



**B.E DEGREE EXAMINATIONS: APRIL / MAY 2023**

(Regulation 2018)

Sixth 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)**

- |  |     |                   |
|--|-----|-------------------|
| 1. Differentiate product cost and product development cost.        | CO1 | [K <sub>1</sub> ] |
| 2. What are the key success factors of product design?             | CO1 | [K <sub>2</sub> ] |
| 3. Explain any two methods used to organize a need into hierarchy. | CO2 | [K <sub>2</sub> ] |
| 4. Define competitive benchmarking.                                | CO2 | [K <sub>2</sub> ] |
| 5. Define the Purpose of the Concept Test.                         | CO3 | [K <sub>2</sub> ] |
| 6. Define product architecture.                                    | CO4 | [K <sub>2</sub> ] |
| 7. List out the needs for industrial design.                       | CO4 | [K <sub>2</sub> ] |
| 8. Write a short note on design for manufacturing.                 | CO5 | [K <sub>2</sub> ] |
| 9. List the types of Prototypes.                                   | CO6 | [K <sub>2</sub> ] |
| 10. What is the main purpose of design structure matrix?           | CO5 | [K <sub>2</sub> ] |

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

- |     |    |   |    |     |                   |
|-----|----|---|----|-----|-------------------|
| 11. | a) | Explain the front-end process of Concept development in detail.                             | 12 | CO1 | [K <sub>2</sub> ] |
|     | b) | Explain the following types of products with suitable examples.                             | 4  | CO1 | [K <sub>2</sub> ] |
|     |    | i. Technology-push products   |    |     |                   |
|     |    | ii. Market Pull products  |    |     |                   |
| 12. | a) | Write the importance of lead users, in choosing customers.                                  | 4  | CO2 | [K <sub>2</sub> ] |
|     | b) | Explain the three methods of gathering raw data from customers in detail.                   | 12 | CO2 | [K <sub>2</sub> ] |
| 13. |    | Discuss the seven-steps used for testing product concepts.                                  |    | CO3 | [K <sub>2</sub> ] |
| 14. | a) | Discuss few implications of product architecture.   | 4  | CO4 | [K <sub>2</sub> ] |
|     | b) | Explain the steps involved in managing the industrial design process.                       | 12 | CO4 | [K <sub>2</sub> ] |
| 15. | a) | Explain in detail about the four steps involved in economic analysis process.               | 8  | CO5 | [K <sub>2</sub> ] |
|     | b) | Discuss the processes involved in design for manufacturing.                                 | 8  | CO5 | [K <sub>2</sub> ] |
| 16. | a) | Write a short note on the principles of prototyping.  | 10 | CO6 | [K <sub>2</sub> ] |
|     | b) | Explain in detail about the four steps involved in planning for prototypes with an example. | 6  | CO6 | [K <sub>2</sub> ] |

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