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MRW–006

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

Term-End Examination

June, 2025

MRW-006 : BIOENERGY CONVERSION AND ITS UTILIZATION

Time : 3 Hours *Maximum Marks : 70*

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

(ii) All questions carry equal marks.

1. (a) Explain the enzymatic degradation of plant based polymers. 5

(b) Discuss the risks related to uncontrolled dumping of solid waste. 5

2. Describe the process of conversion of lignin biomass to fuels for combustion engines/vehicles. 10

3. Explain the process of production of ethanol in detail with the help of a neat sketch. 10

4. Distinguish between any *four* of the following : 2.5×4=10

   (a) High temperature deconstruction and low temperature deconstruction

   (b) Polymeric membrane electrolyzer and alkaline electrolyzer

   (c) Bubbling fluidized bed furnace and circulating fluidized bed furnace

   (d) Volatility and Boiling point

   (e) Acidogenesis and Acetogenesis

   (f) Waste minimization and Pollution prevention

5. Define any *two* of the following properties of a fuel. Discuss their significance also : 5+5=10

   (a) Calorific value

   (b) Octane number

   (c) Density

   (d) Flash point

   (e) Cetane number

6. (a) Explain the process of gasification. 5

   (b) Describe the working of knowledge based control system for bioreactor. 5

7. Describe the design features of biomass cook stove. 10

8. Discuss the objectives of National Green Hydrogen Misson of India. 10

9. (a) Explain in detail the production process of bio-methanol. 5

   (b) What are grey and blue hydrogen ? How are they produced ? 5

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

    (a) Properties of butanol as a fuel

    (b) Cross-current gasifier

    (c) Biogas purification technology

    (d) Biodiesel

    (e) Biofuel policy in India

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