U.S.N.										

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

Autonomous Institute Affiliated to VTU

December 2023 Supplementary 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.

				CO	*PO*	Marks
			UNIT - I			
1	a)		List the benefits and drawbacks of renewable energy sources. (Four each).	*CO1*	*PO7*	**04**
	b)		Explain the process of converting solar energy into electrical energy using a clear and organized block diagram.	*CO2*	*PO2*	**08**
	c)		With the help of a well-structured block diagram elucidate the transformation of wind energy into electrical energy.	*CO3*	*PO1*	**08**
			UNIT - II			
2	a)		With a schematic diagram, define the following terms (i) beam radiation (ii) diffuse radiation (iii) scattering of the incident radiation, (iv) zenith angle (v) angle of incidence and (vi) surface azimuth angle	*CO2*	*PO2*	**10**
	b)		With a neat sketch explain the construction and working principle of solar PV cell with its I-V characteristics	*CO2*	*PO2*	**10**
			OR			
3	a)		Describe the construction and operational principles of an instrument designed to measure beam radiation and outline its various applications.	*CO2*	*PO2*	**10**
	b)		With a 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)		How are wind turbines classified? Illustrate the construction and operation of a single-blade horizontal-axis wind turbine with a neat sketch.	*CO3*	*PO1*	**10**
	b)		With a neat sketch, describe the operation of a vertical axis wind turbine of the Savonius type.	*CO3*	*PO1*	**10**
			OR			

	5	a)	Elucidate the construction and working of a vertical axis wind turbine of the Darrieus type, accompanied by an illustrative diagram.	*CO3*	*PO1*	**10**
		b)	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**
			UNIT - IV			
	6	a)	With appropriate sketch, describe the three methods of generation of power that can be achieved in single basin arrangement.	*CO3*	*PO1*	**10**
		b)	With a neat schematic explain the construction and working of closed cycle ocean thermal energy 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)	How fuel cells are classified? With a neat sketch and relevant reactions explain the working of Phosphoric Acid Fuel Cell (PAFC).	*CO3*	*PO1*	**10**

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