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BIMEE-002

**B.Tech. - VIEP - MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

June, 2015

00366

BIMEE-002 : PRODUCT DEVELOPMENT AND DESIGN

Time : 3 hours

Maximum Marks : 70

Note :

- (i) *Answer any five questions.*
- (ii) *All questions carry equal marks.*
- (iii) *Use of calculator is allowed.*

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1. (a) What do you understand by product development ? Discuss its need. Explain the factors that should be taken into account while developing a new product. 7
- (b) Give examples of design of evolution and explain the evolution of safety razor in detail. 7

2. (a) In morphology of design, why is “Analysis of Need” termed as divergent phase ? Explain “Need Statement” , “Specifications” and “Performance Parameters” as applied to analysis of need.

For **any one** of the following give a generalized need statement, specifications and standards of performance :

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- (i) Match-box
- (ii) Mobile hand-set
- (iii) Mosquito coils

- (b) What is Ideation ? Why is it so difficult to get ideas once the “Analysis of Need” has been carried out ?

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3. (a) Using Transformation technique or Morphological technique carry out the product development exercise for **any one** of the following :

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- (i) Umbrella
- (ii) Alarm watch

- (b) What do you understand by “utility value” of a product ? Explain decision-making in product development using the concept of utility index.

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4. (a) What is bath-tub curve ? Explain failure rate, MTTF, MTBF and reliability of a system.

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- (b) Write a note on compatibility of displays and controls used in any system.

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5. A series system comprises of 5 independent subsystems. The estimated failure rates of these are 0.0002, 0.0003, 0.0004, 0.0005 and 0.0006 failures per hour. The specified failure rate of the series system is 0.0004 failures per hour. Calculate the value of failure rate to be allocated to each subsystem. 14
6. Explain life cycle assessment and describe its role in environment impact analysis. 14
7. Discuss any *four* of the following in brief : 14
- (a) Innovation versus Invention
 - (b) Margin of safety
 - (c) Role of ergonomics in product design and development
 - (d) Brain storming
 - (e) Decision matrix
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