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: 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)		What is sustainable development?	*CO1*	*PO1, PO7*	**05**
	b)		List and briefly explain the 17 Sustainable Goals as per the 70th UN general assembly held on 25th September 2015 under the official agenda "transforming our word: 2030 towards sustainable development"	*CO1*	*PO1, PO7*	**10**
	c)		Explain the concepts of Factor 4 and Factor 10 goals for sustainable development	*CO2*	*PO1, PO7*	**05**
			OR			
2	a)		What are the Guiding Principles for Sustainable Engineering	*CO2*	*PO1, PO7*	**05**
	b)		Explain the green and low carbon economy	*CO1*	*PO1, PO7*	**05**
	c)		Explain the concept of circular economy with example	*CO1*	*PO1, PO7*	**10**
			UNIT - II			
3	a)		Explain environmental impact model IPAT equation developed by Ehrlich and Holdren in 1971 for sustainable development	*CO3*	*PO7, PO9, PO10*	**10**
	b)		Explain the basic elements of an Environmental Management System (EMS) with PDCA cycle	*CO3*	*PO7, PO9, PO10*	**10**
			UNIT - III			
4	a)		Problem Statement: System A is a multi-output process, which produces 10 kg of product A and 5 kg of product B per minute. 1 kg of product A is worth 20 USD, 1 kg of B is worth 5 USD. The process emits 120 kg CO_2 per hour. Product B can also be produced using another process, which produces 0.05 kg CO_2 per kg of product B. Calculate the CO_2 emissions for two different allocation procedures for product A. Determining the CO_2 emissions of the system A from products A and B emissions allocated based on the MASS.	*CO3*	*PO7, PO9, PO10*	**10**

SUPPLEMENTARY EXAMS 2023

		b)	Discuss the need, goals, and Scope for life cycle assessment.	*CO4*	*PO7, PO9, PO10*	**10**
			UNIT - IV			
	5	a)	What are the six GHG emissions it accounts for and what are their sources?	*CO2*	*PO1, PO 7*	**05**
		b)	What is the life cycle tree for a plastic water bottle? Includes the label and cap; excludes the water.	*CO3*	*PO7, PO9, PO10*	**10**
		c)	What is the difference between a carbon footprint and an LCA?	*CO1*	*PO1, PO 7*	**05**
			UNIT - V			
	6	a)	Explain the Sustainable Process Design – Case Study – Chemical Process Design for Vinyl Chloride Monomer (VCM)	*CO1*	*PO1, PO 7*	**10**
		b)	Calculate carbon sequestration in plants involves estimating the amount of carbon dioxide (CO_2) that is absorbed and stored by plants through the process of photosynthesis. Case Study: Calculating Carbon Sequestration in a Forested Area in a 10-acre forest. Suppose the total tree biomass in the 10-acre forest is 200 metric tons (200,000 kg).	*CO3*	*PO7, PO9, PO10*	**10**
			OR			
	7	a)	Explain the case study of sustainable procurement criteria with benefits and challenges considered for office furniture procurements	*CO2*	*PO1, PO 7*	**10**
		b)	What is conventional engineering design process and what are the 4 Cs of design	*CO1*	*PO1, PO 7*	**05**
		c)	Explain the 7-strategy wheel for design for sustainability	*CO2*	*PO1, PO 7*	**05**

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SUPPLEMENTARY EXAMS 2023