

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

00945

**Term-End Examination  
December, 2014**

**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 scientific calculator is allowed.

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1. (a) Explain briefly the essential factors of product design. 7
  - (b) Define the design of evolution with a suitable example. 7
  2. (a) Discuss briefly the three phases of morphology of design. 7
  - (b) What are Ideation techniques ? Explain one method to generate ideas. 7
  3. (a) Explain the role of ergonomics in product design and development. 7
  - (b) Describe the decision-making in product development using the concept of utility index. 7

4. Describe reliability considerations in product design and development. Explain MTTF and MTBF and failure rate. 14
5. (a) Explain Break-Even Analysis. 7  
(b) Write a note on reliability of systems in series and parallel. 7
6. A series system comprises of 4 independent sub-systems. The estimated failures rates of these are 0.0003, 0.0004, 0.0005 and 0.0006 failures per hour. The specified failure rate of the series system is 0.003 failures per hour. Calculate the value of failure rate to be allocated to each sub-system. 14
7. Discuss any *four* of the following in brief : 14
- (a) Technological forecasting
  - (b) Bathtub curve
  - (c) Brainstorming
  - (d) Environment and safety considerations
  - (e) Decision matrix
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