Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: EE367

Course Name: NEW AND RENEWABLE ENERGY SYSTEMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries5 marks. Marks

1		What are energy resources? How are they classified?	(5)
2		What is solar constant? What is the expression for solar constant?	(5)
3		Draw and explain a PV based solar pumping system.	(5)
4		What are the advantages and disadvantages of ocean thermal energy conversion systems?	(5)
5		Define the following terms i) Cut in speed ii) Pitch Control iii) Solidity	(5)
6		Give a comparison between horizontal and vertical axis wind machines.	(5)
7		What is anaerobic digestion? Explain briefly.	(5)
8		What are fuel cells? Mention few applications of fuel cells.	(5)

PART B

Answer any two full questions, each carries10 marks.

9	a)	What are the different instruments used for the measurement of solar radiation? Explain in detail.	(8)
	b)	What are the advantages and disadvantages of conventional energy resources?	(2)
10	a)	What is the principle of conversion of solar energy into heat? What are solar thermal collectors? What are the characteristic features of a collector system?	(7)
	b)	Calculate the sunset hour angle and day length at location latitude of 35^0N, on Feb 14.	(3)
11	a)	Describe the energy scenario in India. What are the various non-conventional energy resources relevant to India?	(5)
	b)	What are concentrating collectors? What is the need for orientation in concentrating collectors? Explain briefly the various types of concentrating collectors.	(5)

PART C

Answer any two full questions, each carries 10 marks.

12 a) Describe a stand-alone PV system. (4)

b) Describe a hybrid cycle OTEC system. (6)

13 a) What are the major components of a tidal power plant? (6)

b) What is biofouling? How can it be prevented? (4)

14 a) How are tidal power plants classified? With neat diagrams, explain the working of each. (8)

b) What is a module, array and panel with reference to a solar PV system. (2)

PART D

Answer any two full questions, each carries 10 marks.

15 a) The following data relate to a wind turbine: (6)

Velocity of wind at 15^0C= 10 m/s

Turbine diameter=10m

Operating speed of the machine=35 rpm at maximum efficiency of 40%

Calculate: i) total power density in the wind stream

ii) The maximum power density

iii) The actual power density

iv) Power output of the turbine

b) Prepare a brief note on emerging technologies in the field of renewable energy. (4)

16 What are biomass resources? Enumerate the processes which are used for biomass conversion. (10)

17 a) What are the two fundamental mechanisms to produce force from the wind? What are the advantages and disadvantages of a wind energy conversion system? (5)

b) What is small hydro power? How is it classified? Obtain an expression for the power that can be generated from a small hydro power station. (5)

****