



**B.E/B.TECH DEGREE EXAMINATIONS: APRIL / MAY 2024**

(Regulation 2018)

Seventh Semester

**AERONAUTICAL ENGINEERING**

U18AEE0019: 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. State the various phases of product development.  | CO1 | [K <sub>1</sub> ] |
| 2. Mention few major characteristics of successful product development process.                              | CO1 | [K <sub>1</sub> ] |
| 3. Mention the major differences between external search and internal search in terms of concept generation. | CO2 | [K <sub>2</sub> ] |
| 4. What are the various methods of concept selection?  | CO2 | [K <sub>1</sub> ] |
| 5. Mention the importance of project brief.  | CO3 | [K <sub>2</sub> ] |
| 6. List out the stages in Concept generation process.  | CO3 | [K <sub>2</sub> ] |
| 7. Write a short note on industrial design?  | CO4 | [K <sub>2</sub> ] |
| 8. Differentiate manufacturing cost from product development cost?   | CO4 | [K <sub>2</sub> ] |
| 9. Mention the role of baseline project planning   | CO5 | [K <sub>2</sub> ] |
| 10. State the major elements of economic analysis.   | CO6 | [K <sub>1</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

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|--|---|-----|-------------------|
| 11. a) A company is interested in redesign of a "Helmet" by considering safety and | 8 | CO1 | [K <sub>2</sub> ] |
|--|---|-----|-------------------|

visibility enhancement. Explain the various activities involved in it in accordance with generic product development process and their functions.

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|--------|---|---|-----|-------------------|
| b)     | Explain the Process-intensive products with suitable examples.  | 8 | CO1 | [K <sub>2</sub> ] |
| 12. a) | Describe the various sources for gathering customer need and their characteristics.   | 8 | CO2 | [K <sub>2</sub> ] |
| b)     | Justify how concept selection is an integral part of the product development process.   | 8 | CO2 | [K <sub>3</sub> ] |
| 13. a) | Explain the concept screening and concept scoring process with a suitable example.  | 8 | CO3 | [K <sub>2</sub> ] |
| b)     | Explain in short about the four steps involved in planning for prototypes.  | 8 | CO3 | [K <sub>2</sub> ] |
| 14. a) | Elaborate the role of Industrial design and explain the guidelines to be followed in creating a user-friendly design with an example. | 8 | CO4 | [K <sub>2</sub> ] |
| b)     | Explain slot modular architecture and bus modular architecture.   | 8 | CO4 | [K <sub>2</sub> ] |
| 15. a) | Write short notes on  | 8 | CO5 | [K <sub>2</sub> ] |
|        | i. Design for manufacturing   |   |     |                   |
|        | ii. Product development economic analysis   |   |     |                   |
| b)     | How sensitivity analysis helps to understand project trade – offs?  | 8 | CO6 | [K <sub>2</sub> ] |
| 16. a) | Discuss the limitations of quantitative economic analysis in product development.   | 8 | CO5 | [K <sub>2</sub> ] |
| b)     | Explain design structure matrix, with a suitable example?   | 8 | CO6 | [K <sub>3</sub> ] |

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