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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

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

Branch: Mechanical Engineering **Duration: 3 hrs.**

Course Code: 22ME7PEPDM **Max Marks: 100**

Course: Product Design and Manufacturing

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 fundamentals of manufacturing in the context of product development.	CO1	PO1	**08**
	b)	Explain the Engineering Design Process with a suitable example.	CO1	PO1	**08**
	c)	Briefly describe the concept of product design morphology.	CO1	PO1	**04**
		OR			
2	a)	Define Value Engineering and explain its importance in product design.	CO1	PO1	**06**
	b)	Describe the methodology of Value Engineering using FAST diagramming.	CO1	PO1	**08**
	c)	Provide an example of a Value Engineering case study and its outcomes.	CO1	PO1	**06**
		UNIT - II			
3	a)	Outline the key factors involved in materials selection and their influence on product performance.	CO2	PO1	**08**
	b)	Explain the importance of selecting appropriate manufacturing processes during product design.	CO2	PO1	**08**
	c)	Briefly describe the concept of product costing.	CO2	PO1	**04**
		OR			
4	a)	Discuss the principles of Design for Manufacturing (DFM) and its significance in reducing production costs.	CO2	PO1	**08**
	b)	Explain the concept of Design for Assembly (DFA) with examples.	CO2	PO1	**06**
	c)	Describe the relevance of Design for Environment (DFE) in sustainable product development.	CO2	PO1	**06**

			UNIT - III			
	5	a)	Differentiate between Quality Control (QC) and Quality Assurance (QA) with examples.	*CO3*	*PO1*	**08**
		b)	Explain creativity techniques in product design.	*CO3*	*PO1*	**08**
		c)	Briefly describe the concept of frugal innovation and its application in product development.	*CO3*	*PO1*	**04**
			OR			
	6	a)	Explain the process of patenting and its importance in protecting intellectual property.	*CO3*	*PO1*	**08**
		b)	Discuss the challenges faced in patenting innovative designs.	*CO3*	*PO1*	**06**
		c)	Describe how patents can foster competitiveness in manufacturing.	*CO3*	*PO1*	**06**
			UNIT - IV			
	7	a)	Define rapid prototyping and explain its role in product development.	*CO4*	*PO1*	**06**
		b)	Compare different rapid prototyping processes with their applications.	*CO4*	*PO1*	**08**
		c)	Briefly explain the concept of rapid prototyping modelling.	*CO4*	*PO1*	**06**
			OR			
	8	a)	Explain the importance of plant layout planning in optimizing manufacturing operations.	*CO4*	*PO1*	**08**
		b)	Discuss the key considerations for designing an efficient plant layout.	*CO4*	*PO1*	**08**
		c)	Provide an example of how poor layout planning can impact productivity.	*CO4*	*PO1*	**04**
			UNIT - V			
	9	a)	Define CIM and explain the role of Computer Integrated Manufacturing (CIM) in modern manufacturing systems.	*CO5*	*PO1*	**08**
		b)	Discuss the benefits and challenges of integrating advanced technologies into manufacturing.	*CO5*	*PO1*	**08**
		c)	Briefly describe the importance of managing competitiveness in the manufacturing industry.	*CO5*	*PO1*	**04**
			OR			
	10	a)	Define reverse engineering and explain its application in product development.	*CO5*	*PO1*	**08**
		b)	Discuss how reverse engineering can help improve existing products.	*CO5*	*PO1*	**06**
		c)	Provide an example of a successful reverse engineering project.	*CO5*	*PO1*	**06**

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