Register No.: .... Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (S), AUGUST 2023
CIVIL ENGINEERING
(2020 SCHEME)

Course Code :   20CET322

Course Name: Geotechnical Investigation

Max. Marks :   100   **Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. Explain the objectives of soil exploration.

2. Describe the criteria used to determine the number and spacing of boreholes as per IS guidelines?

3. List any two advantages and disadvantages of static cone penetration test.

4. What are the precautions to be taken while conducting SPT test?

5. Mention any three limitations of electrical resistivity methods.

6. Explain stabilization of borehole using Bentonite slurry.

7. Differentiate between disturbed and undisturbed samples.

8. Define (i) Area ratio (ii) Inside clearance (iii) Outside Clearance

9. Sketch a typical soil bore log with SPT test data

10. Explain rock quality designation.

PART B
(Answer one full question from each module, each question carries 14 marks)
MODULE I

11. a) Describe wash boring with the help of a neat sketch.   (5)

     b) Explain the major stages involved in the soil exploration programme.   (9)

OR

12. a) Explain site reconnaissance in soil investigation programme. What are the features to be noticed during site reconnaissance.   (7)

     b) Differentiate between auger boring and rotary drilling.   (7)

MODULE II

13. a) The field SPT value (N) in a deposit of fully submerged fine sand was 40 at a depth of 6 m. The average saturated unit weight of the soil is 19kN/m^3. Calculate the corrected N value.   (7)

b) Which cone penetration test would you recommend if it is necessary to determine the skin resistance of the soil at a specific location? With the help of appropriate sketches, illustrate the process for determining skin friction and end resistance from that test. (7)

<div align="center">OR</div>

14. a) Explain Dynamic Cone Penetration Test. (5)

    b) Describe Standard Penetration Test (SPT). Explain the various corrections to be applied for SPT value(N). (9)

<div align="center">MODULE III</div>

15. a) How is the thickness of subsurface layers calculated using the seismic refraction method ? (6)

    b) With neat diagrams, explain electrical sounding and electrical profiling methods. (8)

<div align="center">OR</div>

16. a) Discuss any one method for determining the level of ground water table. (6)

    b) A seismic refraction study of an area has given the following data. (8)

Distance from impact point to geophone (m)	15	30	60	90	120
Time to receive wave (s)	0.025	0.05	0.1	0.11	0.12

Plot the time travel data and determine the seismic velocity for the surface layer and underlying layer. Also determine the thickness of the upper layer

<div align="center">MODULE IV</div>

17. a) Discuss the precautions to be followed while handling and transporting soil samples. (6)

    b) Describe in detail about a sampler used for obtaining undisturbed samples. (8)

<div align="center">OR</div>

18. a) An open drive sampler with an outside diameter 76 mm and inside diameter 72 mm was used to obtain soil sample. Calculate the area ratio and also mention the quality of sample obtained? (4)

    b) With neat sketches explain split spoon sampler and piston sampler. (10)

<div align="center">MODULE V</div>

19. a) Explain pressure meter test with sketch. (7)
    b) Describe the contents of a soil exploration report. (7)

OR

20. a) Differentiate between bore log and soil profile. (4)
    b) Explain plate load test with its limitations. (10)

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