CHUKA UNIVERSITY

UNIVERSITY SUPPLEMENTARY/SPECIAL EXAMINATIONS.

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF COMMERCE, PURCHASING & LOGISTICS MANAGEMENT

BCOM/BCOM 171/162: BUSINESS MATHEMATICS II

STREAMS: **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 12/9/2018 **8.30 A.M - 10.30 P.M.**

INSTRUCTIONS:

- **Answer Question ONE and any other TWO**
- **Clearly show all your workings**

QUESTION ONE

(a) Explain the following terms as used in probability theory:

(i) Equally likely events [2 Marks]

(ii) Mutually likely events [2 Marks]

(iii) Independent events [2 Marks]

(iv) Sample space [2 Marks]

(b) Discuss three types of decision making environments. [6 Marks]

(c) If a ball is drawn from a bag containing 4 red balls numbered 1, 2, 3, 4 and 3 white balls numbered 5, 6, 7, what is the probability that the ball is:

(i) Red or even [2 Marks]

(ii) White or even [2 Marks]

(d) (i) Determine the coordinates and nature of turning points on the curve represented by the following function: $Y = X^3 - 7.5X^2 + 18X + 6$ [6 Marks]

(ii) Determine whether they are maximum or minimum. [2 Marks]

(e) In an orderly manner explain the steps involved in decision making process. [10 Marks]

QUESTION TWO

(a) Explain the following terms as used in decision making environment;

(i) Courses of Action [2 Marks]

(ii) States of nature [2 Marks]

(iii) Expected opportunity loss [2 Marks]

(iv) Pay-off table [2 Marks]

(b) A machine company intends to bring out a new type of machine in the market. The company is attempting to decide whether to bring out a full, partial or minimal product line. This company has three levels of product acceptance. Management will make its decision on the basis of expected profits from the first year of production. The relevant data are shown in the following table below:

Anticipated 1st year profit (Kshs. M')

	Product line		
Product Acceptance	**Full**	**Partial**	**Minimal**
Good	80	70	50
Fair	50	45	40
Poor	-25	-10	0

Required:

Advise the management based on the following: -

(i) Laplace criteria [3 Marks]

(ii) Maximas criteria [3 Marks]

(c) A manufacturer knows that is x (100) products are demanded in a particular week:

(i) The total cost function (Kshs. '000') is 14 + 3x

(ii) The total revenue function (Kshs. '000') is $19x - 2x^2$

Required:

(i) Derive the total profit function. [3 Marks]

(ii) Find the break-even point. [3 Marks]

QUESTION THREE

(a) Given the function $Y = 120X - X^2 + 0.02X^3$, determine the turning points of this curve. [4 Marks]

(b) Explain three uses of calculus in a firm. [6 Marks]

(c) Explain five elements of decision making. [10 Marks]

QUESTION FOUR

(a) An electric manufacturer has two lines A and B assembling identical electronic units. 5% of the units assembled on line A and 10% of those assembled in line B are defective. All defective units must be reworked at a significant increase in cost. During the last eight-hour shift, line A produced 200 units while line B produced 300 units. One unit is selected at random from the 500 units produced.

(i) If it is found to be defective, find the probability that it was assemble in line A. [3 Marks]

(ii) Find the probability that the unit is defective given that it was assembled on line B. [3 Marks]

(b) Explain the following terms as used in matrices:

(i) Equal matrix [2 Marks]

(ii) Singular matrix [2 Marks]

(iii) Vectors [2 Marks]

(c) A restaurant sell beverages as follows:

2 cups of tea, 3 glasses of wine and a bottle of soda for Kshs.162, 3 cups of tea, 4 glasses of wine and 2 bottle of soda for Kshs.232. A cup of tea, 2 glasses of wine and a bottle of soda for Kshs.110.

Required:

Formulate the information in a simultaneous equation and hence from a matrix and find the prices for tea, wine and soda respectively. [8 Marks]

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