Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020

Subject Code:3150507 Date:22/01/2021

Subject Name:Energy Technology

Time:10:30 AM TO 12:30 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Differentiate between conventional & non-conventional Energy sources.	**03**
	(b)	Discuss on world energy futures.	**04**
	(c)	List out all the commercially available waste heat recovery devices. Explain any one device with neat sketch.	**07**
Q.2	**(a)**	Discuss selection and applications of refractories.	**03**
	(b)	Explain types of Energy Audit.	**04**
	(c)	Explain proximate and ultimate analysis of coal in detail.	**07**
Q.3	**(a)**	Define steam traps. State the functions of steam traps.	**03**
	(b)	Explain types of insulations and also discuss its applications.	**04**
	(c)	Discuss in detail about energy conservation. Also state its importance.	**07**
Q.4	**(a)**	Define: (i) Beam Radiation, (ii) Solar Altitude, (iii) Solar Azimuth Angle	**03**
	(b)	What are the advantages and disadvantages of fuel cell?	**04**
	(c)	Explain solar pond briefly. What are the applications of solar pond?	**07**
Q.5	**(a)**	List all the factors affecting biodigestion.	**03**
	(b)	What are the advantages and disadvantages of concentrating collectors over flat plate collectors?	**04**
	(c)	Categorize different types of fuel cell and describe Molten Carbonate Fuel Cell (MCFC) with neat diagram.	**07**
Q.6	**(a)**	Define Photosynthesis. What are the conditions necessary for photosynthesis?	**03**
	(b)	Define biomass and list biomass energy resources.	**04**
	(c)	List out various types of instruments for measuring solar radiation and explain any one.	**07**
Q.7	**(a)**	What are the techniques suggested for maintaining the biogas production?	**03**
	(b)	Enlist various applications of solar energy.	**04**
	(c)	Describe with neat sketch the working of a wind energy system (WECS) with main components.	**07**
Q.8	**(a)**	State different applications of wind energy.	**03**
	(b)	Describe the main considerations in selecting a site for wind generators.	**04**
	(c)	Describe construction and working of KVIC digester.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2021

Subject Code:3150507 Date:15/12/2021

Subject Name:Energy Technology

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)**	Enlist the advantages and limitations of non-conventional energy sources.	**03**
	(b)	Explain solar pond in brief.	**04**
	(c)	Explain proximate and ultimate analysis of coal in detail.	**07**
Q.2	**(a)**	Discuss in brief about criteria for site selection of wind mill.	**03**
	(b)	Discuss in brief: Factors affecting the biogas generation	**04**
	(c)	Define Fuel Cell. Explain in details about ion exchange membrane cell with neat diagram.	**07**
		OR	
	(c)	Discuss in brief about the type of electrodes for fuel cell and state various applications of fuel cell technology.	**07**
Q.3	**(a)**	Explain in brief about the thermal storage system of solar energy.	**03**
	(b)	Explain in brief: Steam trapping	**04**
	(c)	Define conventional & non conventional energy source. Explain in brief about conventional & non conventional energy sources with reference to Indian context.	**07**
		OR	
Q.3	**(a)**	Discuss in brief about energy audit.	**03**
	(b)	Explain in brief: Selection and application of refractories.	**04**
	(c)	Define solar collector. List various types of line focusing type concentrator and explain one of it.	**07**
Q.4	**(a)**	Discuss advantages and disadvantages of fuel cell in brief.	**03**
	(b)	Explain in brief: Thermal gasification of biomass	**04**
	(c)	Explain in details with neat sketch about the working of a wind energy conservation system (WECS) with main components.	**07**
		OR	
Q.4	**(a)**	Enlist various applications of wind energy.	**03**
	(b)	Explain in brief: Polarization in fuel cell	**04**
	(c)	Enlist Indian types of biogas plant and explain any one in details.	**07**
Q.5	**(a)**	Discuss in brief: various application of solar collectors.	**03**
	(b)	Discuss in brief about energy conservation and its importance.	**04**
	(c)	Enlist commercially viable waste heat recovery devices and discuss any one of the device in details.	**07**
		OR	
Q.5	**(a)**	Discuss in brief about importance of site selection for installation of biogas plant.	**03**
	(b)	Discuss in brief: Advantages and disadvantages of wind energy	**04**
	(c)	Enlist various fuel cells. Explain in detail about hydrogen-oxygen fuel cell with neat diagram.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2021

