Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2024

Subject Code:3150507 Date:25-11-2024

Subject Name:Energy Technology

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)**	Define energy security. Why is it important for a growing economy?	**03**
	(b)	Differentiate between primary and secondary energy resources.	**04**
	(c)	Explain the process of gasification of coal with a neat sketch. Discuss its advantages in energy conversion.	**07**
Q.2	**(a)**	What is the significance of calorific value in fuel?	**03**
	(b)	Explain the proximate analysis of coal and its importance in fuel selection.	**04**
	(c)	Discuss the steps involved in identifying energy-saving opportunities in steam distribution systems.	**07**
		OR	
	(c)	Explain the principle of combustion and describe the factors that affect the combustion efficiency.	**07**
Q.3	**(a)**	Mention two methods of solar energy storage.	**03**
	(b)	Compare flat plate collectors and concentrating collectors used in solar energy systems.	**04**
	(c)	Describe the design and working principle of a community biogas plant. Highlight its advantages and limitations.	**07**
		OR	
Q.3	**(a)**	List two properties of fuel oil important for combustion.	**03**
	(b)	Explain the different types of solar energy collectors used for industrial applications.	**04**
	(c)	Describe the wind energy conversion system (WECS) and discuss the basic components involved in it.	**07**
Q.4	**(a)**	What is the role of a steam trap in a steam system?	**03**
	(b)	Discuss the classification of waste heat recovery devices and their commercial applications.	**04**
	(c)	Describe the working of a hydrogen-oxygen fuel cell with a neat diagram. Discuss its advantages and disadvantages.	**07**
		OR	
Q.4	**(a)**	Define polarization in fuel cells. Why is it significant in evaluating fuel cell performance?	**03**
	(b)	Discuss the various factors affecting the design of a biogas plant.	**04**
	(c)	Explain the basic principles of wind energy and how site selection affects the efficiency of wind power generation.	**07**

Q.5	**(a)**	What are the factors affecting the efficiency of thermal gasification of biomass?	**03**
	(b)	Define energy audit and explain its importance in industries.	**04**
	(c)	Discuss the impact of energy consumption on the environment and how energy conservation helps mitigate these impacts.	**07**

OR

Q.5	**(a)**	Write a short note on the future of renewable energy sources.	**03**
	(b)	Explain the concept of economic thickness of insulation and its relevance in energy conservation.	**04**
	(c)	Describe the different types of electrodes used in fuel cells and their roles in improving conversion efficiency.	**07**

****