THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSICS

UPGRADING MATHEMATICS

AMA 1104: COMMERCIAL ARITHMETICS

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination

- *Answer Booklet*

This paper consist of **FIVE** questions in **TWO** sections **A** & **B**

Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **FOUR** printed pages

SECTION A (COMPULSORY)

Question One (30 marks)

a) A businessman who deals with electronics in one of his trips he had the following currencies 1000 American Dollars, 3500 British Pounds and 80,000 Japanese Yen. He visited a Kenyan Bank which buys and sells foreign currencies as shown below:

Currency	Buying Kenya Shillings	Selling Kenya Shillings
1 American Dollar	80.6	89.3
1 British Pound	126.52	139.86
100 Japanese Yen	104.97	115.24

i) If he converted all the currencies into Kenyan shillings, calculate how much money he had in Kshs. **(4 marks)**

ii) If he bought electrical goods worth all the equivalence in Kenya shillings, paid duty 30% on the cost of the goods and sold them at 20% profit. How much money did he collect at the end? **(3 marks)**

b) Find the determinants of the following matrices.

$$N = \begin{pmatrix} 5 & 1 & 2 \\ -3 & 2 & 4 \\ 8 & 1 & 4 \end{pmatrix}$$

(3 marks)

$$M = \begin{pmatrix} 6 & 7 \\ 5 & 3 \end{pmatrix}$$

(2 marks)

c) A mixed school can accommodate a maximum of 440 students. The number of boys must exceed 150. Taking X to represent the number of boys and Y the number of girls, write down all the Inequalities representing this information. **(4 marks)**

d) Nyambura tossed two dice, she added the value of each die to get a value X, if what she recorded was the reminder r after dividing x by 4, calculate the probability that

i) $r > 3$ **(4 marks)**

ii) $r = 0$ **(3 marks)**

iii) $r < 2$ **(3 marks)**

e) A necklace value appreciates at a rate of 10% per year after how many years will its value double? **(4 marks)**

SECTION B (Answer any TWO questions from this section)

Question Two (20 marks)

a) Students performed as follows in a test.

Marks	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 - 79
No of Students	2	5	10	12	8	3

Calculate the:

i) Mean mark **(4 marks)**

ii) Median mark **(4 marks)**

iii) Modal mark **(4 marks)**

b) Find the Inverse of matrix.

$$A=\begin{pmatrix} 5 & 1 & 2 \\ -3 & 2 & 3 \\ 8 & -1 & 4 \end{pmatrix}$$

(8 marks)

Question Three (20 marks)

a) Using Crammers rule solve for X, Y and Z. **(12 marks)**

$$2x - y + 6z = 10$$

$$4y - 3x - 5z = 11$$

$$8x - 7y - 9z = 12$$

b) Agnes bought a sofa set five years ago which depreciates at the rate 10% p.a. If the current value of the sofa set is kshs 29 524.50. What was the sofas price 5 years ago? **(5 marks)**

c) The market price of a dinning set is kshs 22 800. The hire purchase value of the set is 35% more than the marked price. Hussein bought the dinning set by paying a deposit of 8580 followed by equal monthly Installments of Kshs. 1850 each. Calculate the number of installment paid. **(3 marks)**

Question Five (20 marks)

a) The marks obtained by fifty candidates in an examination were recorded in the table below.

Marks	0 – 9	10 – 19	20 – 29	30 – 39	40 – 49	50 – 59	60 - 69
No. of Students	6	8	12	9	7	5	3

Calculate:

i) The mean mark (3 marks)

ii) The standard deviation (6 marks)

b) A bag contains 5 white, 3 yellow and 2 green balls all identical except for the colour. A ball is drawn and set aside. A second ball is drawn. What is the probability that:

i) The balls are of different white (3 marks)

ii) One of the balls is white (3 marks)

iii) At most two balls are white (3 marks)

c) State bayes Theorem (2 marks)

Question Five (20 marks)

a) The table below shows monthly income tax rates for the year 2003.

Monthly Taxable Income In Kshs	**Tax Rates (Percentages)**
1 - 1980	10%
1981 - 18800	15%
18801 - 27920	20%
27921 - 37 040	25%
37041 - 37010	30%

Helens earnings were as follows: Basic salary Ksh. 38,000 p.m, house allowance kshs 14,000pm, travelling allowance kshs 8500 p.m and medical allowance 3300 p.m. Calculate

i) Her taxable Income per month. **(2 marks)**
ii) Her monthly PAYE if she is entitled to a tax relief of kshs 1056 per month. **(6 marks)**
iii) Her net monthly income, if she pays N.H.I.F of kshs 320, NSSF of Kshs 200 per month and cooperative shares of Kshs 2000 per month. **(3 marks)**

b) Using matrix method, solve the simultaneous equation below.

$3x + y = 12$

$2x - 3y = 8$

(5 marks)

c) A man invested Kshs. 40,000 in a financial institution at 5% p.a compound Interest. Calculate the interest the investment earned after 3 years. **(4 marks)**