Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree (Minor) Examination December 2021 (2019 admn.)

Course Code: EET 383

Course Name: SOLAR AND WIND ENERGY CONVERSION SYSTEMS

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

		Marks
1	What you meant by solar constant?	3
2	Differentiate between irradiance and insolation.	3
3	List out merits and demerits of flat plate collector.	3
4	List out various application of solar thermal system.	3
5	Illustrate the working of a solar cell.	3
6	A solar cell having an area of 100sqcm gives a current 3.1 A and 0.5V at maximum power point at STC. The cell gives 3.5 A short circuit current and 0.6V open circuit voltage. What is the maximum output power of the solar cell? Also find out the efficiency of the cell.	3
7	Explain pitch control in wind turbine?	3
8	What is the maximum energy limit extractable from the wind? Explain.	3
9	List out advantages of double fed induction generator	3
10	List out the environmental aspects of wind energy	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Derive the expression for calculating total radiation on a flat surface.	10
	b)	With neat diagram explain the working of sunshine recorder.	4
12	a)	Illustrate the working of pyranometer.	10
	b)	Evaluate the declination angle on 22 September 1995	4

Module -2

13	a)	Explain principle and components of flat plate solar collector.	10
	b)	Illustrate the working of solar water heater.	4

14	a)	Explain different types of solar concentrators?	9
	b)	List out the merits and demerits of solar concentrator collector.	5

Module -3

15	a)	Illustrate the working and components of a grid connected solar power plant.	8
	b)	Explain basic interconnection schemes of PV modules in solar PV system?	6
16	a)	Compare the performance of single crystalline solar cell, poly crystalline solar cell and thin film solar cell.	6
	b)	Draw and explain P-V and I-V characteristics during shadowing in solar PV system. Also explain the effect of temperature on these characteristics.	8

Module -4

17	a)	Distinguish between lift and drag forces in wind. Also explain how they are important in wind power generation.	8
	b)	Derive the expression for power developed due to wind.	6
18	a)	Explain different types of wind turbine used to extract the wind.	8
	b)	Explain the application of Weibull distribution in wind power applications.	6

Module -5

19	a)	Compare the performance of various types of wind generators used in wind mill.	10
	b)	List out the merits and demerits of wind energy conversion system.	4
20	a)	Illustrate the working of variable speed constant frequency wind energy conversion system	8
	b)	Write a short note on various power converters used in renewable energy system.	6

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