

5 Attempt any **two** parts of the following :  $10 \times 2 = 20$

(a) What is Monte Carlo method of simulation ?  
Explain its purpose, advantages and limitations.

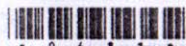
(b) Explain the following :

(i) EMV (Expected monetary value)

(ii) Utility value

(iii) Baye's theorem

(c) Develop a model of inventory control system in production plant.



Printed Pages : 4

TME - 802

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0481

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B. Tech.

(SEM. VIII) EXAMINATION, 2008-09

MECHANICAL SYSTEM DESIGN

Time : 3 Hours]

[Total Marks : 100

Note : (1) Attempt all questions.

(2) All questions carry equal marks.

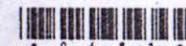
(3) Be Precise in your answer.

1 Attempt any **two** parts of the following :  $10 \times 2 = 20$

(a) What are the characteristics of a system ? Explain with suitable examples the types of system.

(b) Explain the basic concept of concurrent engineering. What are the major advantages of implementing the concurrent engineering for product design and production ?

(c) Prepare a check list for carrying out the need analysis of the design of a product. Give suitable explanations wherever necessary.





2 Attempt any **two** parts of the following :  $10 \times 2 = 20$

(a) (i) Write at least **two** need statements for each of the following product :

- (1) Bicycle
- (2) Envelop
- (3) Telephone
- (4) Gear
- (5) Clutch.

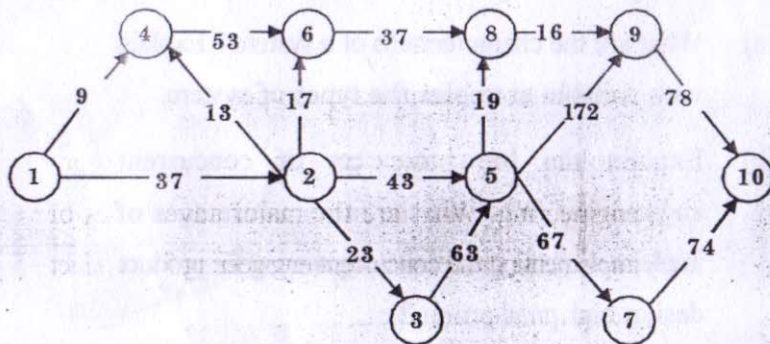
(ii) Explain the component integration approach for the analysis of the system.

(b) Explain the black box approach of system analysis and design with suitable example.

(c) Describe the steps involved in modeling a mechanical system.

3 Attempt any **two** parts of the following :  $10 \times 2 = 20$

(a) For the network shown in figure, find the shortest path from node 1 to node 10. What is the longest path ? The figures (Values) adjacent to the arcs denote their lengths.



(b) Explain the following :

- (i) Analytical methods of optimization.
- (ii) Subjective optimization method.
- (iii) Combinatorial optimization.

(c) With neat sketch, explain the insulation system. Derive the critical thickness of insulation of sphere.

4 Attempt any **two** parts of the following :  $10 \times 2 = 20$

(a) Write a note on time value of money. Calculate the annual payment needed to return the capital of Rs. 100,000 and interest at 10% in 15 years.

(b) A certain individual firm desires an economic analysis to determine which of the two machines is attractive over a given interval of time. The MARR (Minimum attractive rate of return) is 5%. The following data are to be used in the analysis.

	Machinery X	Machinery Y
First cost	Rs.1,50,000	Rs.2,40,000
Estimated life	12 years	12 years
Salvage value	0	Rs.6000
Annual maintenance cost	0	Rs.4500

Which machine would you chose ? Base your answer on annual worth method.

(c) Find the global maximum of the function :

$$Y(x_1, x_2) = 5(x_1 - 3)^2 - 12(x_2 + 5)^2 + 6x_1x_2$$

In the region

$$0 \leq x_1 \leq 10$$

$$0 \leq x_2 \leq 5$$

