

Reg. No. :

Question Paper Code : 52740

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Seventh Semester

Civil Engineering

CE 6012 — GROUND IMPROVEMENT TECHNIQUES

(Regulation 2013)

(Common to PTCE 6012 – Ground Improvement Techniques for B.E. Part-Time –
Sixth Semester – Civil Engineering – Regulation 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Enumerate the factors considered for the selection of suitable Ground Improvement techniques.
2. What is the problem associated with alluvial soil?
3. Write the two dimensional equation governing the flow of fluid through porous media.
4. For which type of soil vacuum dewatering method is suitable?
5. List the various conditions that are to be satisfied for successful adoption of preloading technique in stabilization of soils.
6. Differentiate the functions of stone columns and lime piles.
7. What is called reinforced earth wall?
8. Why non-oven geo textiles are used in drainage ditches?
9. List down the materials used for soil grouting.
10. Write any two imitations of lime stabilization.

PART B — (5 × 13 = 65 marks)

11. (a) Suggest suitable Ground improvement techniques to tackle the problems associated with the construction done in Black cotton soils. (13)

Or

- (b) Describe the role of ground improvement techniques in Foundation Engineering. (13)

12. (a) (i) Discuss on the drainage systems adopted to prevent ground water seepage into the excavation area. (8)
(ii) Write a note on Deep well dewatering along with its merits and demerits. (5)

Or

- (b) How seepage analysis is done for a two dimensional flow for fully penetrated slot in homogenous deposits. (13)

13. (a) (i) Write a note on Stone Columns. (5)
(ii) Differentiate dynamic compaction and deep compaction. (8)

Or

- (b) Discuss the various Vibro-compaction methods used for in situ densification of cohesion less soils. (13)

14. (a) A retaining wall with geotextile reinforcement is 6m high. For the granular backfill, $\gamma = 16 \text{ kN/m}^3$ and $\Phi = 32^\circ$. For the geotextile, $\alpha_G = 20 \text{ kN/m}$. Design the wall with above properties of geotextile for the factor of safety of 1.5 against both tearing and pullout failures. (13)

Or

- (b) Explain the role of geo-textiles in Filtration, Drainage and Road works. (13)

15. (a) Explain in detail about chemical stabilization soils. (13)

Or

- (b) With neat sketches explain in detail about the various grouting techniques. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Write a note on the following aspects related to Ground Improvement techniques.

- (i) Vacuum and electro osmotic methods of dewatering. (8)
(ii) Sand drains and Fabric drains. (7)

Or

- (b) A soft clay having $C_v = 0.5 C_h$ ($C_h = 5 \times 10^3 \text{ cm}^2/\text{sec}$) is 8m thick lies at a depth of 3m from the ground level. The top 3m soil is sand. The soil below clay is also sand and is as permeable as the top sand layer. It is proposed to consolidate the clay layer by preloading technique under a surcharge pressure of 80 kN/m^2 . Calculate the time required for 95% consolidation. If it is proposed to accelerate the consolidation by providing sand drains of 30 cm diameter at a spacing of 3m in a triangular pattern, determine the time required for 95% consolidation due to radial drainage alone. (15)