

KABARAK



UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: FNCE 212:

COURSE TITLE: MANAGEMENT MATHEMATICS II

STREAM: Y2S1

DAY: THURSDAY

TIME: 8.30-10.30 A.M.

DATE: 18/12/2008

INSTRUCTIONS:

Answer question **ONE** and any other **TWO** Questions

PLEASE TURN OVER

QUESTION ONE (30 MARKS)

- a) If A is a matrix and I and an identity matrix, show that $AI = IA$

$$A = \begin{pmatrix} 1 & 6 \\ 2 & 3 \end{pmatrix} \quad (5\text{marks})$$

- b) You go to the shop to buy a toothbrush. The toothbrushes available are red, blue, green, purple, and white. The probability that you buy a red toothbrush is three times the probability that you buy a green one; the probability that you buy a blue one is twice the probability that you a green one; the probabilities of buying green, purple and white are all equal. You are certain to buy exactly one toothbrush. For each colour, find the probability that you buy a toothbrush of that colour (5 marks).

- c) Consider an initial investment of ksh 1000 on machinery that is expected to yield ksh 1600 at end of the second year. Find the internal rate of return on the investment (5 marks)

- d) Define linear programming and describe briefly how it is applied in business decision making (6 marks)

- e) In decision making context, what do you understand by the following;
- i) Opportunity loss (3 marks)
 - ii) Pay-off (3 marks)
 - iii) Events or State of nature (3 marks)

QUESTION TWO (20 MARKS)

- a) The number of calls arriving on an internal switchboard of an office is 90 per hour. Find the probability of 1 to 3 calls in a minute on the board (5 marks).

- b) $2x + y + 2z = 8$
 $x - 3y + 3z = -4$
 $4x + 2y - z = 1$
- (i) Solve for the values of x , y and z using cramer's rule (10 marks)
 - (ii) Obtain its inverse (5marks)

QUESTION THREE (20 MARKS)

- a) In a typing-pool, three typists share the total work in the ratio of 30%, 35% and 35% of the work done by them. The first, second and the third typist spoil the work to the extent of 3%, 4% and 5% respectively. A completed work was selected and found to be spoiled. What is the probability that the work was done by the
- i) Third typist (4 marks)
 - ii) Second typist (4 marks)
 - iii) First typist (4 marks)
- b) An investor wishes to invest ksh 5000 now followed by a regular sum of money at the end of each year over the next six years. Assuming an interest rate of 8% how much would need to be invested at the end of each year in order to obtain ksh 20,000 in six years time (8 marks).

QUESTION FOUR (20 MARKS)

- a) Consider an accounts receivable auditor examining customer accounts for a client. Past records indicate that the mean of ksh 5000 and a standard deviation ksh 1000.
- i) What is the probability that an account selected at random will have a balance of more than ksh 5000 (2 marks)
 - ii) What is the probability that an account selected at random will have a balance between ksh 5000 and 6500 (3 marks)
 - iii) What is the probability that an account selected at random will have a balance of more than ksh 7000 (3 marks)
- i) What is the probability that an account selected at random will have a balance of less than ksh 4000 (3 marks)
- b) Solve the following linear programming problem using graphical method
- Maximize $70x + 60y$

$$\begin{aligned}
 &3x + 2y \leq 3000 \\
 \text{Subject to } &50x + 60y \leq 7500 \\
 &x \geq 0, y \geq 0
 \end{aligned}
 \tag{9 marks}$$

QUESTION FIVE (20 MARKS)

a) Obtain the determinant of $\begin{vmatrix} 1 & 2 & 3 \\ -1 & 4 & 2 \\ 3 & 8 & 11 \end{vmatrix}$ **(3 marks)**

b) A businessman has three alternatives open to him each of which can be followed by any of the four possible events. The conditional payoffs in kshs for each action-event combination are given below;

Payoffs conditional on events

Alternatives	A	B	C	D
X	8	0	-10	6
Y	-4	12	18	-2
Z	14	6	0	8

Determine which alternative should the businessman choose, if he adopts the

- i) Maximin criterion **(2 marks)**
- ii) Maximax Criterion **(2 marks)**
- iii) Hurwicz Criterion, his degree of optimism being 0.7 (2 marks)
- iv) Laplace Criterion **(5 marks)**
- v) Minimax regret criterion **(4 marks)**