Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3170116 Date:14-12-2023

Subject Name: Solar and wind 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 Renewable energy? Write Advantages of Renewable energy.	**03**
	(b)	Explain the basic components of wind energy conversion system.	**04**
	(c)	What is direct and diffuse solar radiation? Explain Pyrheliometer with neat sketch.	**07**
Q.2	**(a)**	Define terms: 1)Longitude 2) Angle of Latitude 3)solar altitude angle	**03**
	(b)	What is Solar air heater? Explain working of Solar air heater.	**04**
	(c)	What is concentrated solar collector? Explain any one concentrated solar collector.	**07**
		OR	
	(c)	What is solar water heater? Explain the solar water heater for domestic applications.	**07**
Q.3	**(a)**	Differentiate Horizontal and Vertical axis rotors.	**03**
	(b)	What is power electronics converter? Explain its role in wind power.	**04**
	(c)	What is optimum velocity? Derive the equation for maximum power, maximum torque and maximum axial thrust available from wind turbine.	**07**
		OR	
Q.3	**(a)**	Write advantages and disadvantages of wind energy.	**03**
	(b)	Describe the main considerations in selecting the site for wind energy conversion system.	**04**
	(c)	Does Betz limit is apply in wind energy conversion system? Draw following curves. 1) Variation of power coefficient with tip speed ratio 2) Variation of torque coefficient with tip speed ratio for wind energy conversion system.	**07**
Q.4	**(a)**	Differentiate Passive space heating and Active space heating.	**03**
	(b)	What is solar dryer? Explain cabinet type solar dryer	**04**
	(c)	Explain Photovoltaic operated refrigeration system.	**07**
		OR	
Q.4	**(a)**	Write advantages and disadvantages of photovoltaic solar energy conversion.	**03**
	(b)	What is solar distillation? Explain solar still with neat sketch.	**04**
	(c)	Explain Solar Pond with neat sketch	**07**
Q.5	**(a)**	Define 1) Initial cost 2) Annual cost 3) payback period	**03**
	(b)	Explain repayment of loan in equal annual installments	**04**
	(c)	Explain economic analysis of solar energy	**07**
		OR	
Q.5	**(a)**	Define 1) Annual solar saving 2) Cumulative saving 3)Energy economics	**03**
	(b)	Explain Life cycle cost analysis	**04**
	(c)	Explain Photovoltaic water pumping system.	**07**

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