

**NEW PRODUCT DEVELOPMENT
(MECH 3223)**

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) In Product development process, planning includes _____ corresponding to the completion of each phase.
 - (a) Milestones
 - (b) Assessment
 - (c) Product launching
 - (d) Both (a) and (b)
- (ii) The design function includes
 - (a) Engineering design only
 - (b) Industrial design only
 - (c) Engineering design and Industrial design
 - (d) Aesthetic design only
- (iii) _____ needs apply to a smaller market segment within the entire buying population.
 - (a) Niche need
 - (b) Latent need
 - (c) Constant need
 - (d) Variable need
- (iv) Why is it important to involve customers early in the product development process?
 - (a) To reduce the product's development time
 - (b) To ensure the product aligns with customer needs and expectations
 - (c) To increase the product's cost
 - (d) To focus only on technological innovations
- (v) Which phase of the S-curve is typically associated with high innovation and rapid improvements?
 - (a) Decline
 - (b) Growth
 - (c) Maturity
 - (d) Introduction
- (vi) What is the primary characteristic of a modular product architecture?
 - (a) The product is designed as a single, indivisible unit.
 - (b) The product is composed of interchangeable, independent modules that can be easily replaced or upgraded.
 - (c) The product requires a high level of customization for each customer.
 - (d) The product has a complex design with few parts.

- (vii) Which of the following is an example of an invention that can be patented?
 - (a) A new process for making a type of fabric
 - (b) A business idea with a new strategy
 - (c) A new name for a product
 - (d) A design for a product packaging
- (viii) What is the primary goal of the benchmarking process in business?
 - (a) To reduce costs without changing product quality
 - (b) To compare a company's performance with industry leaders or competitors
 - (c) To improve internal communication between departments
 - (d) To develop new products and services
- (ix) Which of the following is a key principle of Design for Manufacture (DFM)?
 - (a) Use of the most complex components to enhance functionality
 - (b) Minimization of the number of parts and components
 - (c) Designing with a focus solely on product aesthetics
 - (d) Maximizing the number of assembly operations
- (x) What is the primary purpose of creating a prototype in product development?
 - (a) To reduce the cost of production
 - (b) To test and validate the product design before mass production
 - (c) To increase the aesthetics of the product
 - (d) To market the product to customers

Fill in the blanks with the correct word

- (xi) One common application of reverse engineering is _____ a competitor's product to identify opportunities for improvement or differentiation.
- (xii) The success of a product depends on how well its function aligns with _____ needs and preferences.
- (xiii) Integral architecture is often chosen for products where _____, compactness, and performance optimization are the top priorities.
- (xiv) Benchmarking allows a company to adopt new _____ and strategies that improve overall efficiency and competitive advantage.
- (xv) Prototypes allow designers and engineers to gather _____ from users or stakeholders, which helps in refining the product's design.

Group - B

- 2. (a) List the activities involved in a typical product development process. [[CO1](Remember/LOCQ)]
- (b) What is a product portfolio in product development? [[CO1](Understand/LOCQ)]
- 6 + 6 = 12**
- 3. (a) What do you understand by market opportunity? [[CO1](Understand/LOCQ)]
- (b) What are the legal issues involved in reverse engineering for product development? [[CO1](Understand/LOCQ)]
- 6 + 6 = 12**

Group - C

4. (a) What are the difficulties in understanding customer needs? [[CO2](Analyse/IOCQ)]
(b) What are the methods normally employed in finding out customer needs? [[CO2](Remember/LOCQ)]
6 + 6 = 12
5. (a) How are the cost of a project and its 'Return on Investment' arrived at? [[CO2](Analyse/IOCQ)]
(b) How does the product function impact the customer satisfaction? [[CO2](Analyse/IOCQ)]
6 + 6 = 12

Group - D

6. (a) What are the key differences between modular and integral architecture in terms of design flexibility? [[CO3](Analyse/IOCQ)]
(b) What challenges are associated with implementing integral design, particularly in terms of customization? [[CO3](Analyse/IOCQ)]
6 + 6 = 12
7. (a) How does brainstorming facilitate the generation of creative and innovative concepts during the early stages of product development? [[CO4](Analyse/IOCQ)]
(b) Why is it important to generate a large quantity of ideas during a brainstorming session, even if some of them appear unrealistic or "wild"? [[CO4](Understand/LOCQ)]
6 + 6 = 12

Group - E

8. (a) What is "Design for Manufacture" (DFM), and how does it impact the product development process? [[CO5](Analyse/IOCQ)]
(b) What are the main "Design for Manufacture" (DFM) guidelines that should be followed to ensure a product is easy and cost-effective to produce? [[CO5](Remember/LOCQ)]
6 + 6 = 12
9. (a) What is Failure Mode and Effect Analysis (FMEA)? [[CO6](Remember/LOCQ)]
(b) What are the key steps involved in conducting a Failure Mode and Effect Analysis (FMEA)? [[CO6](Understand/LOCQ)]
4 + 8 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	56	44	0

