

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2024

(2020 SCHEME)

Course Code : 20MET443

Course Name: Renewable Energy Engineering

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Discuss the renewable energy potential of India.
2. Define (a) Solar constant (b) Air mass and (c) Irradiance.
3. What is the difference between passive and active solar energy systems?
4. List any three advantages and disadvantages of solar energy.
5. What are the environmental impacts of wind turbines?
6. State Betz limit theory.
7. Write any two advantages and disadvantages of a tidal power plant.
8. Explain geothermal gradient.
9. "Energy released from biomass comes from Sun". Elaborate on this point.
10. Define (a) Payback time (b) Return on investment (c) Life cycle cost.

PART B

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

MODULE I

11. a) Substantiate your answer for promoting electric vehicles in Kerala, which is a densely populated state. Are there any disadvantages in future? (10)
b) How is nuclear fission different from nuclear fusion? Discuss the method of energy generation in both the cases (4)

OR

12. a) Calculate the number of daylight hours in Srinagar for 12th January, 2024. (The latitude of Srinagar is $34^{\circ} 05' N$). (4)
b) Compare the construction and working of Pyranometer and Pyrhelimeter (10)

MODULE II

13. Sketch and explain different types of solar collectors. (14)

OR

14. With neat sketches, explain the working of any two types of solar thermal electric systems. (14)

MODULE III

15. With a neat block diagram (labelled), explain the working principle of wind turbines. (14)

OR

16. Derive an expression for the actual power generation for a wind turbine. Compare horizontal and vertical axis wind turbines. (14)

MODULE IV

17. Sketch and explain any two types of OTEC systems. List any two environmental impacts of OTEC. (14)

OR

18. Sketch and explain the hydro geothermal energy resources. (14)

MODULE V

19. With appropriate diagrams, explain (a) fixed dome type digester (Janata Model) and (b) floating dome type digester (KVIC Model) (14)

OR

20. Elucidate hydrogen fuel producing and storage of hydrogen energy methods. (14)
