Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3170116 Date:21-05-2025

Subject Name:Solar and wind Energy

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 various Renewable Energy Technologies and their limitations.	**03**
	(b)	Define terms: Solar latitude Angle, Declination Angle, Surface Azimuth angle, and Hour Angle.	**04**
	(c)	Explain construction and working of sunshine recorder with schematic sketch.	**07**
Q.2	**(a)**	Define (1) Beam Radiation (2) Diffuse Radiation and (3) Total Radiation.	**03**
	(b)	Explain the working of solar dryer with neat sketch.	**04**
	(c)	Explain with a neat sketch Solar water heating system in detail.	**07**
		OR	
	(c)	Write a short note on Off shore wind farms.	**07**
Q.3	**(a)**	Explain various factors affecting for the performance of flat plate collector.	**03**
	(b)	Classify Solar cookers and also write its advantage and dis-advantages.	**04**
	(c)	Explain solar chimney with a neat sketch.	**07**
		OR	
Q.3	**(a)**	Write a short note on solar saving	**03**
	(b)	Explain solar furnace with neat sketch?	**04**
	(c)	Give step by step procedure for the design of a solar photovoltaic power plant.	**07**
Q.4	**(a)**	Define the following terms: (1) Annual Cost (2) Present worth value (3) Life cycle cost.	**03**
	(b)	Enlist the various site selection criteria for wind energy conversion system	**04**
	(c)	Classify wind turbine in details. Also explain anyone with neat sketch.	**07**

OR

Q.4	**(a)**	What are the functions of Yaw Control and Pitch Control Mechanisms in wind turbine?	**03**
	(b)	Explain importance of drag and lift force in wind power generation.	**04**
	(c)	Prove that in case of horizontal axis wind turbine maximum power can develop when exit velocity=1/3 of wind velocity and P_{max}=8 ρAVi3/27.	**07**
Q.5	**(a)**	Define the following terms: (1) Payback time (2) Return on investment (3) Life cycle cost	**03**
	(b)	Explain with neat sketch the geometry of airfoil terminology. Also explain with neat sketch indicating the direction of lift force, drag force, pitching moment coefficient.	**04**
	(c)	Explain with neat diagram Savonius rotor wind turbine with advantages, dis-advantages and its applications.	**07**

OR

Q.5	**(a)**	Explain the need of economic analysis for renewable energy system.	**03**
	(b)	What do you understand by "energy management" and "energy audit"? Classify the energy audit and discuss them in brief.	**04**
	(c)	Explain solar pond with neat diagram.	**07**

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