Subject Code:3150507 Date:07/09/2021

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 Management and describe different steps involved in it.	**03**
	(b)	Why the energy Conservation and energy Audit are necessary? Explain with any example.	**04**
	(c)	Explain any one commercial Waste Heat Recovery Devices with neat figure.	**07**
Q.2	**(a)**	What is the nature of wind?	**03**
	(b)	Draw the neat sketches of porous absorber type air heaters.	**04**
	(c)	List out different types of fuel cell and explain fossil fuel cell in detail.	**07**
		OR	
	(c)	Explain ion exchange membrane cell with neat figure.	**07**
Q.3	**(a)**	Discuss energy sector reforms in detail.	**03**
	(b)	Define: (I) Solar constant, (II) Concentration ratio, (III) Declination angle, (IV) Angle of Incidence.	**04**
	(c)	Describe flate plate collector with neat figure also write its advantages.	**07**
		OR	
Q.3	**(a)**	Discuss classification of Refractories in detail.	**03**
	(b)	Write a short note on Gasification.	**04**
	(c)	Describe any two concentrating type collectors in detail.	**07**
Q.4	**(a)**	List out the different type of electrodes in detail.	**03**
	(b)	What are the benefits of insulation other than heat loss / heat gain?	**04**
	(c)	Explain the different dry processes for biomass conversion.	**07**
		OR	
Q.4	**(a)**	Draw the Steam Phase Diagram.	**03**
	(b)	Explain curves of pressure and velocity of wind passing through a propeller of horizontal axis wind turbine.	**04**
	(c)	Discuss factors affecting biogas generation.	**07**
Q.5	**(a)**	Discuss site selection for a biogas plant.	**03**
	(b)	Write a short note on conversion efficiency in fuel cell.	**04**
	(c)	Discuss the different forces on the blades of turbine and also derive the formula.	**07**

OR

Q.5	**(a)**	Discuss the benefits of Waste Heat Recovery.	**03**
	(b)	Derive the formula to calculate power in wind.	**04**
	(c)	A horizontal shaft, propeller type wind turbine is located in area having following wind characteristics: speed of wind 10 m/s at 1 atm and 15 C. Calculate the following: 1. Air density 2. Total power density in wind stream, W/m^2 3. Maximum possible obtainable power density, W/m^2 4. Actual obtainable power density, W/m^2 5. Total Power from a wind-turbine of 120 m diameter. 6. Torque and axial Thrust on the wind-turbine operating at 40 rpm and at maximum efficiency of 42 %.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(NEW) EXAMINATION – SUMMER 2022

Subject Code:3150507 Date:02/06/2022

Subject Name:Energy Technology

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.**

			MARKS
Q.1	**(a)**	What is a solar pond?	**03**
	(b)	Explain site selection criteria for wind power generation.	**04**
	(c)	Discuss the type of solar collector and its advantages.	**07**
Q.2	**(a)**	Explain energy audit.	**03**
	(b)	Discuss energy demand.	**04**
	(c)	List refractory applications and explain their role in selection for energy saving.	**07**
		OR	
	(c)	Explain the importance of a flash recovery system with its principle, operation, and advantages.	**07**
Q.3	**(a)**	Explain the power of wind for power generation.	**03**
	(b)	Discuss community biogas plant.	**04**
	(c)	List the advantages and disadvantages of the fuel cell. Explain hydrogen-oxygen fuel cells.	**07**
		OR	
Q.3	**(a)**	Explain wind force's impact on blades and turbines in power generation.	**03**
	(b)	Discuss the properties of biogas.	**04**
	(c)	Explain in detail the molten carbonate cell with its applications.	**07**
Q.4	**(a)**	What is biomass conversion technology?	**03**
	(b)	Discuss the components of the wind energy conservation system.	**04**
	(c)	List commercially available energy recovery units and explain to anyone with a diagram.	**07**
		OR	
Q.4	**(a)**	Explain pyrolysis of biomass.	**03**
	(b)	List application of wind energy.	**04**
	(c)	Discuss with the sketch stepwise coal gasification.	**07**
Q.5	**(a)**	List out non-conventional energy resources.	**03**
	(b)	Discuss the type of biogas plant.	**04**
	(c)	Explain the type of electrodes used in fuel cells and their conversion efficiency for energy output.	**07**
		OR	
Q.5	**(a)**	Explain the importance of energy conservation.	**03**
	(b)	Justify the importance of pH in the generation of biogas.	**04**
	(c)	Discuss ion exchange membrane cell and fossil fuel cell.	**07**

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