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Question Paper Code : 86600

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Eighth Semester

Electrical and Electronics Engineering

EE 1451 – RENEWABLE ENERGY SOURCES

(Regulations 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the approximate amount of total power generation in India?
2. List two major renewable energy sources of energy.
3. Name the instruments used for the measurement of solar radiation.
4. State the applications of solar PV systems.
5. Name the states that contribute wind power.
6. Compare and contrast horizontal and vertical axis wind turbines.
7. What is meant by the term Energy plantation?
8. List the Wave Power Devices.
9. What is meant by the term Ultra Capacitors?
10. List the various types of Energy Storage systems.

PART B — (5 × 16 = 80 marks)

11. (a) Discuss in detail about the different renewable energy sources. Explain their availability, economics and efficiency with reference to Indian context. (16)

Or

- (b) (i) Discuss the energy consumption pattern and growth rate in India. (8)
- (ii) Illustrate the concept of clean development mechanism. (8)

12. (a) Write short notes on different types of solar energy collectors with neat diagrams. (16)

Or

- (b) Explain the principle of
- (i) Building integrated PV system. (8)
 - (ii) Grid connected solar system. (8)
13. (a) What are the factors to be considered, while selecting a site for wind turbine? Also explain the working principle of wind electric energy system with a block diagram. (16)

Or

- (b) Calculate the generated electric power, when the wind speed is 8.4 meters per second for a horizontal axis three blade wind turbine machine having rotor blade diameter of 75 meter. The co-efficient of power activated in the wind turbine is 0.56. The Gear and Coupling Efficiency is 90%. The conversion efficiency of the generator is 93%. Also calculate the power generated, when the wind speed rise by 25% more than the previous case. (16)
14. (a) Describe in detail the anaerobic digestion process. Explain the parameters to be controlled to achieve the biogas production efficiency. (16)

Or

- (b) Explain with the help of simple schematic, the principle of a closed cycle OTEC. Mention why closed cycle OTEC is preferred. (16)
15. (a) With an Example, explain the working principle of Electrochemical Energy Storage. Also specify the advantages and limitations. (16)

Or

- (b) Calculate the battery size required in Volt-Ampere Hour (VAH) to store the energy requirement of a house which demand a back-up power of 450 VA load at unit power factor for 2 Hours daily. Assume DC to AC energy conversion efficiency is 96% and residual charge to be left out in the battery is 12% of the rated battery energy storage capacity. (16)
