NEW PRODUCT DEVELOPMENT
(MECH 3144)

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) 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.

(iii) Modelling and simulation of a product by analytical method has the following characteristics.
(a) Performance is predicted accurately
(b) Can be completed in short time
(c) It is expensive
(d) Any change in the product cannot be analysed easily.

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

(v) 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.

(vi) One of the important legal issues to be taken care of subsequent to a new product development is
(a) Customer feedback (b) Patent right
(c) Design consideration (d) Product profitability.

(vii) Specification of a product are subject to the following external constraints
(a) size and weight (b) cost and schedule
(c) environmental regulations (d) all of the above.

(viii) Comparing a 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.

(ix) Technology development life cycle follows
(a) Bath tub curve (b) S-curve
(c) normal curve (d) parabolic curve.

(x) Which of the following can be categorised as "Design for Assembly" guideline
(a) Minimize part count (b) Maximise part symmetry
(c) Provide alignment features (d) all of the above.

Group – B

2. Elaborate the activities under the following product development processes:
(i) Market Opportunity analysis.
(ii) Competitive analysis.
(iii) Physical & Analytical Modelling.

4 + 4 + 4 = 12

3. (a) Explain the difference between 'Product Design' and 'Product Development'.

(b) Name few legal and ethical issues faced during product development.

(c) What is the advantage of "integrated team" over "sequential functional team" for product development?

4 + 4 + 4 =12

Group – C

4. (a) What is S-curve and what does it say about the status of a product in the market?

(b) How the cost of a project and its "Return on Investment" are arrived at?

5 + 7 = 12

5. (a) In what way does a 'Product Development' effort differ from 'Product Design' effort.

(b) What team structures are considered for Product Development Team? Explain briefly.

(c) Name and elaborate the 5 steps of 'product development planning'

4 + 4 + 4 = 12

Group – D

6. (a) Elaborate the guidelines of an effective Brain storming process.

   (b) With the help of a cost tree show how to arrive at the final product cost

6 + 6 = 12

7. (a) What are the steps of modular design by clustering method.

   (b) Briefly describe the goal and steps of concept generation process.

   (c) Draw the cost tree to arrive at the final product cost.

4 + 4 + 4 = 12

Group – E

8. (a) Discuss the advantages and disadvantages of analytical model and physical model for simulating a product's performance.

   (b) What is a Prototype? Write short notes on 2 (two) types of Prototype models.

6 + 6 = 12

9. (a) In the context of new product, what is 'Benchmarking' and what are its benefits?

   (b) What is the objective of "Design for Manufacture" and "Design for Assembly".

   (c) In the context of Design for Manufacture and Assembly of a product, explain with short note and relevant sketch the following.

   (i) Design for Manufacture guidelines (give 1 example for sheet metal or machined part)
   (ii) Design for Assembly guideline (give 1 example).

4 + 4 + 4 = 12

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