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Question Paper Code : 40586

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

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. List any two environmental consequences of using fossil fuels.
2. What is the current status of renewable energy in India?
3. What is cut-in wind speed?
4. State one major issue in integrating wind power into the grid.
5. Name any two devices used for measuring solar radiation.
6. Mention any two types of solar cells.
7. What is meant by biomass cogeneration?
8. Define geothermal energy.
9. Distinguish between barrage and non-barrage tidal power systems.
10. Mention one application of hydrogen as an energy carrier.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the importance of renewable energy sources in the current global and Indian context.

Or

- (b) Describe the concept of sustainable design and development and their relevance to renewable energy.

12. (a) With a neat diagram, explain the working of a horizontal axis wind turbine and describe the functions of each component.

Or

- (b) Explain the factors affecting the siting of wind turbines.
13. (a) Describe the working of solar ponds and how thermal energy is extracted from them.

Or

- (b) With neat diagrams, explain the I-V characteristics of a PV cell, and discuss how cells are connected in series and parallel to form modules and arrays.
14. (a) Explain the conversion processes of biomass energy with examples.

Or

- (b) Explain the theory and operation of water turbines used in hydroelectric power systems.
15. (a) Describe wave power devices used to extract energy from ocean waves.

Or

- (b) Classify the types of fuel cells and explain any two in detail.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Derive the equation for power available in the wind and discuss how wind turbine design parameters influence energy output.

Or

- (b) Explain the maximum power point tracking (MPPT) technique. Why is it necessary? Discuss commonly used MPPT algorithms applicable to solar pv systems.