Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170116 Date:03/06/2022

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.**

			MARKS
Q.1	**(a)**	Define: (1) solar altitude angle (2) solar zenith angle (3) solar azimuth angle.	**03**
	(b)	State role of Power electronics converter in wind power.	**04**
	(c)	Define various solar angles and their effects on the collection of solar radiation on a titled flat surface.	**07**
Q.2	**(a)**	What is the importance of renewable energy sources?	**03**
	(b)	Explain structure of solar cell, module, panel and array.	**04**
	(c)	Explain limitation of solar energy.	**07**
		OR	
	(c)	Explain construction and working of pyranometer with neat sketch.	**07**
Q.3	**(a)**	Short note: OFF-SHORE wind farms.	**03**
	(b)	Explain basic principle of wind energy conversion.	**04**
	(c)	Classify and Explain Fixed and Variable speed wind turbines.	**07**
		OR	
Q.3	**(a)**	State advantages of wind energy.	**03**
	(b)	Explain solidity, tip speed ratio and power co-efficient for wind mill.	**04**
	(c)	Discuss problems in operating large wind power generation.	**07**
Q.4	**(a)**	What is solar cell? State its working principle.	**03**
	(b)	Explain measurements of solar radiation.	**04**
	(c)	Explain: Solar Collectors with Types.	**07**
		OR	
Q.4	**(a)**	Mention voltage and frequency operating limits on integration of solar and wind.	**03**
	(b)	List out application of solar –thermal systems.	**04**
	(c)	Explain Solar Water heaters with equation.	**07**
Q.5	**(a)**	Explain concept of solar constant and air mass.	**03**
	(b)	How solar water pump works?	**04**
	(c)	What is solar pond? Explain solar pond with schematic diagram.	**07**
		OR	
Q.5	**(a)**	Explain direct, diffuse and total radiation.	**03**
	(b)	Advantages of photovoltaic solar energy conversion.	**04**
	(c)	Describe Hot-plate solar cooker.	**07**

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