No. of Pages: 2

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, APRIL/MAY 2018

Branch: Electrical & Electronics Engineering

Elective I

Stream(s)

1. *Power Systems*
2. *Guidance & Navigational Control*
3. *Power control and Drives*
4. *Control Systems*
5. *Electrical Machines*
6. *Power System and Control*

01EE6412 New And Renewable Sources Of Energy

Answer *any two full* questions from *each* part
Limit answers to the required points.

Max. Marks: 60 Duration: 3 hours

PART A

1.	a.	What are the reasons for variations in solar radiation reaching the earth? Differentiate between beam radiation, diffuse radiation and total radiation.	3
	b.	What are the characteristics of the solar spectrum? Which part is known as the visible spectrum?	3
	c.	Differentiate between solar insolation and irradiance.	3
2.	a.	Explain any one instrument used for measuring total solar radiation.	3
	b.	Determine the average value of solar radiation on a horizontal surface for June 22, at the latitude of 10^0 N, if constants a and b are given as equal to 0.30 and 0.51 respectively, and the ratio n/N = 0.55.	3
	c.	What are the main parts of a flat plate solar collector? Explain the function of each.	3
3.	a.	Explain the different types of solar cookers.	4.5
	b.	Explain the principle of solar photovoltaic power generation? What are the main elements of a PV system?	4.5

PART B

4.	a.	Explain how power can be generated from waves.	3
	b.	Describe with the help of diagrams, any one type of wave energy conversion device.	3
	c.	Write down the advantages and disadvantages of tidal power.	3
5.	a.	Explain the working of different systems used for OTEC with the help of diagrams.	4.5
	b.	Write down the advantages and disadvantages of different OTEC systems.	4.5
6.	a.	Explain in detail, the different types of wind energy systems.	3
	b.	What are the factors to be considered while selecting site for wind turbines?	3
	c.	Compare horizontal and vertical axis wind turbines.	3

PART C

7.	a.	Explain the design considerations of a small hydro plant.	6
	b.	Explain the different types of turbines and generators used in small hydro plants.	6
8.	a.	What are bio fuels? How they can be produced?	4
	b.	Explain the different types of biogas plants.	4
	c.	Write notes on energy plantation.	4
9.	a.	With the help of a diagram, explain the working of a fuel cell.	4
	b.	Explain the different types of geothermal energy systems.	4
	c.	Write notes on power from satellite stations and nuclear fusion energy.	4