Code No: R1631022 **R16** SET - 1

III B. Tech I Semester Supplementary Examinations, May - 2019

RENEWABLE ENERGY SOURCES

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A

1. a) Define the terms: [2M]
i) Altitude angle ii)Incident angle

b) What is the principle collection of solar energy used in a non-convective solar pond? [2M]

c) Show that a wavelength of $\lambda = 1$ µm solar radiation corresponds to an energy of 1.24 eV. Give all assumptions made. [2M]

d) Define the power coefficient of a wind turbine .What usually is the maximum value of this parameter? [3M]

e) Sea waves are irregular in amplitude. How significant wave height is defined? [3M]

f) What are the techniques suggested for maintaining bio-gas production? [2M]

PART -B

2. a) Explain in detail, the solar radiation on tilted surfaces. [7M]

b) Calculate the angle made by the beam radiation with the normal to a flat collector on Dec 1, at 9:00 A.M. solar time for a location at $28^0$35'N. The collector is tilted at an angle of latitude plus 10^0, with the horizontal and is pointing due south. [7M]

3. a) How solar collectors are classified? What are the main applications of a drier? [7M]

b) Data for a flat plate collector used for heating the building are given below [7M]

Factor	Specification
Location and latitude	Baroda 22^0 00`N
Day and time	Jan 1,11.30 to12.30(IST)
Annual average intensity of solar radiation	0.5 langley/min
Collector tilt	latitude+ 15^0
Number of glass cover	2
Heat removal factor for collector	0.810
Transmittance of glass	0.88
Absorptance of the plat	0.90
U_L for collector	7.88W/m^{20}C
Collector fluid temperature	60^0C
Ambient temperature	15^0C

Calcualte
i) Solar attitude angle ii) Incident angle iii) Collector efficiency
~~~~~~

Code No: R1631022 **R16** SET - 1

4.	a)	Discuss the step-by-step procedure to execute P & O algorithm for tracking the maximum power from the sun.	[7M]
	b)	What is the implication of cell mismatch in a solar module?	[7M]
5.	a)	Describe with a neat sketch the working of a wind energy system with main components?	[7M]
	b)	Write short notes on applications of wind energy.	[7M]
6.	a)	What are the advantages and limitations of small scale hydro electric power generation?	[7M]
	b)	A tidal power plant of the simple single basin type has a basin area of $30x10^6$ m^2. The tide has a range of 12m. The turbine, however, stops operating when the head on it falls below 3m. Calculate the energy generated in 1 filling (or emptying) process in kWh if the turbine generator efficiency is 0.73.	[7M]
7.	a)	Describe the classification of fuel cell. With a neat sketch explain the working of fuel cell	[7M]
	b)	What is meant by anaerobic digestion? What are the factors that effect bio-digestion? Explain briefly.	[7M]

******