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No. of Printed Pages—3   **ME—501**

B. TECH.

FIFTH SEMESTER EXAMINATION, 2003-2004
PRODUCT DESIGN & DEVELOPMENT

Time : 2 Hours   *Total Marks : 50*

Note : Attempt **ALL** questions.

1.   Attempt any FOUR parts of the following :—   (3·5×4)

   (a)   What is meant by design by evolution ? Discuss the various stages of the development of a safety razor, mentioning important features at each stage.

   (b)   List the major changes in any one of the following products/systems in the last one-decade :—

   (i)   Automobiles

   (ii)   Communication system

   (c)   With a neat drawing, explain the Product Consumption Cycle.

   (d)   Differentiate between the Old and New Design Methods.

   (e)   With suitable examples, explain the difference between the Need-based and Technology-based product development.

   (f)   What is meant by Product Life Cycle ? Elaborate.

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2. Attempt any FOUR parts of the following :— (3×4)

(a) What is Aesthetics ? Why is it important to the product designer ?

(b) What do you understand by the term, 'Designer as a Black Box' ? What is its significance in product development ?

(c) "Identifying need itself is a problem." Do you agree with the statement ? Explain.

(d) What are the essential factors considered in the analysis of Need ?

(e) Discuss the functions of Colours in the product design.

(f) In your opinion, what is the importance of Divergence Stage in product development process ?

3. Attempt any TWO parts of the following :— (6×2)

(a) What is meant by System Transformation ? How is it used in product development ?

(b) With two different examples, discuss the importance of Synectics in product design.

(c) A travelling salesman is reimbursed actual taxi charges by the company or is paid Rs. 10 per kilometre travelled, if using his own car. The expenditure incurred in a car is as given :—

Depreciation   Rs.   25000 per year
Tax & Insurance   Rs.   9000 per year
Maintenance   Rs.   50 per 100 kilometres
Fuel & Oil   Rs.   4·50 per kilometre

Find the break-even distance he should travel per month that will make owning a car an attractive proposition.

4. Attempt any TWO parts of the following :—   (6×2)

(a) Draw and explain the various features of a bathtub curve of a product. Also discuss MTTF, MTBF and availability of a product.

(b) What are the essential ergonomical factors to be considered while designing man/machine interface of a product ?

(c) Explain the term Reliability in Series and Parallel. Find the reliability $R(s)$ of the given combined system :

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