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) Analytical modelling for simulation of a product will address which of the following?
(a) Performance is predicted accurately
(b) Can be completed in relatively short time
(c) It is expensive
(d) Any change in the product cannot be analysed easily.

(ii) 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.

(iii) What characteristic is represented by letter 'R' of PRIDE principle?
(a) Robust (b) Respect (c) Reason (d) Right.

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

(v) Need that typically are not expressed by the customer without probing is called
(a) constant need (b) niche need
(c) latent need (d) general need.

(vi) Disruptive technology signifies
(a) wartime technology (b) unusual technology
(c) new era of technology (d) incompetitive technology.

(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) 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.

(ix) 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.

(x) Components of a product designed following the guidelines of DFA will be
(a) easy to manufacture (b) easy to sell
(c) easy to assemble (d) easy to maintain.

Group – B

2. Elaborate the activities under the following product development processes:
(i) Understand the opportunity
(ii) Develop a concept
(iii) Implement a concept.

4 + 4 + 4 = 12

3. (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 – C

4. (a) Discuss on the "like–dislike" method of customer need identification.

(b) What is functional decomposition? Discuss the steps of FAST method.

4 + 8 = 12

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

(b) Explain the 5 steps normally employed in finding out customer needs.

7 + 5 = 12

Group – D

6. (a) What is meant by "Product architecture" and what does it try to achieve?

   (b) Write at least 4 characteristics of Integral Product Architecture.

   (c) Describe different types of function based modularity with examples.

4 + 4 + 4 = 12

7. (a) In the context of new product development, outline the goal and steps of concept generation process.

   (b) Describe the steps of brain storming process.

   (c) Identify all cost elements to arrive at the final cost of a new product.

4 + 4 + 4 = 12

Group – E

8. (a) What are the uses of a prototype? Describe the characteristics of Beta and Preproduction prototypes.

   (b) What influences writing 'specification' of a new product. List six parameters that should be specified for a new product giving reasons for specifying those.

6 + 6 = 12

9. (a) What is the objective of "Design for Manufacture" and "Design for Assembly"?

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

   (c) What are the three things "Failure Mode & Effect Analysis" does for a product? List four potential causes of failures of a product and their potential effects.

4 + 4 + 4 = 12