Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160917 Date:08/06/2022

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)**	Explain the available wind power scenario in India.	**03**
	(b)	Explain stall and pitch control for wind power conversion system.	**04**
	(c)	What is maximum power point tracking algorithm for PV system? Explain any one in details	**07**
Q.2	**(a)**	Draw the Torque – Speed characteristic of induction generator.	**03**
	(b)	Draw and explain I-V characteristic of a PV array.	**04**
	(c)	Derive an expression for power generation in wind turbine.	**07**
		OR	
	(c)	Explain the power conversion in PV cell with circuit diagram.	**07**
Q.3	**(a)**	Draw the per phase model of PMSG. Also write its terminal per phase voltage expression.	**03**
	(b)	Draw and explain variable speed wind energy conversion system.	**04**
	(c)	Explain the electrical circuit model of PV cell.	**07**
		OR	
Q.3	**(a)**	Define earth sun angle and observer sun angle.	**03**
	(b)	Explain the solar energy availability in India throughout the year.	**04**
	(c)	Explain power electronics converter used for doubly-fed induction generator with circuit diagram	**07**
Q.4	**(a)**	What are PV module and PV Array?	**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**
		OR	
Q.4	**(a)**	Explain necessity of battery in PV based power system.	**03**
	(b)	Explain solar water pump with its circuit diagram.	**04**
	(c)	State and explains any three network integration issues for solar and wind energy sources integration with grid.	**07**
Q.5	**(a)**	What is solar collector? Explain its uses.	**03**
	(b)	Draw the power generation by solar PV and wind turbine during 24 hours of a day.	**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)	Explain solar Air Conditioner.	**04**
	(c)	Explain Solar heater in details.	**07**

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