Sub Code:EME043/NME043

Paper Id: 910055 Roll No:

B. TECH.
(SEM-VII) THEORY EXAMINATION 2019-20
MECHANICAL SYSTEM DESIGN

Time: 3 Hours *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Describe the systems approach to engineering problem solving.
b. How an analysis of system hierarchy permits the analysis of system at various levels?
c. Define Shorten time to market the products?
d. State the theory approach for system analysis?
e. Discuss in brief the important characteristics of iconic, analog model
f. What are types of taxes?
g. What is decision Tree?
h. What is the law of diminishing return?
i. What is computer simulation?
j. What is the role of random numbers in simulation?

SECTION B

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

a. You are required to develop a simulation model for a study of an assembly line. Describe how you would develop the simulation model purpose.
b. Discuss the origins of system analysis concept. What are the components of a total weapon system?
c. What is optimization process? What is the meaning of Goal, Objective, motivation and freedom of Choice?
d. Calculate the annual payment needed to return the capital of Rs. 1,00,000 and interest at 10 % in 15 Years.
e. Explain clearly the various ingredient of decision problem. What are the basic steps of a decision making process?

SECTION C

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

(a) What are the characteristics of the system? Give their importance in the system?
(b) What is the importance of need Statement? What question must be put up to place need statement in as definitive context as possible?

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

(a) Explain with suitable example the methodology of system analysis based Black – Box approach. Illustrate your answer with reference to a production system.
(b) "Model Building is the essence of the system Design'. Discuss.

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

(a) A project Schedule ha the following characteristics:

Activity	Time	Activity	Time
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

Construct a network diagram.

(b) What is subjective optimization? What is the role human user in it?

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

(a) A company is trying to diversify its business is new product line. The life of the project is 10 year with no salvage value at the end of its life. The initial outlay of the project is Rs. 20,00,000. The annual net profit is Rs. 3,50,000. Finds the rate of return for the new business.

(b) Find the minimum value of x^2+y^2 subjected to the condition ax + by = C.

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

(a) Payoffs the three acts X, Y, Z and the state of nature P,Q, R are given below:

Sate of Nature	Act		
	X	Y	Z
P	-120	-80	100
Q	200	400	-300
R	260	260	600

The probabilities of the states of nature are 0.3 , 0.5, and 0.2 respectively. Tabulate the EVMs for the above data and state which can be chosen as the best act.

(b) What is the use of simulation in system design? Also Define Monte Carlo Simulation