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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: EE367
Course Name: NEW AND RENEWABLE SOURCES OF ENERGY (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

			Marks
1		What is the present status of various modes of renewable power generations in India. Explain.	(5)
2		Define and explain the following angles as related to solar geometry: (i) Surface azimuth angle (ii) Declination angle (iii) Latitude angle	(5)
3		Draw and Explain the VI characteristics of a solar cell. How does temperature affect the performance of solar cell?	(5)
4		List out any five merits and demerits of OTEC.	(5)
5		Discuss the different types of wind turbine rotors used to extract wind.	(5)
6		Explain the terms solidity, pitch angle, tip speed ratio, cut-in speed and cut speed of wind turbine	(5)
7		With a neat diagram, explain the working of biogas plant	(5)
8		What are the components of a micro hydel power plant	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	Explain various energy storage systems. Give advantages and disadvantages of each.	(6)
	b)	List the merits and de-merits of non-conventional energy resources	(4)
10	a)	Find the hour angle at the sunrise and the sunset on March 22 for a surface inclined at an angle of 20^0 facing south at New Delhi (280 35' N, 770 12' E).	(6)
	b)	Explain the principle, working and components of a solar flat plate collector	(4)
11	a)	Explain the principle and working of the following solar radiation measuring instruments: (i) Pyranometer (ii) Pyrheliometer and (iii) Sunshine recorder	(7)
	b)	What is solar constant? Explain.	(3)

PART C

Answer any two full questions, each carries10 marks.

12		Discuss the basic principle of OTEC. Describe a closed cycle OTEC with its advantages and disadvantages.	(10)
13	a)	Explain various types of tidal power plants.	(5)
	b)	Classify solar cell based on the type of material used. Explain each one.	(5)
14	a)	Draw and explain the block diagram of a standalone solar PV power system	(5)
	b)	A certain PV cell is illuminated with an irradiance of 1000 W/m^2. If the cell is 100 mm X 100 mm in size and produces 3 A at 0.5 V at the maximum power point. What is the conversion efficiency?	(3)
	c)	What is maximum power point tracking?	(2)

PART D

Answer any two full questions, each carries 10 marks.

15	a)	Prove that the maximum wind turbine output can be achieved when V_d=1/3 V_u, where V_d and V_u are down-stream and up-stream wind velocity respectively.	(6)
	b)	What is pitch control of wind turbine? Explain.	(4)
16	a)	Explain any two types of biogas plants? Discuss the factors which decide the quality of biogas.	(5)
	b)	Determine the power output of a wind turbine whose blades are 12 m in diameter and when the wind speed is 6 m/s, the air density is about 1.2 kg/m^3 and the maximum power coefficient of the wind turbine is 0.35.	(5)
17	a)	With a neat schematic diagram, explain the biomass gasification based electric power generation system.	(5)
	b)	Describe the working and constructional features of PEM fuel cell.	(5)

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