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MRW–003

MASTER OF SCIENCE (RENEWABLE ENERGY AND ENVIRONMENT) (MSCRWEE)

Term-End Examination

June, 2025

MRW-003 : RENEWABLE ENERGY SYSTEM

Time : 3 Hours *Maximum Marks : 70*

Note : *(i) Attempt any **seven** questions.*

(ii) All questions carry equal marks.

(iii) Use of scientific calculator is permitted.

1. (a) What is the difference between renewable energy and non-renewable energy ? 5

   (b) What are the common minerals found in coal ? How do you select the type of coal mining ? 5

2. (a) What are the environmental impacts of photovoltaic solar energy ? 5

   (b) Define solar water heaters. State the temperature of hot water available from a solar water heater. 5

3. (a) A solar PV cell is irradiated by solar insulation of 900 W/m^2. The maximum power output per unit area of the cell is 100 W/m^2. Determine the following : 5

   (i) The maximum conversion efficiency

   (ii) The cell area for an output of 950 W at the condition of maximum power.

   (b) What is the effective life of a photovoltaic module ? State the factors on which voltage output of a PV module depends. 5

4. (a) Describe the utilization wind energy for water pumping and off grid power generation. 5

(b) Classify the water turbines based on the name of the originator and mention the specific speeds under which they work. How is the performance of water turbines expressed ? 5

5. (a) What are the various ways in which tidal power can be harnessed ? What is tidal stream generator ? 5

(b) What is the difference between synthesis gas and biogas ? How is electricity generated from biomass ? 5

6. (a) How is ethanol produced ? 5

(b) What is biogas ? What is its composition ? Explain the applications of biogas. 5

7. (a) Discuss the characteristics and applications of geothermal energy. 5

(b) What is energy harvesting and why is it required ? Explain. 5

8. Write short notes on any *two* of the following : 5+5=10

   (a) Piezoelectric energy harvesting

   (b) Cryogenic storage of hydrogen

   (c) Hydrogen production from electrolysis

   (d) Horizontal axis wind turbine

9. What is pyrolysis ? Explain the types of pyrolysis in detail. 10

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