



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF BUSINESS ENTREPRENEURSHIP AND MANAGEMENT
SCIENCES

SECOND SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF
COMMERCE

BMS 102: MANAGEMENT MATHEMATICS II

Date: 3/12/2015

Time: 2:00 – 4:00 PM

INSTRUCTIONS

Answer Question one and Any Other Two Questions

QUESTION ONE

- a) Distinguish the following terms
- i) The inverse and the co factor of a matrix (2 marks)
 - ii) Steady state and transition matrix. (2 marks)
- b) Using crammers rule ,find the value of unknown
- $$2p_1 + 3p_2 = 18$$
- $$3p_1 - p_2 = 5$$
- (4 marks)
- c) Explain four areas where the markov process can be applied. (6 marks)
- d) Maridadi limited is planning to make table and chairs. They both require materials and labour time .To manufacture a table and chair requires 3 units and 4 units of direct material respectively of which they are 96 units available in a week. Making a table or

a chair each take 6 hours and there are 168 labour hours available in a week whereas the market for table is unlimited, only 18 chairs can be sold weekly. The price per table and chair are 50 and Sh 60 whereas their unit variable cost are sh 38 and sh 40 respectively. Fixed costs average sh 200 per week

- (i) Formulate the above linear programming problem (7 marks)
- (ii) What is the production schedule (3 marks)
- e) State FIVE reasons for holding stock (5 marks)

QUESTION TWO

- a) The purchase department has many orders and the number of orders made by each of the 5 departments in the company by type this financial year is given in the table below.

Order type	sales	purchase	Production	Accounts	maintenance	total
Consumable	10	12	4	8	4	38
Equipment	1	3	9	1	1	15
Special	0	0	4	1	2	7
Total	11	15	17	10	7	60

An error has been found in one of these orders. What is the probability that the incorrect orders

- a) Was for consumables (1 mark)
- b) Was not for consumable (1 mark)
- c) Come from maintenance (1 mark)
- d) Come from production (1 mark)
- e) Come from maintenance or production. (1 mark)
- f) Come from neither maintenance nor production. (1 mark)
- g) Was an equipment order from purchase. (2 marks)

- b) Explain the meaning of the following terms as used in probability theory.
- (i) Sample space (2 marks)
 - (ii) Event (2 marks)
 - (iii) Mutually exclusive vents (2 marks)
 - (iv) Independence events (2 marks)
 - (v) Experiment (2 marks)
3. (a) Distinguish between the following terms as used in matrix algebra.
- (i) Identity Matrix and scalar matrix
 - (ii) Singular matrix and non –singular matrix (4 marks)
- (b) In a certain county there are two competing brands of products sambamba, brand A and B. A researcher interested in the consumption habits of the population of this county found out the following:-
- (i) For those who bought brand A on a given day, 60% will buy the same in the following day while the rest shift to brand B
 - (ii) For those who bought Brand B on a given Day, 40% will shift to brand A the following day.
 - (iii) Yesterday the consumption level were 40% for brand A and 60% brand B (assume all markov conditions hold)

Required.

Determine the consumption levels for both brands

- (i) Today (2 marks)
 - (ii) Tomorrow (3 marks)
 - (iii) In the long run (3 marks)
- c) Consider the following transaction table for two industries S and T for the previous years.

Procedure of Output

	S	T	Final demand
S	20	30	50
T	10	10	30

The transactions are in billions shilling. Required

- (i) The technical coefficient matrix A (2 marks)
 - (ii) The total output required for each industry so as to satisfy both intermediate and final demand for this year given that forecasted final demand are Sh 54 billions and Sh 37 billion for S and T respectively
4. (a) A distributor expects to sell 10,000 tyres. The annual holding cost is sh 20 per tyre and ordering cost is sh 75. The distributor operates 360 days in a year, required
 - (i) EOQ (2 marks)
 - (ii) Number of orders per year (2 marks)
 - (iii) The length of the order cycle (lead time) (2 marks)
 - (iv) The total annual cost if EBQ (Economic batch quantity is considered) (4 marks)
- (b) (i) Using crammers rule, find the value of the unknown in evaluation below. (5 marks)

$$4x - 2y + 3z - 20 = 0$$

$$2y - 2.5z - 2x + 16 = 0$$

$$-1.5z + 4x - 2y - 2 = 0$$
 - (ii) Find the inverse of the matrix formed above (5 marks)
5. (a) In the context of game theory, explain the following statement “winning isn’t everything, it is the only thing” (3 marks)

- (b) The optimal solution of two person Zero sum game always represents a saddle point regardless of whether the players use a pure or mixed strategies. Explain

(5 marks)

- (c) Joseph Njau and Ann Wairimu can use one strategy some of the time and the other strategy the rest of the time. Consider the following case of player one. (JosephNjau) and the opponent (Ann Wairimu). Joseph Njau has two strategies A and B whereas the opponent AnnWairimu has strategies X and Y. Utilities have been assigned as indicated below

		Ann Wairimu	
		X	Y
Joseph Njau	A	1	-2
	B	- 1.5	2

Required : Determine the % time Joseph should play strategy A and strategy B .also determine the percentage time that Ann Wairimu should play strategy A and strategy Y. (12 marks)