Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160917 Date:16-12-2022

Subject Name:Wind And Solar 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)**	Classify the solar radiation and define each term.	**03**
	(b)	Write Betz Law and mention betz limit value in case of wind turbine.	**04**
	(c)	List out various solar thermal applications & explain any one in detail.	**07**
Q.2	**(a)**	Explain solar cell, module and array.	**03**
	(b)	Explain stall control & pitch control of wind power.	**04**
	(c)	Explain fixed speed wind turbine with neat sketch. Also mention its advantages & disadvantages.	**07**
		OR	
	(c)	Explain construction and working of Doubly-Fed Induction Generators.	**07**
Q.3	**(a)**	Explain Wind Physics in detail.	**03**
	(b)	Define the following. 1) Azimuth angle 2) Latitude angle 3) longitude angle 4) Zenith angle	**04**
	(c)	Explain the importance & working of solar water pump.	**07**
		OR	
Q.3	**(a)**	Classify the generators used in wind power plant.	**03**
	(b)	Explain the operation of grid connected solar PV system.	**04**
	(c)	Explain the modeling of elements in hybrid PV-wind system briefly.	**07**
Q.4	**(a)**	Write the short note on battery sizing.	**03**
	(b)	List the advantage and limitation of Solar Energy.	**04**
	(c)	What is Maximum Power Point Tracking (MPPT) system? Explain P & O algorithm to track maximum power from solar PV System.	**07**
		OR	
Q.4	**(a)**	What are the grid code technical requirements?	**03**
	(b)	Describe various types of power quality issues.	**04**
	(c)	Explain solar passive heating & cooling system.	**07**
Q.5	**(a)**	Define : Cut in speed, Cut out speed & Tip speed ratio	**03**
	(b)	Explain the concept of central receiver.	**04**
	(c)	Classify the solar thermal collectors. Explain the construction & working of solar flat plate collector.	**07**
		OR	
Q.5	**(a)**	Define air mass & explain it.	**03**
	(b)	Write short note on box type solar cooker.	**04**
	(c)	Draw & explain the I-V and P-V characteristics of Solar cell.	**07**

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