Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3160917 Date:12-07-2023

Subject Name:Wind And Solar 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)**	Define Cut in speed, Cut out speed and Tip speed ratio.	**03**
	(b)	Write Betz Law and mention Betz limit value for wind turbine.	**04**
	(c)	Derive an expression for power generation in wind turbine.	**07**
Q.2	**(a)**	List the types of generator used in wind power plant.	**03**
	(b)	Draw and explain I-V characteristic of a PV array.	**04**
	(c)	Explain the power conversion in PV cell with circuit diagram.	**07**
		OR	
	(c)	Explain construction and working of Doubly-Fed Induction Generators with characteristics.	**07**
Q.3	**(a)**	Define zenith, solar altitude and azimuth angle in solar geometry.	**03**
	(b)	Draw and explain variable speed wind energy conversion system.	**04**
	(c)	Explain structure of solar cell, module, panel and array.	**07**
		OR	
Q.3	**(a)**	Compare polycrystalline and thin film type solar module.	**03**
	(b)	Explain the solar energy availability in India throughout the year.	**04**
	(c)	What is Maximum Power Point Tracking (MPPT) system and which types of algorithms used to track maximum power from solar PV System.	**07**
Q.4	**(a)**	Differentiate Grid-Connected System and Standalone system.	**03**
	(b)	List out Power quality issues during integration of solar wind with grid.	**04**
	(c)	Write technical note on Solar Refrigeration and Air Conditioning.	**07**
		OR	
Q.4	**(a)**	How solar water pump works?	**03**
	(b)	Draw and explain solar street light operation with its circuit diagram	**04**
	(c)	Explain power electronics converter used in PV power system for maximum power extraction.	**07**
Q.5	**(a)**	What is solar collector? Explain its uses.	**03**
	(b)	Give the type of Solar Concentrators used in solar thermal plant.	**04**
	(c)	Explain operation of solar pond with its applications.	**07**
		OR	
Q.5	**(a)**	Explain operation of solar cooker with usual diagram.	**03**
	(b)	What is grid code and why it is required?	**04**
	(c)	List out application of solar –thermal systems.	**07**

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