USN ☐☐☐☐☐☐☐☐☐☐   **07MCA52**

Fifth Semester MCA Degree Examination, December 2010
System Simulation and Modeling

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. What is simulation? What are its advantages and disadvantages? **(08 Marks)**
   b. Differentiate between discrete and continuous systems, with suitable examples. **(05 Marks)**
   c. Explain the following steps in a simulation study:
     i) Model conceptualization   ii) Experimental design. **(07 Marks)**

2 a. Explain the steps in a project simulation by drawing an associated activity network diagram. **(10 Marks)**
   b. Define an order-up-to-level inventory system. Calculate the average ending inventory and number of shortage days. (Assume the initial inventory and the lead time) **(10 Marks)**

3 a. Define : i) System   ii) Model   iii) System state   iv) Entity
     v) Attributes   vi) Event   vii) Event notice **(07 Marks)**
   b. Explain the event scheduling / time advance algorithm. Draw the snapshot at simulation time, t. **(07 Marks)**
   c. Explain the three different types of world views. **(06 Marks)**

4 a. Explain the characteristics of queuing systems. What does the format A / B / C / N / K represent? **(10 Marks)**
   b. Test whether the following sequence of numbers are auto correlated, $i = 2$ and $m = 2$ ($Z_{0.025} = 1.96$) : **(10 Marks)**
     .594, .928, .515, .055, .507, .351, .262, .797, .788, .442,
     .097, .798, .227, .127, .474, .825, .007, .182, .929, .852.

5 a. Give a step by step procedure to generate the random variates, using the inverse transform technique for : i) Uniform distribution   ii) Weibull distribution. **(10 Marks)**
   b. Explain the acceptance-rejection technique. Generate three Poisson variates with mean $\alpha = 0.2$. Generate the required number of random numbers using calculator. **(10 Marks)**

6 a. Distinguish between verification and validation. **(04 Marks)**
   b. Briefly describe the commonly used methods in the verification process. **(06 Marks)**
   c. The rates of return on ten investments in a portfolio are given as follows:
     18.8, 27.9, 21.0, 6.1, 37.4, 5.0, 22.9, 1.0, 3.1 and 8.3 percent.
     Estimate the parameters by identifying from which distribution the data belongs to. **(10 Marks)**

7 a. What are transient and steady state simulation with respect to output analysis? Explain with an example for each. **(08 Marks)**
   b. Explain point estimation and interval estimation. **(06 Marks)**
   c. Explain Naylor and Finger method for validation. **(06 Marks)**

8   Write short notes on: **(20 Marks)**
   a. Random-search algorithm   b. Types of simulation models
   c. Steps in input modeling   d. Statistical models in simulation.

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