference in the mechanism of static and dynamic techniques of ground improvement . (2)

2. Name the functions served by Bitumen in stabilization of cohesion-less and cohesive soils. (2)

3. Which geo-technical phenomenon is responsible for in-situ densification of fully saturated cohesion-less soils subjected vibrations ? (2)

4. A 6m thick fully saturated compressible clay medium with vertical drainage and without vertical drains is expected to undergo a total primary consolidation settlement of 0.90m. How much settlement will take place if vertical drains are provided ? (2)

5. In a non-woven geo-textile, how the fibre is bonded ? (2)

6. What is the uniqueness of grouting among the ground improvement techniques and state any two applications of grouting in ground improvement? (3)

7. Determine sutiability of a soil with D 10=0.50mm, D20=1.80mm and D50=4.20mm, to be used as fill material in vibro-floatation technique. (3)

8. Applying Carillo's solution for the differential equation governing consolidation process aided with vertical drain, determine the overall degree of consolidation (U) if degree of consolidation due to vertical drainage and radial drainage are 60% and 80% respectively. (3)

9. A pavement is to be constructed on a soft sub-grade. Identify the scope for ground improvement applying geo-synthetics. Suggest name of the geo-synthetic product and the function it has to serve. (3)

10. The inter-surface friction between the earth and reinforcing material do not influence performance of the reinforced earth. Answer yes or no and justify your answer. (3)

PART – B (5x10=50 Marks)

11. Explain the necessity of ground improvement at various stages of a civil engineering project. Justify your answer with suitable field examples. (10)

12.(a) Write in detailed note on Bitumen stabilization. (5)
(b) Explain the procedure of grouting adopted in ground improvement. (5)

13.(a) State various vibration methods used in ground improvement and explain the principle on which is of them is based, merits and demerits, suitability. (5)

(b) Compare terra probe with vibro-floatation. (5)

14.(a) Explain the concept of "pre-compression". Describe briefly various pre-compression methods and their suitability. (5)

(b) Write a note on vacuum method of in-situ densification of cohesive soils and discuss the necessary conditions for its effectiveness. (5)

15.(a) Describe the separation function served by geo-textiles. Justify your answer with suitable field applications. (5)

(b) Compare Geo-textiles with Geo-grids. Comment on their specific applications. (5)

16.(a) Explain in detail about mechanical stabilization. (5)

(b) Describe about Blanket grouting and Curtain grouting. (5)

17. Write a note on any **two** of the following :

(a) Pre-fabricated vertical drains

(b) Tests on geo-textiles

(c) Preloading method

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