Code No: B3305 **NR**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II SEMESTER EXAMINATIONS, APRIL/MAY-2012
SIMULATION MODELING OF MANUFACTURING SYSTEMS
(ADVANCED MANUFACTURING SYSTEMS)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1.a) Explain the characteristics of various types of simulation models. Discuss their suitability

b) State the advantages and limitations of simulation.

2.a) Define the following terms:
i) consistency ii) Unbiased and iii) Efficiency

b) Let X_1, X_2, X_3, and X_4 be independent random variables such that $E(X_i)=\mu$ and $Var(X_i)=\sigma^2$ for i=1,2, …4
If $Y= (X_1+X_2+X_3+X_4)/4$
$Z= (X_1+X_2+X_3+X_4)/5$
$T= (X_1+2X_2+X_3-X_4)/4$
Examine whether Y, Z, and T are unbiased estimators of μ? What is the efficiency of Y relative to Z?

3.a) Explain the terms:
i) Verification, ii) Validation and iii) Credibility

b) Explain various techniques for verification of simulation model with suitable examples.

4.a) "Selection of right distribution for random elements is essential for better simulation results"- Explain

b) List out various approaches for modeling random elements and explain any two and compare them.

5.a) List out various algorithms for generating random variates from given distribution and explain any two in detail.

b) Write algorithms to generate random variates from the following distributions
i) U(30,90) ii) Weibul (2, 20) and iii) Binomial (4,0.6)

6.a) Draw the symbols used in GPSS

b) A toll gate in a highway consists of 5 lanes. The inter-arrival time of the vehicles at the toll gate follow uniform distribution with 120±20 seconds. The service time also follows uniform distribution with 30 ±10 seconds. Draw a GPSS diagram and prepare a program to simulate the system for 5 hrs.

7.a) What is warm-up period? Explain its importance

b) Explain "Batch means method" for the output data analysis and its important characteristics.

8. Assembled television sets are inspected for volume control in an assembly line. The arrival rate of the television sets follows Poisson distribution and it is 21 sets per hour. The inspection rate also follows Poisson distribution and it is 25 sets per hour. In front of the inspection station, waiting space is sufficient for a maximum of 6 television sets. Simulate for arrival of 10 television sets and estimate the following:
i) Average waiting number of television sets in the system
ii)Average waiting time per television set in the system.

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