Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination December 2022 (2019 scheme)

Course Code: EET435

Course Name: RENEWABLE ENERGY SYSTEMS

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Explain about the role of non-conventional energy sources on the basis of current energy demands of the world.	(3)
2		Explain the principle of solar energy conversion into heat energy.	(3)
3		List out any four environmental impacts of OTEC systems	(3)
4		What are the different components of the tidal power plant? Explain.	(3)
5		Three-bladed wind rotor with blade length of 52 m is operating in a wind stream having wind velocity of 13 m/s. Air density is 1.23 kg/m^3 and power coefficient may be taken as 0.3. Calculate the extractable power from the wind.	(3)
6		Discuss the advantages and disadvantages of horizontal and vertical axis wind mills.	(3)
7		Define biomass gasification. List different types of biomass gasifiers.	(3)
8		What are the factors affecting the biogas generation?	(3)
9		What are the risks for the hydrogen energy storage?	(3)
10		What are fuel cells? List out the applications of fuel cells.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	What are solar collectors? Give their classification and compare them based on construction and area of applications.	(10)
	b)	Write about any three types of solar cells based on construction materials	(4)

OR

12	a)	Explain about stand alone and grid connected solar photo voltaic systems	(10)
	b)	Explain the voltage- current characteristics of a solar cell with neat sketch	(4)

Module II

13	a)	Discuss the basic principle of OTEC. Describe a closed cycle OTEC with its advantages and disadvantages.	(10)
	b)	What is biofouling? How it affects efficiency of energy conversion and how can it be minimised?	(4)

OR

14	a)	What are the different classifications of tidal power plants. Explain the components and detailed working operation of double basin tidal power plant with neat sketch.	(10)
	b)	What are the limitations of the tidal power production?	(4)

Module III

15	a)	What is mean by betz limit? Derive the expression for the power extracted by a wind turbine.	(8)
	b)	What are the different types of generators used with wind turbines?	(6)

OR

16	a)	Describe the construction of a three-bladed horizontal shaft wind turbine generator unit. Explain the terms yaw control and pitch control.	(8)
	b)	What are the advantages and disadvantages of a vertical axis wind turbine system?	(6)

Module IV

17	a)	Describe the construction and working of a biogas plant, its material aspects, and utilization of plant products with a neat diagram	(10)
	b)	Explain the advantages and uses of biogas.	(4)

OR

18	a)	What are the different types of biogas plants? Explain the construction, working of a fixed dome type biogas plant and floating dome type biogas plant	(10)
	b)	What are the factors affecting the selection of a particular model of a biogas plant?	(4)

Module V

19	a)	Explain about the components of a small hydro electric power generation scheme with the help of a neat diagram.	(8)
	b)	Explain about any two methods of hydrogen production.	(6)

OR

20	a)	Explain the working of a H_2O_2 fuel cell and also write the advantages and disadvantages of a fuel cell	(8)
	b)	What are the advantages and applications of hydrogen energy?	(6)

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