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**B.TECH**  
**(SEM VII) THEORY EXAMINATION 2017-18**  
**MECHANICAL SYSTEM DESIGN**

**Time: 3 Hours****Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x10 = 20**

- a. What is probability density function?
- b. Write down Bay's theorem.
- c. List the element of decision problem.
- d. What is the condition of maxima and minima?
- e. What is the condition of saddle point and stationary point?
- f. What is optimization concept?
- g. List the name of Aluminum alloys.
- h. Define goal programming.
- i. Define system evaluation.
- j. Discuss time value of money

**SECTION B****2. Attempt any three of the following: 10 x 3 = 30**

- a. The data is given for two equipment A and B. Find the economical machine for selection by using present worth value.

	Equipment A	Equipment B
Initial cost in Rs.	10000	15000
Operating cost per year Rs.	1000	1000
Life of Equipment in Year	4	4
Interest rate 10%		

- b. Explain method of optimization (a) Analytical (b) combinatorial.
- c. What are the characteristic features of material handling system? Briefly explain the material handling system.
- d. What kind of questions are going to ask while evaluating a mechanical system? Explain briefly.
- e. Explain the case study of compound bar system model.

**SECTION C****3. Attempt any one part of the following: 10 x 1 = 10**

- a. Model building is the essence of system evaluation. Discuss.
- b. Write in brief about iconic, analog and mathematical model.

**4. Attempt any one part of the following: 10 x 1 = 10**

- a. Explain the basic concept of concurrent engineering with proper example. Describe with suitable example, the basic step to be followed in concurrent engineering.
- b. Explain the role of models in engineering design. Explain different types of models.

- 5. Attempt any *one* part of the following: **10 x 1 = 10****
- a. Explain various phases and interactions involved in design process
  - b. Explain state theory approach in system analysis
- 6. Attempt any *one* part of the following: **10 x 1 = 10****
- a. What is need of system modeling in mechanical system? How system modeling is used in mechanical system.
  - b. Explain design process approach in system analysis.
- 7. Attempt any *one* part of the following: **10 x 1 = 10****
- a. Write short note on (i) role of computer in simulation (ii) Model of inventory control system in production plant.
  - b. Explain the insulation system. Derive the expression for critical thickness of insulation of sphere.