MURANGA UNIVERSITY COLLEGE

(A constituent College of Jomo Kenyatta University of Agriculture & Technology)

MAIN/TOWN CAMPUS

SUPPLIMENTARY/SPECIAL UNIVERSITY EXAMINATIONS

2014/2015 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF PURCHASING AND SUPPLIES CHAIN MANAGEMENT

COURSE CODE: HPS2111

COURSE TITLE: MANAGEMENT MATHEMATICS II

DATE: **TIME:**

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer any TWO (2) questions

MRUC observes ZERO tolerance to examination irregularities

This Paper Consists of 2 Printed Pages. Please Turn Over.

QUESTION ONE (30 MKS).

(a). If $\mathbf{A}=\begin{pmatrix}-1 & -2 & 3\\ -4 & 2 & 5\end{pmatrix}$ and $\mathbf{B}=\begin{pmatrix}2 & 3\\ 4 & 5\\ 2 & 1\end{pmatrix}$

Find **BA** (4mks).

(b) A machine produces non-defective items with a probability of 0.7. How many parts should be picked at random so that the probability of getting at least one non-defective is 0.95? (6mks).

(c) A diameter of a component produced on a semi-automatic machine is known to be distributed normally with a mean of 10mm and a standard deviation of 0.1 mm. If we pick up a random sample size of 5, what is the probability that the sample mean will be between 9.95m, and 10.05 mm? (6mks).

(d) Solve the following equations using matrix algebra. (8mks).

$x + y + z = 1$
$x + 2y + 3z = 6$
$x + 3y + 4z = 6$

(e) Mention any six merits of sampling methods. (6mks).

QUESTION TWO (20 MKS).

(a) The following data give the ages and blood pressure of 10 women.

Age (X)	56	42	36	47	49	42	60	72	63	55
Blood Pressure (Y)	147	125	118	128	145	140	155	160	149	150

(i) Determine the regression equation of y or x. (10mks).
(ii) Estimate the blood pressure of a woman whose age is 45 years. (3mks).
(iii) Find the correlation co-efficient between x and y (2mks).

(b) Mention five types of matrices (5mks).

QUESTION THREE (20 MKS).

(a) A mobile telephone service provider is undertaking a promotion in which 40% of the scratch cards reveal a prize. A customer has in possession three of the promotional scratch cards.

(i) Use a tree diagram to represent the customer's probability space. (4mks).
Find;
(ii) The probability of receiving one prize. (2mks).
(iii) The probability of receiving no prize. (2mks).
(iv) The probability of winning a prize. (2mks).

(b) Fit a straight line trend by the method of least squares to the following data.

Year	2004	2005	2006	2007	2008	2009	2010
Production of Steel (in million tonnes)	12	10	14	11	18	15	16

Calculate the trend values and estimate the likely production for the year 2017. Interpret the values of a and b. (10mks).

QUESTION FOUR (20 MKS).

(a) State four properties of markov chains. (4mks).

(b) Recently two electronics companies, Kenya initiative (KI) and African Intelligence (AI) were launched in Kenyan market to sell locally manufactured electronic equipment. The marketing analyst of Kenya initiative wishes to determine the market shares enjoyed by each of the two companies which the only ones are selling locally manufactured electronic equipment. For this purpose he picked samples of 3,200 customers of each of the two companies at the beginning of January 2014.
The sampled customers were observed during the next 6 months with respect to loyalty shifting pattern in the locally manufactured electronic equipment. By the end of June, 2014, it was observed that 75% of the customers loyal to Kenya Initiative in June 2014 continued to be loyal to the company while the rest had shifted their loyalty to African intelligence. Furthermore the sampled customers who were royal to African intelligence in June 2014, 50% shifted their loyalty to the competitor. If this loyalty shifting pattern persists or continue in the future, how many of the customers sampled in January are loyal to each of the competitors.

(i) By the end of June 2014. (4mks).

(ii) By the end of December 2014. (3mks).

(iii) What proportions of loyalty will persist after many years or steady state. (4mks).

(c) In the year 2013, a policy was introduced to give loans to unemployed engineers to start their own business. Out of 100,000 unemployed engineers, 60,000 accepted the policy and got the loans. A sample of 100 unemployed engineers is taken at the time, of allotment of loan. What is the probability that the sample proportion would have exceeded 50% acceptance? (5mks)