B.Tech. MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

December, 2013

BIMEE-010 : MECHANICAL SYSTEM DESIGN

Time : 3 hours *Maximum Marks : 70*

*Note : Answer **any five** questions. All questions carry **equal** marks.*

1. (a) Describe briefly about various approaches and techniques used in concurrent engineering. 7

   (b) Define the term engineering system and give its different types. Explain briefly about overall design process, along with a block diagram. 7

2. (a) What is the need of modelling of a system ? Briefly explain the various types of models used. 7

   (b) Describe briefly about state theory approach and discuss its essential features. 7

3. (a) Explain the importance of optimization in a network model used in an assembly line of a manufacturing industry. 7

   (b) Explain the following : 7
   (i) Analytical methods of optimization
   (ii) Combinational optimization

4. (a) How is feasibility assessment important for evaluating a system ? Explain the significance of financial analysis. 7

(b) Write short notes on ***any two*** of the following : 7

(i) Time value of money

(ii) Planning horizon

(iii) Utility value

5. A company is considering purchase of a new computer controller. A semi automatic controller will cost Rs. 10,000/- and can be expected to last for 6 years with salvage value of Rs.1,000/-. Operating cost will be Rs.6,000/- per year. A fully automatic controller will cost Rs.16,000/-, should last for 6 years and will have salvage value of Rs.4,000/-, operating cost would be Rs.4,000/- per year. The service provided by the two controllers is identical. Find the alternative to be selected. Use interest rate of 10%. Your decision should be based on equivalent annual cost. 14

6. (a) What are the general goals and purposes of an optimization process ? Explain. 7

(b) Briefly explain how a mathematical model is formulated for a compound bar system. 7

7. What are the components of a typical network. For the network shown in fig. below, determine the shortest and longest path between node 1 and node 8. The numbers written immediately above the arrows represent the arc length. 14