KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
END SEMESTER EXAMINATION
FOR THE BACHELOR OF BUSINESS INFORMATION TECHNOLOGY
KBI 2312 – SIMULATION AND MODELING
SPECIAL

Date: 16TH AUGUST 2023
Time: 8:30AM – 10:30AM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)
a)   Define the following terms
    i)   Simulation   (2 Marks)
    ii)   Pseudo-random numbers   (2 Marks)
    iii)   Seed   (2 Marks)

b)   Differentiate between the following
    i)   pseudo-random numbers and random numbers   (3 Marks)
    ii)   endogenous and exogenous variables   (3 Marks)

c)   Discuss and explain the advantages for using simulation other than experimenting with real life systems?   (6 Marks)

d)   Distinguish the following models
    i)   Deterministic vs Stochastic models
    ii)   Discrete vs Continuous models   (8 Marks)

e)   State and Explain any four examples of simulation software.   (4 Marks)

QUESTION TWO (20 MARKS)

a)   Highlight the steps involved in carrying out a simulation exercise   (7 Marks)
b)   Briefly explain any FOUR common techniques used to generate random numbers   (8 Marks)
c)   Consider simulating a single server queue; identify the exogenous and endogenous variables   (5 Marks)

QUESTION THREE (20 MARKS)

Consider a bank where arrivals follow a poison process with mean arrival rate of 5.1 customers per hour, service time are exponential with mean time of 10 minutes.
a)   Compute the measures of performance.   (12 Marks)
b)   What is the probability that the number of customers in the shop exceeds three?   (4 Marks)
c)   What percentage of customers goes directly to service?   (4 Marks)

QUESTION FOUR (20 MARKS)

a) Discuss the common random number generators commonly is use in simulation   (5 Marks)
b) Briefly discuss Four different kinds of simulations   (8 Marks)
c) Write statements (algorithm) in MATLAB on how to simulate a fair coin 50 times and record the resulting number of heads and tails   (6 Marks)
d) Discuss any three statistical techniques used to test for randomness when pseudo-random numbers are generated   (6 Marks)

QUESTION FIVE (20 MARKS)

a) What does a M/M/1 model represent? in simulation   (1 Mark)
b) Discuss the different types of systems and their corresponding reliabilities of performance
                                                                                                      (9 Marks)
c) Highlight five and Explain common steps used to all digital simulation Computer   (10 Marks)