Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 70569

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Seventh Semester

Electrical and Electronics Engineering

EE 8703 – RENEWABLE ENERGY SYSTEMS

(Regulations 2017)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the disadvantages of fossil fuel usage.

2. Mention the total Installed capacity of renewable energy sources based power generation.

3. Compare horizontal axis and vertical axis wind turbines.

4. What is meant yaw control in wind energy systems? What is the use of it?

5. Define global radiation. What is solar constant?

6. Compare the following types of solar PV cells with respect to manufacturing process, efficiency, appearance.

   (a) Monocrystalline

   (b) Polycrystalline

7. Enumerate the environmental benefits of biomass resources.

8. List out the types of water turbines.

9. How tides are created in nature?

10. Write the basic principle of fuel cells.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss about the solar and wind energy sources with respect to its principle, characteristics, advantages and disadvantages.

Or

(b) Discuss the Indian energy scenario related to conventional and renewable energy sources as per December 2022 data.

12. (a) Explain features of main components of wind power plant.

Or

(b) Discuss about the grid integration issues of wind power plant.

13. (a) Explain the working principle, features, advantages and disadvantages of dish type solar power plant with its schematic diagram.

Or

(b) (i) Describe the principle and construction of solar photovoltaic cells. (7)

(ii) Explain series and parallel connections of PV modules and their purpose. (6)

14. (a) Describe pyrolysis process of biomass digestion.

Or

(b) Explain the principle and working of a dry steam geothermal power plant. Discuss about the advantages and disadvantages.

15. (a) (i) Describe the principle and working of wave energy conversion system. (5)

(ii) Describe the methods of production of hydrogen from coal. (8)

Or

(b) (i) Describe about the construction of fuel cells. (8)

(ii) Explain the operation of proton exchange membrane fuel cell. (5)

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the necessity of Maximum Power Point Tracking (MPPT) in solar PV systems. Explain the incremental conductance algorithm for achieving MPPT.

Or

(b) Derive the equation for power generated from a wind turbine. Derive Betz limit for power generation in wind turbine. What do you infer from Betz limit?

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