



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY 2018

COURSE NO: CE 378
COURSE NAME: SIMULATION AND MODELING
CLASS: CE III **TIME:** 3 HOURS

Name: _____ Index Number: _____

INSTRUCTIONS: YOU ARE ANSWERING **TWO (2) QUESTIONS**. QUESTION ONE AND ANY OTHER

QUESTION ONE

A classical inventory problem concerns the purchase and sale of newspapers. The paper seller buys the papers for 186 pesewas each and sells them for 215 pesewas each. Newspapers not sold at the end of the day are sold as scrap for 55 pesewas each. Newspapers can be purchased in bundles of 10. Thus, the paper seller can buy 50, 60, and so on. There are three types of Newspapers, good, fair, and poor with probability of 0.35, 0.45, and 0.20 respectively. The distribution of papers demanded on each of these days is given in table 1. The problem is to determine the optimal number of papers the newspaper seller should purchase. This will be accomplished by simulating demands for 10 days and recording profits from sales each day.

Table 1. Distribution of newspapers demanded on each of these days

Demand	Good	Fair	Poor
40	0.03	0.10	0.44
50	0.05	0.18	0.22
60	0.15	0.40	0.16
70	0.25	0.20	0.12
80	0.30	0.04	0.06
90	0.15	0.08	0.00
100	0.07	0.00	0.00

Random Digits for types of news day: **58, 17, 21, 45, 43, 36, 27, 73, 86, 19**

Random Digits for Demand: **93, 63, 31, 19, 91, 75, 84, 37, 23, 02**

Assume the newsstand buys 150 newspapers each day. Find the optimal number of newspapers the news stand should purchase.

QUESTION TWO

- a) Contrast between deterministic and stochastic systems. Give an example of a real-life system which requires development of a stochastic model for its description. [6 marks]
- b) Give five (5) desirable features of a simulation application software. [10 marks]
- c) Give an example each of the following:
- i. Deterministic system
 - ii. Stochastic system
 - iii. Continuous system
 - iv. Discrete system
- [4 marks]
- d)
- i. Give four (4) disadvantages to the use of Simulation. [4 marks]
 - ii. What is a Discrete Event Systems (DES)? Give some examples. [6 marks]

QUESTION THREE

- a) Contrast between Continuous and Monte Carlo simulations. Give two (2) example of a real-life system which fall under a Continuous simulation types. [6 marks]
- b) Give five (5) advantages of using simulation techniques to solve problems in the world today. [10 marks]
- c) Give an example each of the following:
- i. Deterministic system

- ii. Stochastic system
- iii. Continuous system
- iv. Discrete system

[4 marks]

d)

- i. Give two (2) examples of simulation software and where they can be applied.

[4 marks]

- ii. What is an Agent-Based Modeling? Give some examples.

[6 marks]

Examiner: T. Kwantwi