

3 hours

80 Marks

**Instructions:**

1. Question Number 1 is Compulsory
2. Attempt ANY THREE Questions out of remaining FIVE
3. Use illustrative diagrams wherever required

**Q1)** Attempt any FOUR questions

- a) Define new product. What is the need for developing new products? **05**
- b) What is product life cycle? Draw the four phases of product life cycle. **05**
- c) Draw the flow chart of Concept Development Process in the product design. **05**
- d) Why it is necessary to integrate the basic forms and elements of a product like balance, rhythm and proportion? **05**
- e) What are the principles of Design for Manufacturing and Assembly (DFMA)? **05**
- f) List ANY FIVE Prototyping techniques used in manufacturing a product. **05**

**Q2)** a) Explain SIX steps/phases of the Generic product development process with flow chart. **10**  
b) Define market research. List and explain the methods of market research required in the product design and development. **10**

**Q3)** a) What do you mean by concept selection? Explain concept screening and concept scoring methodology giving example. **10**  
b) What is Product Architecture? Explain the Steps in developing product architecture. **10**

**Q4)** a) Explain the process of identifying customer needs in concept development process. **10**  
b) What is Quality Function Deployment (QFD)? Explain the phases of QFD. **10**

**Q5)** a) Draw House of Quality (HoQ) and highlight the customer matrix part in (HoQ)? Explain Voice of the Customer as an input to QFD. **10**  
b) Define creative thinking. List any FIVE Creativity and problem-solving methods. Explain the Brainstorming Technique used in product development. **10**

**Q6)** a) What is golden ratio of proportion? Explain any THREE applications of Golden Ratio? **10**  
b) Write short notes on Design for Environment and Design for Serviceability. **10**

---