Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Modelling and Simulation

Time: 3 hrs.

Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting at least TWO full questions from each part.*
2. Use of statistical table is permitted.

PART – A

1   a. With neat flow chart explain the steps in simulation study. **(10 Marks)**
    b. Explain simulation of inventory system with neat diagram. **(06 Marks)**
    c. Differentiate between continuous system and discrete system. **(04 Marks)**

2   a. Explain concept in discrete event simulation. **(08 Marks)**
    b. Six dump-trucks are used to load coal from the entrance of a small mine to the rail road. Each truck is loaded by one of the two loaders. After a loading, the truck immediately moves to the scale to be weighted as soon as possible. Both the loaders and the scale have first come first serve scheme for trucks. Travel time from loader to the scale is negligible. After being weighted, a truck begins a travel time and then returns to the loader queue. Simulate for clock = 24. The distributions of loading time, weighing time and travel time is as shown below.

    Loading Time : 10, 5,   5,   10, 15, 10, 10
    Weighing Time : 12, 12, 12, 16, 12, 16
    Travel Time   : 60, 100, 40, 40, 80

    (12 Marks)

3   a. Consider the following sequence of five numbers 0.44, 0.81, 0.14, 0.05, 0.93 are generated. Use Kolmogorov-Smirnov test to test the uniformity. Consider level of significance $\alpha = 0.05$. **(08 Marks)**
    b. For 16-bit computers, L' Ecuyer recommends combining three multiplicative generators, with $m_1 = 32,363$, $a_1 = 157$, $m_2 = 31,727$, $a_2 = 146$, $m_3 = 31,657$ and $a_3 = 142$. The period of this generator is approximately 8×10^{12}. Generate three random numbers with the combined generator, using the initial seeds $x_{i,o} = 100, 300, 500$ for the individual generators $i = 1, 2, 3$. **(10 Marks)**
    c. What is random number explain pseudo random number? **(02 Marks)**

4   Write note on:
    a. Uniform distribution
    b. Triangular distribution
    c. Weibull distribution
    d. Empirical distribution. **(20 Marks)**

PART – B

5   a. Explain briefly with example acceptance – rejection technique for poisson distribution and gamma distribution. **(15 Marks)**
    b. Explain briefly what do you mean by discrete uniform distribution. **(05 Marks)**

6 a. Explain briefly variables-verification and validation of simulation model. **(12 Marks)**

b. What is antithetic variable and explain? **(08 Marks)**

7 a. Explain briefly histogram method of identifying type of distribution. **(08 Marks)**

b. Record pertaining to the monthly number of job-related injuries at an underground coal mine were being studies by a federal agency. The values for the past 100 months were as follows:

Injuries/month	0	1	2	3	4	5	6
Frequency of occurrence	35	40	13	6	4	1	1

i) Apply chi – square test to these data to test the hypothesis that the underlying distribution is poisson use $\alpha = 0.05$.

ii) Apply Chisquare test for Poisson distribution with mean = 1.0 and $\alpha = 0.05$. **(12 Marks)**

8 a. Explain Arena simulation language with example. **(10 Marks)**

b. Explain SLAM simulation language with example. **(10 Marks)**

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