

CHUKA**UNIVERSITY****UNIVERSITY EXAMINATIONS****CHUKA AND EMBU CAMPUES**

**FIRST YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN
PROCUREMENT/BUSINESS MANAGEMENT AND ACCOUNTING**

DIBM 0122: BUSINESS MATHEMATICS II**STREAMS: B.ED (ARTS) Y4S2****TIME: 2 HOURS****DAY/DATE: TUESDAY 07/08/2018****2.30 P.M. – 4.30 P.M.****INSTRUCTIONS:**

- Answer questions ONE and any other TWO.
- Clearly show all your working.

QUESTION ONE

- (a) Explain the following terms as used in probability theory. Give examples.
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|-------|------------------------|-----------|
| (i) | Early likely events | (3 marks) |
| (ii) | Mutually likely events | (3 marks) |
| (iii) | Independent events | (3 marks) |
| (iv) | Sample space | (3 marks) |
- (b) Discuss two types of decision making environment. (4 marks)
- (c) ABC industries must choose a supplier for the raw materials that it uses in its manufacturing division at C and B.

Each division uses different units of steel, wood and plastic as shown in the table below:

	Steel	Wood	Plastic
C	20	30	8
B	22	25	15

The two supply companies being considered, Western and Coastal can each supply all these materials out at different prices per unit as described in the following table:

	Western	Coastal
Steel	300	290
Wood	100	90
Plastic	145	180

Using matrix multiplication decide which supplier should be chosen to supply

- (i) C division (3 marks)
- (ii) B division (3 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) Determine the coordinates and nature of turning points on the curve represented by the function
- $$y = x^3 - 7.5x^2 + 18x + 6$$
- (6 marks)
- (e) Determine whether they are maximum or minimum. (2 marks)

QUESTION TWO

- (a) A manufacturer knows that if x (00) products are demanded in a particular week:

- (i) The total cost function (Ksh 000) is $14 + 3x$
- (ii) The total revenue function (Ksh 000) is $19x - 2x^2$

You are required to:

- (i) Derive the total profit function. (3 marks)
- (ii) Find the breakeven point. (3 marks)
- (iii) Calculate the level of demand that maximizes profit and the profit obtained. (4 marks)
- (b) In an orderly manner explain the steps involved in decision making process. (10 marks)

QUESTION THREE

- (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) Payoff table (2 marks)
- (b) An automobile company is bringing out a new type of vehicle. The company is attempting to decide whether to bring out a full, partial or minimal product line. The company has three levels of product acceptance. Management will its decision on the basis of expected profit from the first year of production. The relevant data are shown in the following table below:

Product acceptance	Anticipated 1 st year profit (Ksh 'm')		
	Full	Partial	Minimal
Good	80	70	50
Fair	50	45	40
Poor	-25	-10	0

Required:

Take optimal decision under each of the following decision

Criteria:

- (i) Maximax (2 marks)
- (ii) Maximin (3 marks)
- (iii) Laplace criteria (3 marks)
- (iv) Minimax regret (3 marks)

QUESTION FOUR

- (a) A bag contains 5 red balls, 4 blue balls and 3 white balls. Two balls are drawn, one after the other without replacement.

Required

Draw a tree diagram representing the experiment and find:

- (i) Probability of getting blue on first draw and white on second. (3 marks)
- (ii) Probability of getting white on both draws. (3 marks)
- (iii) Probability of drawing a blue ball and white ball. (4 marks)

- (b) David uses decision tree analysis to evaluate potential projects. The company has been looking forward to a launch of a new product which it believed has a 70 percent probability of success. The company is however, considering undertaking an advertising company costing Ksh 50,000, which would increase the profitability of success to 95%.

If successful the product would generate income of Ksh 200,000. Otherwise Ksh 70,000 would be received.

- (i) Draw a tree diagram to represent this. (4 marks)
- (ii) Determine the maximum amount that the company would be prepared to pay for advertising. (6 marks)
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