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Question Paper Code	14305
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M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Second Semester

ME - CAD/CAM

24PCDPC203 - INTEGRATED PRODUCT DESIGN AND PROCESS DEVELOPMENT

Regulations - 2024

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. The core goal of IPPD is to understand and promote customer understanding by involving the customer in which two main areas? (a) Manufacturing and Shipping (b) Development and managing requirements (c) Financial planning and Marketing (d) Competitor analysis and Organization process analysis	1	K1	CO1
2. Which team member is integrated to manage the production methods and steps in the IPPD context? (a) Customer b) Designer (c) Process Planner (d) Competitor	1	K1	CO1
3. The first step in Concept Generation, Selection, and Testing is to: (a) Conduct concept testing methodologies. (b) Explore systematically. (c) Plan and establish product specifications. (d) Perform economic analysis.	1	K1	CO2
4. The goal of 'Component Standardization' in the context of concept generation is to: (a) Increase product variety. (b) Reduce system complexity and component costs. (c) Slow down the manufacturing process. (d) Increase the need for unique designs.	1	K1	CO2
5. Product development management establishes the architecture through the creation of: (a) Market segmentation. (b) Financial projections. (c) Clustering and geometric layout development. (d) Advertising strategies.	1	K1	CO3
6. What does 'Portfolio Architecture' focus on in a multi-product company? (a) The geometric layout of a single product. (b) The detailed specifications for one component. (c) The strategic reuse of chunks and interfaces across multiple products in a product family. (d) The clustering of functions within one product.	1	K1	CO3
7. A 'Robust design' is one that: (a) Is the most aesthetically pleasing? (b) Performs as intended even when manufacturing parameters or environmental conditions vary. (c) Is the cheapest to produce? (d) Uses the fewest components.	1	K1	CO4
8. Industrial Design plays a crucial role in creating a compelling "design-impact" which relates to: (a) Regulatory compliance. (b) The product's ability to communicate its brand identity and value to the user. (c) Cost reduction in assembly. (d) The speed of concept generation.	1	K1	CO4

9. The definition phase of Design for Manufacturing (DFM) primarily focuses on: 1 K1 CO5
 (a) Industrial design refinement.
 (b) Estimation of Manufacturing cost, reducing component and assembly costs.
 (c) Portfolio architecture development.
 (d) Customer needs investigation.
10. The 'Principles of prototyping' guide the design team on: 1 K1 CO5
 (a) How to select a software simulation tool.
 (b) What to build, how much to build, and what the prototype is intended to test.
 (c) How to set the final product price.
 (d) How to negotiate material costs.

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11. List any two key stakeholders involved in IPPD. 2 K1 CO1
12. Mention two strategic advantages of effective product development. 2 K1 CO1
13. What is the purpose of establishing product specifications in the development process? 2 K1 CO2
14. List two concept testing methodologies used before full-scale development. 2 K1 CO2
15. What is meant by product architecture? 2 K1 CO3
16. What are secondary systems in product architecture? Give one example. 2 K1 CO3
17. Name any two tools used in integrating product and process design. 2 K1 CO4
18. Differentiate between user-driven and technology-driven products. 2 K2 CO4
19. Name any two principles of prototyping. 2 K1 CO5
20. Mention two financial tools used in economic analysis of a project. 2 K1 CO5
21. List the need for IPPD. 2 K1 CO1
22. Explain briefly about the clarification of problems. 2 K2 CO2

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23. a) (i) Explain the strategic importance of product development in gaining competitive advantage and customer satisfaction. 6 K2 CO1
 (ii) Describe how competitor and customer behavior analysis influences product development decisions. 5 K2 CO1
- OR**
- b) Explain various concept testing methodologies and how they help in refining product ideas before final development. Support your answer with suitable techniques and examples. 11 K2 CO2
24. a) Explain the process of establishing product architecture. Describe how functional elements are mapped to physical components 11 K2 CO3
- OR**
- b) Describe the role of geometric layout development and interface specification in product architecture. Why are these critical for manufacturing and integration? 11 K2 CO3
25. a) Discuss the concept of robust design and its role in managing costs and improving product quality. Mention any tools or techniques used. 11 K2 CO4
- OR**
- b) Describe the need and impact of industrial design in the product development process. How does it influence user satisfaction and market success? 11 K2 CO4
26. a) Explain the methods for estimating manufacturing costs and discuss strategies to reduce component and assembly costs in product development. 11 K2 CO5

OR

- b) Explain the steps involved in baseline project planning and project execution. How can project timelines be accelerated without compromising quality? 11 K2 CO5
27. a) Explain the process of establishing product architecture. Describe how functional elements are mapped to physical components. 11 K2 CO3
- OR**
- b) Describe the role of geometric layout development and interface specification in product architecture. Why are these critical for manufacturing and integration? 11 K2 CO3
28. a) Explain how a component can be machined in CNC milling machine with the design for manufacturing concepts. 11 K2 CO5
- OR**
- b) Discuss the importance of minimizing system complexity in product design. How does complexity impact manufacturing and product performance? 11 K2 CO5