U.S.N.										

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

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22EE1ESRES / 22EE2ESRES **Max Marks: 100**
Course: Renewable Energy Sources

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	CO	PO	Marks
1	a)	Contrast renewable energy sources and non-renewable energy sources. (Four each).	CO1	PO7	**04**
	b)	Solar energy is the clean, cheap and abundantly available renewable energy and has greatest potential compared to other sources of renewable energies. With the help of a systematic block diagram illustrate the conversion of solar energy into electrical energy.	CO1	PO7	**08**
	c)	With the help of schematic diagram, illustrate the process of harnessing heat from the Earth's crust to generate power.	CO1	PO7	**08**
		UNIT - II			
2	a)	Illustrate with a schematic diagram, the following terms referred to solar radiation: (i) Beam radiation (ii) Diffuse radiation (iii) Solar altitude angle (iv) Zenith angle (v) Surface azimuth angle	CO2	PO2	**10**
	b)	Provide a detailed illustration and explanation of the construction and operational principles of a solar photovoltaic (PV) cell, accompanied by a depiction of its I-V (current-voltage) characteristics.	CO2	PO2	**10**
		OR			
3	a)	Describe the construction and operational principles of an instrument designed to measure beam / direct radiation and outline its various applications.	CO2	PO2	**10**
	b)	With neat sketch explain the construction and working of (i) concentrating type and (ii) non-concentrating type solar collector	CO2	PO2	**10**

			UNIT - III			
	4	a)	Obtain the expression that determines the optimal condition for extracting the maximum power from the total available wind energy by a wind turbine.	*CO3*	*PO1*	**10**
		b)	List and briefly describe site selection criteria for installing wind turbines.	*CO3*	*PO1*	**10**
			OR			
	5	a)	Classify wind turbines and illustrate the construction and operation of a single-blade horizontal-axis wind turbine with a neat sketch.	*CO3*	*PO1*	**10**
		b)	With neat sketch describe the construction and operation of a vertical axis wind turbine of the Darrieus type.	*CO3*	*PO1*	**10**
			UNIT - IV			
	6	a)	With appropriate sketch, describe the method of generation of power that can be achieved in Single basin- double cycle system Also outline the advantages & limitations of tidal power system (Three each)	*CO3*	*PO1*	**10**
		b)	Explain the construction and working of a closed cycle OTEC conversion system.	*CO3*	*PO1*	**10**
			UNIT - V			
	7	a)	With a neat schematic explain the construction and working of fixed dome biogas plant	*CO3*	*PO1*	**10**
		b)	"Of the technologies being studied, fuel cell technology is the most promising one and can be used as power source for automobiles." Justify the statement by classifying fuel cells and explaining the operational principles of an Alkaline Fuel Cell (AFC) using a clear diagram and pertinent chemical reactions. Also provide your viewpoints on its application.	*CO3*	*PO1*	**10**

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