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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: I**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22EE1ESRES **Max Marks: 100**
Course: RENEWABLE ENERGY SOURCES **Date: 08.05.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1	a)	List the advantages and disadvantages of renewable energy sources (Four each).	**04**
	b)	With a neat block diagram explain the conversion of solar energy to electrical energy.	**08**
	c)	Explain with a neat block diagram geothermal energy conversion system.	**08**

UNIT - II

2	a)	Draw the neat schematic which shows the mechanism of absorption, scattering, and beam and diffuse radiation received at earth's surface.	**04**
	b)	With a neat sketch define the following terms (i) angle of latitude, (ii) declination angle, (iii) zenith angle and (iv) inclination angle	**08**
	c)	Explain with a neat diagram the construction and working of pyranometer.	**08**

OR

3	a)	As part of an alternative assessment tool, your professor asked you to purchase four 20V and 5A rated solar photovoltaic panels from the market and install them on the rooftop. However, before buying, they want to check your knowledge about the series and parallel arrangements of PV panels. In view of this, you have been asked to draw a sketch that shows the configuration of PV panels in (i) parallel and (ii) a combination of series and parallel. Also write down the final current, voltage and power value of the overall system in the above mentioned cases.	**04**
	b)	With a neat sketch explain the construction and working principle of solar PV cell with its I-V characteristics.	**08**
	c)	List the advantages, disadvantages and applications of solar PV systems.	**08**

UNIT - III

4	a)	List the criteria for site selection while installing wind turbines (any four).	**04**
	b)	Draw the neat diagram of (i) Savonius type and (ii) Darrieus type vertical axis wind turbine	**08**
	c)	Derive the condition for maximum power extraction by the wind turbine from the total available wind energy.	**08**

OR

5	a)	How wind turbines are classified?	**04**
	b)	Write a note on (i) safety systems and (ii) environmental aspects associated with wind power.	**08**
	c)	With a neat sketch explain the construction and working of three blade horizontal axis wind turbine.	**08**

UNIT - IV

6	a)	List the advantages of tidal power system and OTEC system (two each).	**04**
	b)	With a neat sketch explain the (i) single ebb cycle system and (ii) double cycle system of generation of power that can achieved in single basin arrangement.	**08**
	c)	With a neat schematic explain the construction and working of closed cycle based ocean thermal energy conversion system.	**08**

UNIT - V

7	a)	What is photosynthesis? List commonly used bio fuels and biomass sources (three each).	**04**
	b)	With a neat schematic explain the construction and working of conversion of electrical energy from municipal sewage waste (MSW).	**08**
	c)	With a neat sketch and relevant reactions explain the construction and working of Alkaline Fuel Cell.	**08**

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