



Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (S, FE) (FT/WP/S5PT) Examinations May 2026 (2019 Scheme)

Course Code: CET423

Course Name: GROUND IMPROVEMENT TECHNIQUES

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

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| 1 | What field observations indicate the need for ground improvement before foundation construction? | (3) |
| 2 | Name three commonly used soil stabilizing materials and state their key effects on the engineering properties of soil. | (3) |
| 3 | How does shallow compaction differ from deep compaction? | (3) |
| 4 | Explain dynamic compaction for ground improvement. | (3) |
| 5 | Explain the necessity of dewatering systems and name two common dewatering methods used in ground improvement | (3) |
| 6 | Discuss how preloading differs from vacuum consolidation. | (3) |
| 7 | Explain the different types of reinforcing material. | (3) |
| 8 | What are the merits and demerits of micropiles? | (3) |
| 9 | List any three desirable properties of a good grout material used in ground improvement. | (3) |
| 10 | What is the principle behind ground freezing as a method of soil stabilization? | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

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| 11 | a) List out any four problematic soils and also suggest one suitable ground improvement technique for the soils. | (8) |
| | b) Describe the microbial method as a sustainable ground improvement technique. | (6) |

OR

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| 12 | a) Discuss the classification of ground improvement methods based on the mechanism involved. | (8) |
| | b) Discuss the key factors that influence the choice of a suitable ground improvement method. | (6) |

Module II

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| 13 | a) Explain how compaction alters the engineering behaviour of soil. | (6) |
| | b) Explain how the stone column method is applied to improve soil conditions, describing its working principle, installation procedure, and practical merits and | (8) |

limitations.

OR

- 14 a) Describe the mechanism of soil improvement by blasting and list its advantages, limitations, and suitable soil conditions. (8)
 b) Describe how the sand pile method improves weak ground. (6)

Module III

- 15 a) Explain the concept, function, and engineering importance of foundation drain, blanket drain, and interceptor drains. (6)
 b) Explain the working mechanism of the electro-osmotic method of ground improvement. (8)

OR

- 16 a) How do single-stage and multi-stage well point systems differ in design, operation, and field application? (6)
 b) Explain principle, installation procedure, and important design considerations of Prefabricated Vertical Drains. (8)

Module IV

- 17 a) Describe the design principles, construction procedure, and advantages of soil nailing. (14)

OR

- 18 a) Enumerate and explain the principal functions of geosynthetics used in geotechnical engineering applications. (8)
 b) Explain the design considerations of reinforced soil walls. (6)

Module V

- 19 a) Explain in detail the various grouting methods used for ground improvement, with special reference to compaction, penetration and jet grouting. And also mention the merits and demerits of grouting techniques. (14)

OR

- 20 a) Explain how cement stabilization can be effectively used to improve the engineering properties of the soil. (7)
 b) Explain the mechanism of lime stabilisation and also mention the effect of lime stabilisation on soil properties. (7)
