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

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 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. List out the information obtained from a general investigation program.
2. Define significant depth in connection with geotechnical investigation.
3. Describe the correction for dilatancy for SPT values, mentioning its necessity.
4. What are the advantages for CPT compared to SPT?
5. Differentiate between electrical sounding and electrical profiling.
6. What are the limitations for seismic refraction method?
7. 'Truly undisturbed sample is theoretical'. Justify the statement.
8. What is a split spoon sampler?
9. Define modulus of subgrade reaction.
10. What are the limitations of pressuremeter test?

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Describe site reconnaissance in a typical soil investigation programme, focusing on the features to be noted during site reconnaissance (8)
    b) What are the key advantages and disadvantages of open pit excavations. (6)

OR

12. a) Delineate the essential requirements for number and disposition of trial pits and borings as per IS 1892 (1979). (6)
    b) Explain wash boring with the help of a sketch. What are its disadvantages compared to other exploration techniques? (8)

MODULE II

13. Describe in detail the procedure for carrying out SPT test. What are the dimensions of the sampling tube? What are the typical precautions to be taken while conducting SPT? (14)

OR

14. a) Explain dynamic cone penetration test with a neat diagram. How is it different form static cone penetration test? If it is required to find the friction resistance of soil at a given site, which cone penetration test would you recommend? (10)

b) List out the typical correlations for SPT N value with various soil properties (4)

MODULE III

15. a) If you are given the velocity of shock-waves in different soils, which geophysical test would you recommend? Explain the procedure with help of a neat figure. (10)

b) What are the typical limitations for electrical resistivity method for soil exploration (4)

OR

16. a) The following data was obtained from seismic refraction study of an area : (9)

Distance from impact point to geophone (m)	10	20	40	80	160	320
Time to receive wave (s)	0.025	0.05	0.1	0.11	0.12	0.14

Determine the thickness of the upper layer by plotting time travel data. Also determine the seismic wave velocity for the underlying layer.

b) Enlist the various methods for borehole stabilisaton. Describe any one. (5)

MODULE IV

17. a) The dimensions of a particular sampling tube are as below: (8)
Inside diameter – 34 mm.
Outside diameter – 46 mm.
The sampling tube has a cutting shoe of internal diameter 32mm and external diameter 50mm attached to it.
Compute the inside clearance, outside clearance, and area ratio of the given assembly. Do you recommend the given sampler for obtaining undisturbed soil samples? Justify.

b) Describe the procedure to obtain undisturbed clay samples as per IS 1892 (1979). (6)

OR

18. a) Prepare a note on thin walled sampler and piston sampler, comparing the usage of both. Also explain the use of a core retainer in sample collection. 6)

b) Describe handling and labeling of disturbed and undisturbed samples as per IS 1892 (1979). What are the data recorded in a typical label? (8)

MODULE V

19. a) What is the significance of pressure meter modulus and limit pressure? Explain the procedure for determination of the same. (8)

b) How are the settlements of a foundation computed in sandy soil and clayey soil if plate settlement for corresponding pressure and dimensions of plate and foundation are available? Also describe the limitations of the test. (6)

OR

20. a) Define rock quality designation and core recovery. How are core samples handled and transported to laboratory? (9)

b) Draw and depict a typical bore log used for recording of borings (5)

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