Tribhuwan University

Institute Of Science and Technology

Simulation and Modeling

2070

Full Marks : 60

Pass Marks : 24

Time : 3 Hours

Group A

Attempt any two questions : (2*10=20)

1.) Why do we perform the analysis of simulation output? Explain how do you use simulation run statistics in the output analysis. (4+6)

2.) Describe the linear congruential method for random number generation. Use the Multiplicative congruential method to generate a sequence of four-three digit random integers, with seed=117, constant multiplier=43 and modulus=1000. (4+6)

3.) Consider that a machine tool in a manufacturing shop is turning out parts at the rate of one every 5 minutes. As they are finished , the parts go to an inspector, who takes 4±3 minutes to examine each one and rejects about 10% of the parts. Now, develop a block diagram and write the code for simulating the above problem using GPSS, and also explain the function of each block used in the block diagram in detail. (3+3+4)

Group B

Attempt any eight questions : (8*5=40)

4.) Differentiate between analytical models and numerical models. (5)

5.) Define congestion in a queuing system, and describe its major characteristics. (1+4)

6.) Describe the process of model building, verification, and validation in brief. (5)

7.) Explain, how do you update the clock time in system simulation. (5)

8.) What are the different phases that are employed in system simulation study? Explain in brief.(5)

9.) The sequence of numbers 0.54, 0.73, 0.97, 0.10, and 0.67 has been generated. Use the kolmogorov – smirnov test α=0.05 to determine if the hypothesis that the numbers are uniformly distributed on the interval [0,1] can be rejected. (Note that critical value of D for α=0.05 and μ=5 is 0.565). (5)

10.) Describe different types of statements, used in CSMP, with suitable examples. (5)

11.) "To simulate is to experiment". Justify it.

12.) Name the entities, attributes, activities, events, and state variables for the following systems :

- a.) Cafeteria
- b.) Inventory
- c.) Banking
- d.) A hospital emergency room
- e.) Communication

13.) Write short notes on :

a.) System, boundary and system environment
b.) Real time simulstion