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13MCA52

Fifth Semester MCA Degree Examination, June/July 2016
System Simulation & Modeling

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. What is simulation? When is simulation the appropriate tool? Mention any two areas of application. **(10 Marks)**

b. Explain the steps in a simulation study. **(10 Marks)**

2 a. What is discrete event simulation? Explain event scheduling / time advance algorithm. **(10 Marks)**

b. Discuss the three most prevalent world views for manual simulation. **(10 Marks)**

3 a. A production process manufactures computer chips on the average at 2% is non conforming. Every day, a random sample of size is 50 is taken from the process. If the sample contains more than two non conforming chips, the process will be stopped. Compute the probability that the process is stopped by the sampling scheme. **(10 Marks)**

b. A medical examination is given in three stages by a physician. Each stage is exponentially distributed with a mean service time of 20 minutes. Find probability that the exam will take 50 min or less. Also compare the expected length of exam. (note mean $\alpha = 0.543$) **(10 Marks)**

4 a. Explain the queuing notations. **(05 Marks)**

b. What is conservation equation? Explain. **(08 Marks)**

c. Discuss queuing models for server utilization. **(07 Marks)**

5 a. Elaborate on Kolomogorov-Smirnov test of uniformity. **(10 Marks)**

b. Use linear congruential method to generate a sequence of random numbers with $X_0 = 27$, $a = 17$, $c = 43$ and $m = 100$

How can maximal period be achieved by proper choice of a, c, m and X_0? **(10 Marks)**

6 a. Explain uniform distribution technique and Weibull distribution technique. **(10 Marks)**

b. What are the steps to be taken during the development of a useful model of input data? What are the points to be considered in evaluating the linearity of a q – q plot? **(10 Marks)**

7 a. What is verification? How is verification of simulation models done? **(10 Marks)**

b. Discuss calibration and validation of models. **(10 Marks)**

8 Write short notes on:

a. Simulation software. **(05 Marks)**

b. Difference between discrete and continuous systems. **(05 Marks)**

c. Goodness-of-fit tests. **(05 Marks)**

d. Write the components of the following systems : Banking, Production, Communications. **(05 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.