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
ELECTRICAL AND ELECTRONICS ENGINEERING
(2020 SCHEME)

Course Code : 20EET322

Course Name: Renewable Energy Systems

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

PART A

(Answer all questions. Each question carries 3 marks)

1. Discuss the advantages of non-conventional energy sources.
2. What do you mean by greenhouse effect?
3. Define a) Solar constant b) Hour angle c) Declination angle
4. Draw and explain the VI characteristics of a solar cell.
5. What is meant by small hydro project? Give its classifications.
6. Wind speed is 10 m/s at the standard atmospheric pressure. Calculate the total power produced by a turbine of 100 m diameter with an efficiency of 40%. Air density = 1.226 kg/m^3.
7. What are the different components of tidal power plant? Explain.
8. "Bio fouling is a biological process mostly associated with OTEC systems". Explain.
9. What are the factors affecting biogas generation?
10. What are the advantages of hydrogen energy?

PART B

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

MODULE I

11. a) Define global warming. What are the causes and effects of global warming. (8)
    b) Explain the importance of Kyoto protocol. (6)

OR

12. a) Discuss the type of conventional and non-conventional energy sources, their advantages and disadvantages. (10)
    b) Discuss the Indian energy scenario. (4)

MODULE II

13. a) Compare the construction and working of Pyranometer and Pyrheliometer. (10)
    b) Calculate the angle of declination of solar rays during June 21st and March 21st. (4)

OR

14. a) Draw and explain the operation of flat plate collectors. (7)
    b) Explain about stand alone and grid connected solar photovoltaic systems. (7)

MODULE III

15. a) Derive the expression for the power extracted by a wind turbine. (10)
    b) Explain the terms yaw control and pitch control. (4)

OR

16. a) Explain the classification of wind mills. Explain vertical axis wind turbine with neat diagrams. (7)
    b) Explain the different types of turbines used in small hydro plants. (7)

MODULE IV

17. a) With the help of a neat diagram explain closed cycle OTEC system. (8)
    b) What are the factors affecting the site selection of OTEC? (6)

OR

18. a) Classify tidal power plants and explain any two of them. (10)
    b) What are the advantages and limitations of tidal power plants. (4)

MODULE V

19. a) Compare the construction and working of fixed dome type and floating dome type biogas plants with the help of neat sketches. (10)
    b) Explain the thermochemical conversion of biomass. (4)

OR

20. a) Explain the working of a fuel cell with the help of a diagram. (7)
    b) Explain the different types of energy storage. (7)

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