

CHUKA



UNIVERSITY

**RESIT/ SPECIAL EXAMINATIONS
EXAMINATION FOR THE AWARD OF
BACHELOR OF COMMERCE AND BACHELOR OF ENTREPRENEURSHIP AND
SMALL BUSINESS MANAGEMENT**

BCOM 371/BBAM 371: OPERATIONS RESEARCH II

STREAMS: BCOM, BBAM

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 12/09/2018

11.30 AM – 1.30 PM

INSTRUCTIONS:

**ANSWER QUESTION ONE AND ANY OTHER TWO. TIME
ALLOWED TWO HOURS**

- 1 (a) Discuss any five reasons for using a simulation process in business decision 10mks
 (b) Discuss any five reasons to explain why assets are replaced in organizations (10 Marks)
 (e) A company produces two products P and Q that compete in the same market. The marketing department has calculated the state transition matrix for the products to be

	P	Q
P	0.9	0.1
Q	0.5	0.5

If P commands 60% of the market share, calculate the market shares at steady state (10 Marks).

2 (a) Discuss any five limitations of Simulation (10 Marks).

(b) A queue was analyzed and the following distribution for arrivals and service time formed.

Till next arrival		Service time	
Time in minutes	Probability	Time in minutes	Probability
1	0.14	1	0.19
2	0.10	2	0.34
3	0.40	3	0.25
4	0.36	4	0.22

The office opens at 8.30 AM

Required

Using the following Random numbers simulate the first **FIVE** arrivals and determine the time the last customer left the service point. 81060; 33449; 68055; 98055; 78685; 71250 **(10 Marks)**

3 (a) Discuss the assumptions of a single channel single queuing phase model **(10 Marks)**

(b) A typist in an office receives letters according to the Poisson probability distribution. The typist receives on average 22 letters per day for typing. The typist works for 8 hours a day and it takes on average 20 minutes to type a letter. The typist works on the letters on First Come First Served (FCFS) basis.

Calculate the Following;

- (i) The typist utilization rate
- (ii) The probability that the typist is idle
- (iii) The average number of letters waiting to be typed
- (iv) The average waiting time needed to have a letter typed.
- (v) Advice on the work of the typist as a professional person in this area **(10 Marks)**

4 Ndagani construction company specializes in delivering construction materials to various sites. The company has obtained a contract to supply top soil to three residential housing projects in Chuka, Meru and Embu. The top soil can be supplied from three different sites as follows;

<u>Site</u>	<u>Weekly capacity</u>
A	100
B	200
C	200

The demand for top by the three residential housing projects is as follows;

<u>Project</u>	<u>Monthly demand in tones</u>
Chuka	50
Meru	150
Embu	300

The manager of the company has estimated the cost of transporting the top soil per tone to each construction site as follows;

<u>From/ To</u>	<u>Chuka</u>	<u>Meru</u>	<u>Embu</u>
A	4	2	9
B	5	1	8
C	7	6	3

REQUIRED

- (i) Formulate the problem as a transportation problem using a suitable transportation tableau **(10Marks)**
 - (ii) Using the Vogels Approximation Method (VAM) determine the minimum transportation cost **(10 Marks).**
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