U.S.N.										

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

Autonomous Institute Affiliated to VTU

February / March 2025 Semester End Main Examinations

Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22ME1ETISE / 22ME2ETISE **Max Marks: 100**
Course: Introduction to Sustainable Engineering

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)		List and briefly describe the nine planetary boundary (PBs) concepts of recent scientific framework.	*CO1*	*PO1 PO7*	**10**
	b)		Explain factor 4 and factor 10 with respect to sustainability.	*CO1*	*PO1 PO7*	**10**
			OR			
2	a)		Explain the concept of circular economy with a neat diagram.	*CO1*	*PO1 PO7*	**10**
	b)		Explain the concept of system and life cycle thinking towards sustainable development.	*CO1*	*PO1 PO7*	**10**
			UNIT - II			
3	a)		Explain the basic elements of an Environmental Management System (EMS) with PDCA cycle.	*CO1 CO2*	*PO1 PO7*	**10**
	b)		Explain in brief the 7 cleaner production implementation strategies.	*CO3*	*PO1 PO7 PO9*	**10**
			OR			
4	a)		Explain green, low carbon economy and Triple bottom Line.	*CO3*	*PO1 PO7 PO9*	**10**
	b)		List the guiding principles for sustainable engineering.	*CO3*	*PO1 PO7 PO9*	**10**
			UNIT - III			
5	a)		What critical methodological choices engineers should follow for determining the outcome of Life Cycle Assessment study?	*CO3*	*PO1 PO7 PO9*	**10**
	b)		Name the four main phases of a life cycle assessment according to ISO 14040. Mention the content of each phase.	*CO3*	*PO1 PO7 PO9*	**10**
			OR			
6	a)		Distinguish between Life cycle costing and social life cycle assessment	*CO3*	*PO1 PO7 PO9*	**10**

		b)	Define appropriate functional units to compare the following systems: (i) Soft drink packaging (ii) Waste management options (iii) People's transportation (iv) Goods Transportation (v) Remote control for your TV with either one-way or rechargeable batteries (vi) Online or conventional dictionary (book) ".	*CO3*	*PO1 PO7 PO9*	**10**
			UNIT - IV			
	7	a)	What are the six GHG emissions it accounts for and what are their sources?	*CO3*	*PO1 PO7 PO9*	**06**
		b)	What is the GHG protocol and distinguish between scopes 1, 2, and 3.	*CO3*	*PO1 PO7 PO9*	**06**
		c)	Explain the market-based incentives or economic instruments for sustainability	*CO3*	*PO1 PO7 PO9*	**08**
			OR			
	8	a)	What is externalized and internalized cost in an environmental context with an example?	*CO3*	*PO1 PO7 PO9*	**10**
		b)	Consider the commonly used household appliance (Washing Machine), and describe its environmental concerns at each stage of its life cycle (cradle-to-grave).	*CO3*	*PO1 PO7 PO9*	**10**
			UNIT - V			
	9	a)	What are the two types of engineering problem solving methods?	*CO4*	*PO1 PO7 PO9*	**06**
		b)	What is conventional engineering design process.	*CO4*	*PO1 PO7 PO9*	**04**
		c)	Explain the 12 Principles of green engineering for Sustainable Engineering Design.	*CO4*	*PO1 PO7 PO9*	**10**
			OR			
	10	a)	Explain the 7-strategy wheel for design for sustainability.	*CO4*	*PO1 PO7 PO9*	**06**
		b)	What are the 4 Cs of design process?	*CO4*	*PO1 PO7 PO9*	**04**
		c)	Explain the different methods used to measure sustainability	*CO4*	*PO1 PO7 PO9*	**10**

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