Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - V EXAMINATION - WINTER 2025

Subject Code: 3154404 **Date: 29-11-2025**

Subject Name: Waste to Energy

Time: 10:30 AM TO 01:00 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.**

			Marks
Q.1	**(a)**	What is the purpose of Syngas generation ?	**03**
	(b)	What is the energy conversion of Pyrolysis.	**04**
	(c)	Classify Microalgae Phyla and their role in waste to energy generation.	**07**
Q.2	**(a)**	Define: BOD, Heating value, Incineration.	**03**
	(b)	What is Waste ? Discuss the characterization of Waste in brief.	**04**
	(c)	Write a brief note on Routes for Energy production from waste.	**07**
		OR	
	(c)	What is Gasification ? Explain Chemistry of the Gasification Process.	**07**
Q.3	**(a)**	How does an Anaerobic digester work.	**03**
	(b)	Explain basis of the Transesterification process.	**04**
	(c)	Discuss the present scenario for Energy from waste.	**07**
		OR	
	(a)	What are the advantages of Pyrolysis ?	**03**
	(b)	Explain the working and significance of fabric filters.	**04**
	(c)	Discuss opportunities and challenges for waste to energy concept in India.	**07**
Q.4	**(a)**	List the different types of Transesterification processes.	**03**
	(b)	Discuss strategies for enhanced lipid accumulation.	**04**
	(c)	Discuss Energy production from organic wastes through fermentation and anaerobic digestion.	**07**
		OR	
	(a)	Discuss the Electron Transfer Mechanism.	**03**
	(b)	Compare various Liquid Extraction Processes.	**04**
	(c)	Comparison of open and closed Photo Bioreactor.	**07**

Q.5 **(a)** Discuss Mechanism of oil Extraction using Solvent. **03**

(b) What is Flocculation and explain how it works ? **04**

(c) Explain energy production from wastes through Pyrolysis and Gasification. **07**

OR

(a) What is Microbial fuel cells. **03**

(b) Write a short note on Biodiesel. **04**

(c) Liquid ethanol (C_2H_5OH) is burned with 150% theoretical oxygen. The reactants enter at 25^{o}C and the products are cooled and leave at 65 ^{o}C, 0.1 MPa. Calculate the heat transfer per kmole of fuel. Take enthalpy of formation for ethanol is -277634 kJ / kmole of fuel. **07**

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