Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022

GEOMECHANICS AND STRUCTURES

(2021 Scheme)

Course Code: **21GS204-A**

Course Name: **Environmental Geotechniques**

Max. Marks: **60** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. List the engineering properties of solid wastes.
2. What is the significance of combustion potential of solid wastes, especially those in a landfill?
3. Explain the sources of sub-surface contamination with a detailed sketch.
4. Draw the schematics of a landfill gas collection system.
5. How is it possible to reduce the quantity of wastes generated?
6. What are the geotechnical uses of the following solid wastes?
   a. Worn out rubber tires.
   b. Building debris.
   c. Blast furnace slag.
7. What are the advantages of converting flyash powder into slurry form?
8. What are the sources of slurry wastes?

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. a) Explain wet and dry ash disposal facilities. (3)
   b) What are the specific advantages of dry and wet methods of ash disposal? (3)

OR

10. a) What are the different criteria for selection of a solid waste disposal site? (4)
    b) What is Site Sensitivity Index? (2)

MODULE II

11. a) What are the principal landfill gases? (3)
    b) Elaborate on the significance of landfill gas monitoring and management. (3)

OR

12. Explain the detailed processes and principles of combustion potential tests. (6)

MODULE III

13. Explain the mechanisms of contaminant transport through a porous soil mass. (6)

OR

14. a) What are bioreactor landfills? (3)
    b) Explain the specific advantages of bioreactor landfills over conventional landfill systems. (3)

MODULE IV

15. a) Explain the design and installation process for a compacted clay liner below the leachate collection layer. How to attain the expected level of permeability by using the same clay? (4)
    b) What are the expected properties of a material to be used in a compacted clay liner? (2)

OR

16. Explain the different types of geosynthetic clay liners and the methods of manufacturing the same. (6)

MODULE V

17. a) What are the different considerations while transporting waste from the source to the processing unit? (4)
    b) What are the different types of wastes that can be used in geotechnical construction? (2)

OR

18. Explain the different aspects of using waste materials for constructing embankments and fills. (6)

MODULE VI

19. a) What are vertical barriers for containment? Where are they used? (3)
    b) Explain the construction process of a bentonite slurry vertical barrier wall. (3)

OR

20. a) What are slurry ponds? (2)
    b) What are the impacts of slurry ponds on the environment and how to control them? (4)

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