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**

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PART –A

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

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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 30×10^6 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]

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