

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

# **UNIVERSITY EXAMINATIONS 2014/2015**

**STAGE THREE SEMESTER ONE, THIRD YEAR FIRST SEMESTER & FOURTH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY AND BACHELOR OF BUSINESS INFORMATION TECHNOLOGY**

**ICS 2307: SIMULATION AND MODELING**

**DATE: AUGUST 2014 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

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**QUESTION ONE[COMPULSORY] [30 MARKS]**

1. With the aid of a neat sketch, show simulation study schematic. [6 marks]
2. Differentiate between
3. Continuous simulation and discrete simulation
4. Point estimator and interval estimator
5. Determination model and schematic model [9 marks]
6. Describe in detail six steps involved in simulation and modeling [9 marks]
7. Explain in detail the following terms
8. Simulation
9. Modeling
10. Validation [6 marks]

**QUESTION TWO [20 MARKS]**

1. Explain any three situations in which simulation modeling and analysis are used. [6 marks]
2. The managers of Central warehousing corporation was concerned about lines of trucks waiting for loading and unloading of food grains in one of its units. He is interested in simulating this process and therefore, collected the data for arrival and service time (loading or unloading) distribution. There is a single line and two serving stations.

|  |  |  |  |
| --- | --- | --- | --- |
| Inter-arrival  Time (min) | Frequency | Service time  (minutes) | Frequency |
| 12 | 8 | 15 | 5 |
| 13 | 16 | 16 | 10 |
| 14 | 30 | 17 | 18 |
| 15 | 22 | 18 | 37 |
| 16 | 17 | 19 | 20 |
| 17 | 7 | 20 | 15 |

Using a simulated samples of 10 arrivals, estimate the average time a truck spends waiting for loading or unloading. Estimate the mean fraction of times each server is idle. [14 marks]

Assume the company opened at 8.00 am.

**QUESTION THREE [20 MARKS]**

1. Discuss the role of Monte Carlos method in simulation [6 marks]
2. Explain the role of random number in simulations [6 marks]
3. Discuss six benefits of simulation modeling and analysis. [8 marks]

**QUESTION FOUR [20 MARKS]**

1. Define the following terms
2. Null hypothesis
3. Alternative hypothesis [4 marks]
4. Outline five steps in hypothesis testing [6 marks]
5. One of the supermarkets stores claims the man length of fish sold by the fishermen was 12.5 inches with a standard deviation of 5.2 inches. A sample of 64 fish sold by the fishermen led to a mean value of 14. 3 inches. Is there evidence to reject the supermarkets claim at =5%? [10 marks]