U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2025 Semester End Make-Up Examinations

Programme: B.E. **Semester: VII**

Branch: Common to all Branches **Duration: 3 hrs.**

Course Code: 22CH7OEAET **Max Marks: 100**

Course: Advances in Energy Technology

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)	Discuss the benefits and challenges associated with renewable energy sources. Comment on the growth of the energy sector in India.	CO1	PO2	**12**
	b)	Discuss the nuclear power scenario of the world and India in particular.	CO1	PO2	**08**
		OR			
2	a)	How is per capita energy consumption an indicator of the standard of living?	CO1	PO2	**10**
	b)	Discuss the current state of biomass energy in India and its global trajectory. Also, address the challenges impeding the bioenergy sector's expansion.	CO2	PO7	**10**
		UNIT - II			
3	a)	Explain the terms insolation and irradiance. Discuss the factors affecting the total amount of energy solar panels receive.	CO3	PO2	**10**
	b)	Describe the key technical aspects of converting solar energy into electrical energy through solar photovoltaic energy conversion.	CO3	PO2	**10**
		OR			
4	a)	What is the difference between a pyrheliometer and a pyranometer?	CO3	PO2	**04**
	b)	Discuss the advantages and disadvantages of concentrating collectors over non-concentrating collectors. Name different types of these collectors.	CO3	PO2	**06**
	c)	Briefly explain about the characteristics and principles of flat plate solar collectors. Draw diagrams illustrating the constructional features of this collector.	CO3	PO2	**10**

			UNIT - III			
	5	a)	What are the primary sources of ethanol, and discuss the key steps involved in its production process?	*CO4*	*PO6*	**10**
		b)	A hostel in a remote place has the following energy requirements. i. Ten lamps each of 100 candle power that operate for 4 hours daily ii. Six computers, each 250 W that operate for 6 hours daily by a dual fuel engine driven generator. iii. 2 hp water pump driven by dual fuel engine for two hours daily. Calculate the size of the biogas plant and the number of cows required to feed the plant. Assume the standard values of data where required.	*CO4*	*PO6*	**10**
			OR			
	6	a)	Compare the relative performances of a floating drum and fixed dome-type biogas plants.	*CO4*	*PO6*	**08**
		b)	Explain the processing and recovery systems implemented in preparation for refuse-derived fuels.	*CO4*	*PO6*	**06**
		c)	What are the environmental problems caused by geothermal energy? Explain briefly.	*CO4*	*PO6*	**06**
			UNIT - IV			
	7	a)	What types of turbines are used in hydropower? Explain the construction and working of any one type of turbine.	*CO5*	*PO3*	**10**
		b)	Explain the working principle of a wind turbine plant for generating electricity. Discuss how wind energy is converted into electrical energy and provide an overview of its key components and their functions.	*CO5*	*PO3*	**10**
			OR			
	8	a)	Demonstrate mathematically that a wind turbine can extract a maximum of 59.3% of the kinetic energy from the wind.	*CO5*	*PO3*	**12**
		b)	What are the advantages of vertical-axis machines over horizontal-type ones? Describe a rotor for relatively low-velocity wind.	*CO5*	*PO3*	**08**
			UNIT - V			
	9	a)	Explain the construction and working of the alkali fuel cell. Also, discuss the advantages and limitations with a neat sketch.	*CO5*	*PO3*	**10**
		b)	Discuss the available fuels and their features used in fuel cells.	*CO5*	*PO3*	**05**
		c)	Elucidate the applications of fuel cells.	*CO6*	*PO2*	**05**
			OR			
	10	a)	Classify fuel cells based on electrolytes, types of fuel, oxidants, operating temperature, application, and the chemical nature of electrolytes.	*CO6*	*PO2*	**10**
		b)	Explain the construction and working of molten carbonate fuel cells. Also, discuss the advantages and limitations with a neat sketch.	*CO6*	*PO2*	**10**

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