B.TECH.
THEORY EXAMINATION (SEM–VI) 2016-17
MODELING AND SIMULATION

Time : 3 Hours   *Max. Marks : 100*

Note : *Be precise in your answer.* *In case of numerical problem assume data wherever not provided.*

SECTION – A

1.   **Explain the following:**   **10 x 2 = 20**
    (a)   Compare Actual system with simulation.
    (b)   Write the purpose of dynamic modeling.
    (c)   Using random numbers, simulate the gender of children born.
    (d)   Why simulation is required?
    (e)   Identity the outcomes of cobweb model.
    (f)   Draw the flow chart for next event simulation.
    (g)   Define stochastic simulation. Give an example.
    (h)   A builder observes that the rate at which he can sell the houses, depends directly upon the number of families who do not have a house. As the number of families without house diminish, the rate at which he sells the houses drops. How many houses in a year can he sell?
    (i)   State the advantages and disadvantages of simulation languages.
    (j)   Identify the important feature in project planning and control. How it can be resolved?

SECTION – B

2.   **Attempt any five of the following questions:**   **5 x 10 = 50**
    (a)   Write in detail about the components of the discrete event system model. Give an example.
    (b)   Brief about the classification of models in detail. Enumerate the limitations of models.
    (c)   Compare fixed time-step versus next-event model:
    (d)   List the steps in Monte carlo simulation. Using the Monte Carlo Simulation, estimate the arc under the sine curve over 0 and π.
    (e)   How Exponential growth and Exponential decay model work? Explain with an example.
    (f)   Consider the ATM Machine. Simulate this using single-server queuing model.
    (g)   Find the CPM for the below example.

Activity	Duration	Precedence
A	3	-
B	3	A
C	4	-
D	1	C
E	3	B, D
F	2	A, B, D
G	2	C, F
H	4	G
I	1	C
J	3	E, G
K	5	F, H, I

(h) Compare and contrast the simulation languages. How do you select the simulation language?

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3.   **(a)** A new casino game involves rolling 3 dice. The winnings are directly proportional to the total number of sixes rolled. Suppose a gambler plays the game 100 times, with the following observed counts:

Number of Sixes	Number of Rolls
0	48
1	35
2	15
3	3

The casino becomes suspicious of the gambler and wishes to determine whether the dice are fair. What do they conclude?

  (b) How pseudo random numbers are generated?

4. How to simulate the water reservoir system?

5. The Lajwaab Bakery Shop keeps stock of a popular brand of cake. Previous experience indicates the daily demand as given below:

Daily demand	Probability
0	0.01
15	0.15
25	0.20
35	0.50
40	0.12
50	0.02

Consider the following sequence of random numbers:
21, 27, 47, 54, 60, 39, 43, 91, 25, 20.

Using this sequence, simulate the demand for the next 10 days. Find out the stock situation, if the owner of the bakery shop decides to make 30 cakes every day. Also estimate the daily average demand for the cakes on the basis of simulated data.

NOTE: "Make sub division as per your choice "