

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE MINOR - SEMESTER-V EXAMINATION – SUMMER 2024

**Subject Code:115AB02**

**Date:06-06-2024**

**Subject Name:Waste Heat and Energy Recovery**

**Time:02:30 PM TO 05:00 PM**

**Total Marks:70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What is Energy from Waste (EfW)? **03**
- (b) How does the combustion process work in EfW? **04**
- (c) Describe the landfill gas recovery process and its benefits **07**
- Q.2** (a) List the main advantages of EfW. **03**
- (b) Discuss the role of public opinion in the establishment and operation of EfW plants. **04**
- (c) Write in detail about the types of Agro-Based Waste Used as Fuel. **07**

**OR**

- (c) Write short note on: The processes for Converting Agro-Based Waste into Fuel. **07**
- Q.3** (a) Define waste heat recovery and its primary objectives **03**
- (b) Identify industries where waste heat recovery can be particularly effective and beneficial. **04**
- (c) What are the different types of anaerobic digesters? Explain in detail. **07**

**OR**

- Q.3** (a) Define gasification and explain the basic principle behind the process. **03**
- (b) Compare pyrolysis with other waste treatment methods such as incineration and land filling. **04**
- (c) Explain various applications of biogas, including electricity generation, heat production, and vehicle fuel. **07**
- Q.4** (a) Define pyrolysis and explain the basic principle behind the process. **03**
- (b) What types of plastic waste can be processed through pyrolysis? **04**
- (c) Explain the various types of heat pumps. **07**

**OR**

- Q.4** (a) What are the future prospects for energy recovery from waste? **03**
- (b) How does a heat pump recover energy? **04**
- (c) What are the different applications of energy recovery in heat pump systems? **07**
- Q.5** (a) What are the environmental benefits of energy recovery into heat pump systems? **03**
- (b) Explain waste valorization? **04**
- (c) What are the future prospects for combustion technology? **07**

**OR**

- Q.5** (a) What types of waste materials can be valorized? **03**
- (b) Define recycling and explain how it is applied in industrial settings to recover materials or products for reuse. **04**
- (c) What are the challenges and barriers to implementing recycling and reuse-based industrial processes? **07**

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