NEW PRODUCT DEVELOPMENT
(MECH 3223)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

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

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) The process of transforming the product functions to product form is called
(a) product specification (b) product benchmarking
(c) product prototype (d) product architecture.

(ii) What the last letter of "PRIDE" principle stands for?
(a) Excellence (b) Enterprise (c) Energy (d) Eagerness.

(iii) If a product is designed based on integral architecture, then
(a) product can become integral part of another product
(b) change of product design in future becomes easy
(c) copying the product by competitor becomes difficult
(d) none of the above.

(iv) FAST is a method used for finding
(a) product function (b) customer needs
(c) product assembly steps (d) project facilities.

(v) During concept generation and brain storming process
(a) too many ideas should not be generated to avoid confusion
(b) only those ideas that seem feasible should be considered
(c) the discussion should be completed within a predetermined fixed time
(d) none of the above.

(vi) Portfolio planning is a subject of
(a) understanding opportunity (b) development of a concept
(c) implementation of a concept (d) embodiment engineering.

(vii) The customer need that apply only to a smaller market segment within the entire buying population is called
(a) Direct need (b) Latent need (c) Constant need (d) Niche need.

(viii) Reverse engineering of a product involves
(a) engineering a product by following the steps in reverse
(b) designing a product which is reverse of an existing product
(c) extracting information from an existing product
(d) designing a product from fundamental.

(ix) Concurrent Engineering means
(a) latest design (b) concept to manufacture
(c) product modelling (d) doing design and manufacturing together.

(x) Comparing a company's product's specification, durability and maintainability with that of competitor's is called
(a) Quality function deployment (b) Prototype testing
(c) Market survey (d) Benchmarking.

Group- B

2. (a) In relation to new product development, write the significance of reverse engineering. *[(CO1)(Remember/LOCQ)]*
(b) In what ways does a 'Product Development' process differ from 'Product Design' process? *[(CO1)(Analyse/IOCQ)]*
6 + 6 = 12

3. (a) How market segmentation mapping could be beneficial for assessment of product opportunities? *[(CO1)(Analyse/IOCQ)]*
(b) Briefly describe about different types of product development projects. *[(CO1)(Remember/LOCQ)]*
6 + 6 = 12

Group - C

4. (a) Briefly explain the implications of 'S'-curves in product planning decision. *[(CO2)(Analyse/IOCQ)]*
(b) Briefly describe the 'FAST' method in developing function trees. *[(CO2)(Understand/LOCQ)]*
6 + 6 = 12

5. (a) Briefly explain the product life-cycle strategies with the help of product life-cycle graph. *[(CO2)(Analyse/IOCQ)]*
(b) Briefly describe the following modular architectures, (i) Slot, (ii) Bus and (iii) Sectional. *[(CO3)(Understand/LOCQ)]*
6 + 6 = 12

Group - D

6. (a) Explain the advantages and disadvantages of clustering method based modular design. *[(CO4)(Evaluate/HOCQ)]*

(b) Specify the goals of concept generation process in the context of new product development. *[(CO4)(Analyse/IOCQ)]*

6 + 6 = 12

7. (a) Describe the guidelines of an effective brain storming process. *[(CO4)(Understand/LOCQ)]*

(b) With the help of a cost tree, show how to arrive at the final product cost. *[(CO5)(Evaluate/HOCQ)]*

6 + 6 = 12

Group - E

8. (a) What are the advantages of 'Benchmarking' in relation to new product development? *[(CO5)(Evaluate/HOCQ)]*

(b) Show the check list for developing product specifications. *[(CO6)(Understand/LOCQ)]*

6 + 6 = 12

9. (a) Explain the need for making functional prototypes in relation to the new product development. *[(CO6)(Analyse/IOCQ)]*

(b) Briefly explain the 'Failure Mode and Effects Analysis (FMEA)' for a product. *[(CO6)(Understand/LOCQ)]*

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	43.75	37.5	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.*