U.S.N.										

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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

Branch: Institutional Elective **Duration: 3 hrs.**

Course Code: 25CY8OEEES **Max Marks: 100**

Course: Energy and Environmental Sustainability

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.

				CO	PO	Marks
			UNIT - I			
1	a)		Evaluate the key factors influencing global energy demand and consumption.	*CO1*	*PO1*	**7**
	b)		Elaborate the various renewable and clean energy solutions, comparing their efficiency and environmental impact.	*CO2*	*PO1*	**7**
	c)		Summarize the principles and the benefits of circular economy.	*CO3*	*PO1, 7*	**6**
			OR			
2	a)		Evaluate the impact of making energy & environmental sustainability mandatory in various sectors and propose alternative approaches**.**	*CO1*	*PO1*	**7**
	b)		Elaborate the environmental impacts of different types of energy usage and compare their long-term consequences on ecosystems and human health.	*CO2*	*PO1*	**7**
	c)		Summarize the policies & regulations for sustainability.	*CO3*	*PO1, 7*	**6**
			UNIT - II			
3	a)		Define the term low carbon. Illustrate various types of low-carbon energy with suitable examples.	*CO3*	*PO1, 7*	**7**
	b)		Elaborate the working principle of heat energy harvest from wastewater. Mention its challenges.	*CO2*	*PO1*	**7**
	c)		Describe the role of AI in smart grid management.	*CO1*	*PO1*	**6**
			OR			
4	a)		Define the term biomass energy. Illustrate the anaerobic digestion process with their applications.	*CO3*	*PO1, 7*	**7**
	b)		Elaborate the basics of biomass boilers with neat diagram.	*CO2*	*PO1*	**7**
	c)		Outline the concept of floating wind farm. Mention the benefits of it.	*CO1*	*PO1*	**6**

			UNIT - III			
	5	a)	Discuss the electrochemical conversion of CO_2 to carbon monoxide and the challenges involved.	*CO3*	*PO1, 7*	**7**
		b)	Describe the construction and working of solid oxide fuel cells. Mention its applications.	*CO2*	*PO1*	**7**
		c)	Summarize the superconducting magnetic energy storage. Discuss its merits.	*CO3*	*PO1, 7*	**6**
			OR			
	6	a)	Discuss the working principle of redox flow battery (RFB) with suitable diagram.	*CO3*	*PO1, 7*	**7**
		b)	Describe photothermal conversion. Mention the materials used in photothermal conversion.	*CO2*	*PO1*	**7**
		c)	Outline the construction and working of a biofuel cell.	*CO3*	*PO1, 7*	6
			UNIT - IV			
	7	a)	Describe the advanced oxidation processes for water treatment.	*CO2*	*PO1*	**7**
		b)	Explain the in-situ stabilization of cadmium and lead contaminated soil using various modifications.	*CO3*	*PO1, 7*	**7**
		c)	Illustrate the ambient air quality criteria with suitable examples.	*CO3*	*PO1, 7*	**6**
			OR			
	8	a)	Describe the bioremediation of contaminated water-based on various technologies	*CO2*	*PO1*	**7**
		b)	Explain the basics of Air Quality Index (AQI) with suitable parameter	*CO3*	*PO1, 7*	**7**
		c)	Summarize the advanced technologies in pollution control.	*CO3*	*PO1, 7*	**6**
			UNIT - V			
	9	a)	Describe any seven key sustainable development goals (SDGs).	*CO2*	*PO1*	**7**
		b)	Discuss the steps involved in e-waste management.	*CO3*	*PO1, 7*	**7**
		c)	Explain any five critical challenges to implement the sustainable development.	*CO2*	*PO1*	**6**
			OR			
	10	a)	Describe the significance of sustainable development goals (SDGs) related to: a) Affordable and clean energy b) Responsible consumption and production and c) Life on Land.	*CO2*	*PO1*	**7**
		b)	Discuss the Features of sustainable development in future India	*CO3*	*PO1, 7*	**7**
		c)	Explain the process of Lithium-ion battery collection, recycling and reuse.	*CO2*	*PO1*	**6**

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