Reg. No.																

Question Paper Code	14507

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Second Semester

M.E. - CAD/CAM

24PCDPC203 - INTEGRATED PRODUCT DESIGN AND PROCESS DEVELOPMENT

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	What does IPPD stand for in product development? a) Internal Product and Process Design b) Integrated Product and Process Development c) Initial Product and Process Definition d) Interactive Product and Process Design	1	K1	CO1
2.	Which of the following is NOT typically integrated in IPPD? a) Customer b) Competitor c) Material Supplier d) Process Planner	1	K1	CO1
3.	Summarize the main goal of competitor and customer behavior analysis. a) To copy competitor designs b) To ignore customer needs c) To understand and promote customer understanding d) To reduce material costs	1	K2	CO1
4.	What is the first step in establishing product specifications? a) Concept Selection b) Task Clarification c) External Search d) Internal Search	1	K1	CO2
5.	_____ factor is NOT a direct implication of concept selection? a) Product variety b) Component standardization c) Competitor analysis d) Manufacturability	1	K2	CO2
6.	Illustrate a benefit of systematic concept exploration. a) Increases development time b) Reduces the need for testing c) Ensures reflection on diverse solutions d) Eliminates the need for customer input	1	K2	CO2
7.	What does 'clustering' refer to in product architecture? a) Grouping customers b) Grouping related components into chunks c) Grouping competitors d) Grouping marketing strategies	1	K1	CO3
8.	_____ type of interaction is crucial when creating detailed interface specifications? a) Customer-supplier interaction b) Fundamental and incidental interactions c) Management-employee interaction d) Designer-competitor interaction	1	K2	CO3
9.	Apply the concept of 'Portfolio Architecture' to determine its main advantage. a) Minimizing product lines b) Maximizing commonality across a product family. c) Reducing customer involvement d) Increasing incidental interactions	1	K3	CO3
10.	Industrial design primarily aims to satisfy the needs of the _____. a) Manufacturer b) User c) Material Supplier d) Process Planner	1	K1	CO4
11.	Integrating CAE/CAD/CAM tools impact the design process by _____ a) Increased manual drafting b) Simulated product performance electronically c) Eliminated the need for prototypes d) Decreased design robustness	1	K3	CO4

12.	Apply robust design principles to evaluate a product's performance. a) Performance varies greatly with environment. b) Performance is sensitive to manufacturing variations. c) Performance remains stable despite variations. d) Performance relies solely on aesthetic appeal.	*1*	*K3*	*CO4*
13.	_____ is a primary goal of Design for Manufacturing (DFM)? a) Increasing component costs b) Maximizing system complexity c) Reducing assembly costs d) Extending the project timeline	*1*	*K2*	*CO5*
14.	Employ economic analysis to justify the use of a prototype. a) It increases baseline planning time b) It minimizes the risk of costly late-stage changes c) It ensures the project will be accelerated d) It eliminates the need for user testing	*1*	*K3*	*CO5*
15.	Apply the principles of prototyping to select the appropriate fidelity for an early-stage concept test. a) High fidelity, fully functional b) Low fidelity, physical or virtual representation c) Final production tooling d)No prototype needed	*1*	*K3*	*CO5*
16.	Use baseline project planning to determine the sequence of tasks. a) Execution before planning b) Random task assignment c) Understanding and representing tasks logically. d) Ignoring baseline constraints	*1*	*K3*	*CO5*

PART – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Apply organizational process management techniques to improve customer involvement in product development.	*3*	*K3*	*CO1*
18.	Analyze the impact of competitor behavior on the strategic importance of IPPD.	*3*	*K4*	*CO1*
19.	Build how 'exploring systematically' contributes to an effective concept selection methodology.	*3*	*K3*	*CO2*
20.	Analyze the relationship between component standardization and product performance.	*3*	*K4*	*CO2*
21.	Apply 'geometric layout development principles' to establish the architecture of a new consumer electronic device.	*3*	*K3*	*CO3*
22.	Utilize robust design principles to manage costs while integrating CAE tools in process design.	*3*	*K3*	*CO4*
23.	Analyze the differences in the industrial design process for 'technology-driven products' versus 'user-driven products'.	*3*	*K4*	*CO4*
24.	Construct the impact of reducing assembly costs on the overall estimation of manufacturing cost.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a) (i)	Apply structured methods to integrate customer, designer, and material supplier inputs in the early stages of product development.	*8*	*K3*	*CO1*
	(ii)	Build how promoting customer understanding manages requirements effectively.	*4*	*K3*	*CO1*
		OR			
	b) (i)	Make use of techniques for customer and competitor behavior analysis to inform strategic product development decisions.	*8*	*K3*	*CO1*
	(ii)	Apply organization process improvement strategies to enhance the IPPD framework.	*4*	*K3*	*CO1*

26.	a)	Analyze the structured approaches for concept generation, through the external and internal search phases, and their impact on concept selection benefits.	*12*	*K4*	*CO2*
		OR			
	b)	Analyze the implications of product change, variety, and manufacturability when planning and establishing product specifications.	*12*	*K4*	*CO2*
27.	a)	Apply product development management principles to establish the architecture of a new product, detailing the creation of chunks.	*12*	*K3*	*CO3*
		OR			
	b)	Make use of methods to resolve system-level design issues by managing fundamental and incidental interactions.	*12*	*K3*	*CO3*
28.	a)	Examine the need for industrial design and analyze its impact on technology-driven products versus user-driven products.	*12*	*K4*	*CO4*
		OR			
	b)	Analyze the process of integrating CAE, CAD, and CAM tools to simulate product performance and its effect on managing costs.	*12*	*K4*	*CO4*
29.	a)	Construct the estimated manufacturing cost by detailing strategies to reduce component and assembly costs while minimizing system complexity.	*12*	*K3*	*CO5*
		OR			
	b)	Construct baseline project planning techniques to understand and represent tasks, and develop a strategy for accelerating project execution.	*12*	*K3*	*CO5*