



B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Sixth Semester

MECHATRONICS ENGINEERING

U18MCE0019: Product Design and Development

COURSE OUTCOMES

- CO1:** Apply concepts of product development and outline product planning process
CO2: Apply relative importance of customer needs in establishing product specifications
CO3: Identify concept generation activities and summarize the methodology involved in concept selection and testing
CO4: Outline supply chain considerations in product architecture and understand the industrial design process
CO5: Apply design for manufacturing concepts in estimating manufacturing costs
CO6: Apply principles of prototyping in product development economics and highlight importance of managing projects

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|-------------------|
| 1. Mention the characteristics of the successful product development. | CO1 | [K ₂] |
| 2. State the distinct functions of the market-pull products with examples. | CO1 | [K ₂] |
| 3. Outline the common methods for documenting interactions with customers. | CO2 | [K ₂] |
| 4. State the process of establishing the target specifications. | CO2 | [K ₂] |
| 5. Write down the benefits of concept classification tree. | CO3 | [K ₂] |
| 6. List out the steps in concept screening. | CO3 | [K ₂] |
| 7. What do you mean by delayed differentiation? | CO4 | [K ₂] |
| 8. List out the elements of manufacturing cost. | CO5 | [K ₂] |
| 9. Outline the methods for planning each prototype during a product development project. | CO6 | [K ₂] |
| 10. List out the typical cash flows for a successful new product over a life cycle. | CO6 | [K ₂] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

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| 11. | a) | Illustrate the six phases of generic product development process with key functions. | 8 | CO1 | [K ₃] |
| | b) | Explain briefly the five step process involved in product planning. | 8 | CO1 | [K ₃] |
| 12. | a) | Discuss in detail the processes involved in identifying customer needs. | 8 | CO2 | [K ₃] |
| | b) | Describe the five-step process in setting the final specifications of a product. | 8 | CO2 | [K ₃] |
| 13. | a) | Describe the five step method in concept generation process. | 8 | CO3 | [K ₃] |
| | b) | Illustrate the seven-step method for testing product concepts. | 8 | CO3 | [K ₃] |
| 14. | a) | How do you establish the architecture to structure the decision process? | 8 | CO4 | [K ₃] |
| | b) | Explain in detail the phases of industrial design process. | 8 | CO4 | [K ₃] |
| 15. | a) | Discuss in detail the design for manufacturing process with flow chart. | 8 | CO5 | [K ₃] |
| | b) | Describe in detail the elements of the manufacturing cost of a product. | 8 | CO5 | [K ₃] |
| 16. | a) | Describe the steps involved in economic analysis for supporting decision making. | 8 | CO6 | [K ₃] |
| | b) | Discuss the several mechanisms to facilitate coordination in executing the projects. | 8 | CO6 | [K ₃] |
