

**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) The design function plays the lead role in defining the physical form of the product to best meet _____.
 - (a) customer need
 - (b) designer need
 - (c) manufacturer need
 - (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) A clearly articulated development process acts as a master plan that defines the roles of each of the players of the _____ team.
 - (a) marketing
 - (b) development
 - (c) management
 - (d) both (a) and (b)
- (iv) The detail design phase includes the complete specification of the _____ of all of the unique parts in the product.
 - (a) Geometry
 - (b) Materials
 - (c) Tolerances
 - (d) Geometry, Materials, and Tolerances
- (v) 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)
- (vi) In the concept development phase, the needs of the target market are identified, and _____ product concepts are generated and evaluated.
 - (a) similar
 - (b) alternative
 - (c) unique
 - (d) both (a) and (b)

- (vii) In product life cycle, new competitors enter the market during
 (a) introduction stage (b) growth stage
 (c) maturity stage (d) decline stage
- (viii) In order to make a product more difficult for copying by competitors, the product should have
 (a) modular architecture (b) integral architecture
 (c) mixed architecture (d) can have any architecture
- (ix) _____ architecture allows a design change to be made to one chunk without requiring a change to other chunks for the product to function correctly.
 (a) Modular (b) Integral
 (c) Mixed (d) Both (a) and (b)
- (x) _____ prototypes are usually built with parts supplied by the intended production processes but may not be assembled using the intended final assembly process.
 (a) Alpha (b) Beta (c) Gamma (d) Both (a) and (b)

Fill in the blanks with the correct word

- (xi) The process of extracting knowledge, design information, and specifications from an existing product by disassembling and analyzing sub-assemblies / components is called _____.
- (xii) _____ modularity is, where a device is equipped with a standard interface that accepts any combinations of different functioning modules.
- (xiii) Comparison of a product's parameters with competitor's products is known as _____.
- (xiv) A copyright is an _____ right granted by a government to copy and distribute an original work of expression, whether literature, graphics, music, art, entertainment, or software.
- (xv) DFM stands for _____.

Group - B

2. (a) What are the challenges of a typical product development process?
[[C01](Analyse/IOCQ)]
 (b) In relation to a new product development, briefly describe on 'market opportunity'.
[[C01](Understand/LOCQ)]
6 + 6 = 12
3. (a) How the product development process differs from product design?
[[C01](Analyse/IOCQ)]
 (b) Name and briefly elaborate the important phases of a typical product development process.
[[C01](Remember/LOCQ)]
6 + 6 = 12

Group - C

4. (a) What is S-curve and what does it say about the technological trajectories? [[CO2](Analyse/HOCQ)]
(b) Describe various types of customer needs. [[CO2](Remember/LOCQ)]
6 + 6 = 12
5. (a) What do you understand by function, sub-function in relation to a product development process? [[CO3](Understand/LOCQ)]
(b) What is the importance of constraints? Explain with example. [[CO3](Evaluate/HOCQ)]
6 + 6 = 12

Group - D

6. (a) What are the merits and demerits of integral architecture? [[CO3](Evaluate/HOCQ)]
(b) How brainstorming is related to useful idea generation? [[CO4](Remember/LOCQ)]
6 + 6 = 12
7. (a) Explain the need of concept classification tree with suitable example. [[CO4](Analyse/IOCQ)]
(b) With the help of a suitable example, explain what you understand by 'manufacturing cost'. [[CO5](Understand/LOCQ)]
6 + 6 = 12

Group - E

8. (a) What is 'Benchmarking' in relation to new product development? [[CO5](Understand/LOCQ)]
(b) What do you understand by 'Product Specifications'? [[CO5](Understand/LOCQ)]
6 + 6 = 12
9. (a) What do you understand by 'Intellectual Property Right'? [[CO6](Understand/LOCQ)]
(b) Briefly describe on different types of prototypes. [[CO6](Remember/LOCQ)]
6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	62.5	18.75	18.75

Course Outcome (CO):

After the completion of the course students will be able to

- CO1 Identify market opportunity for new products and initiate necessary actions for developing the product.
- CO2 Forecast technology requirement, assess market demand and customer needs and work out project cost and ROI of a product.
- CO3 Prepare detailed product architecture and product costing.
- CO4 Conduct brainstorming and generate ideas.
- CO5 Set final product specification taking into account its manufacturability, assembly and maintenance.
- CO6 Create prototype of a product, validate its performance and carry out failure analysis.

**LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*