MURANGA UNIVERSITY COLLEGE

(A CONSTITUENT COLLEGE OF JOMO KENYATTA UNIVERSITY OF AGRICULTURE & TECHNOLOGY)

MAIN CAMPUS

ORDINARY UNIVERSITY EXAMINATIONS

2015/2016 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF HUMAN RESOURCE MANAGEMENT

COURSE CODE: HBC2110

COURSE TITLE: MANAGEMENT MATHEMATICS 1

DATE: **TIME:**

INSTRUCTIONS TO CANDIDATES

QUESTION ONE (1) IS COMPULSORY
ANSWER ANY OTHER TWO (2) QUESTIONS

QUESTION ONE

(a) Solve the equation $\log_2 (x + 7) = 2 - \log_2(x + 4)$ (5mks).

(b) A bookshop vender sold 5 statistics books and 6 financial management books for sh 24,400 to Elimu College of Accountancy. The vendor also sold 7 statistics books and 9 Financial Management books for Sh. 35,600 to Mhasibu Institute of business. Compute the cost of a statistics book and a financial management book. (4mks).

(c) Kassim deposited sh. 80,000 in a fixed deposit account. After four years, the amount of money in the account was Sh. 97,240.50. Determine the compound rate of interest per annum. (4mks).

(d) A company is considering a salary plan that would pay new employees Sh 50,000 per month with Sh. 2,000 as annual increment.

(i) Find the total earned salary through 20 years. (2mks).

(ii) Find the period needed for the monthly salary to get doubled. (2mks).

(e) In an industry of 100 firms, 54 practices Symbiotic marketing, 15 employ Synchro-marketing and 66 adopt Morph marketing. The number of firms adopting symbiotic marketing and Synchro marketing is 33, Synchro-marketing and Morph marketing is 30. Symbiotic and Morph marketing is 24.

Represent the above information in a Venn diagram. (3mks).

Find the number of firms,

(i) Employing Symbiotic marketing only. (1mks).

(ii) Adopting Synchro-marketing only. (1mks).

(f) Solve for x in the inequality. (3mks)

$$\frac{1}{2} \leq \frac{4x+5}{2} \leq 1$$

(g) A payroll can be completed in 4 hours by the computer working simultaneously. How many hours are required for each computer to complete the payroll alone if the older model requires 3 hours longer than the newer model (5mks)

QUESTION TWO (20 MKS).

(a) Piripiri is employed to sell generators on a salary and commission basis. His fixed monthly salary is sh. 105,000. He is entitled to a commission of 5% on the first Sh. 500,000 and a commission of 12.5% on sales in excess of 500,000. During the month of December, 2014 his total earnings amounted to Sh. 225,000.
The selling price of one generator is Sh. 70,000. Calculate the number of generators sold by Piripiri during the month of December 2014. (5mks).

(b) You can save Sh. 2,000 at the end of each year for 5 years and sh. 3,000 c year for 10 years thereafter. What will these savings cumulate to at the end of 15 years, if the rate of interest is 10% per annum? (5mks).

(c) Solve for x in

$6x^{3/4} + 3x^{-1/4} = 11x^{1/4}$ (6mks)

(d) Find the value of

$$\frac{2\log 6+6\log 2}{4\log 2+\log 27-\log 9}$$ (4mks)

QUESTION THREE (20 MKS).

(a) Rama deposited Sh. 20,000 in a bank for 2 years at 14% per annum compounded quarterly. Find the interest that he will get at the time of maturity. (5mks).

(b) Mention five basic concepts in linear programming. (5mks).

(c) A publisher wishes to print a book with 1 cm margin at the top, bottom, inside and outside of each page. Each page is to have an area of 42 square cm. What must be the dimensions of the pages? (7mks).

(d) Differentiate between "set union" and set intersection as used in set theory. (3mks).

QUESTION FOUR (20 MKS).

(a) A quick survey of 1,000 children in a refugee camp produced the following results.
320 children were fed on Beans.
200 children were fed on Rice.
450 children were fed on Potatoes.
150 children were fed on Beans and Potatoes.
70 children were fed on Beans and Rice.
100 children were fed on Rice and Potatoes.
300 children were fed on none of the three types of food.

(i) Present the above information in a Venn diagram. (4mks).

(ii) Find the number of children who were fed on all the three types of food (2mks).

(iii) Find the number of children who were fed on exactly one type of food. (2mks).

(iv) Find the number of children who were fed on at least two types of food. (2mks).

(b) A person wants to decide the constituents of a diet which will fulfill his daily requirements of proteins, fats and carbohydrates at the minimum cost. The choice is to be made from four different types of food. The yields per unit of those foods are given below.

Food	**Yield per unit**			**Cost per unit**
	Proteins	**Fats**	**Carbohydrates**	**(Sh).**
1	3	2	6	45
2	4	2	4	40
3	8	7	7	85
4	6	5	4	65
Minimum Requirement	800	200	700	

Formulate the linear programming model for the problem. (5mks).

(c) The costs function of Romax Ltd. Is partly constant and partly varies with the number of units produced. During the months of September and October 2014, the data for this enterprise was as follows.

	September 2014	**October 2014**
Number of units produced	12,500	9,780
Production cost (sh)	1,213,750	975,750

During the month of November 2014, Romax Ltd produced and sold 13,725 units at Sh. 124 per unit.

Determine

(i) The costs function of Romax Ltd. (3mks).

(ii) Determine the percentage increase in profit between the months of September and November 2014. (2mks).