MURANGA UNIVERSITY COLLEGE

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

MAIN CAMPUS

SPECIAL /SUPPLIMENTARY UNIVERSITY EXAMINATIONS

2015/2016 ACADEMIC YEAR

FIRST YEAR SECOND 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 (30mks).

(a) Solve $\log 10 (x+4) - \log_{10} 7 = 3\log_{10} 2 - \log_{10} (x+5)$. (5mks)

(b) A manufacturer of TV sets produced 600 units in the third year and 700 units in the seventh year. Assuming that the increases in production every year are the same.

Find what was,

(i) the total production in 7 years. (4mks).

(ii) the production in the 10^{th} year. (2mks).

(c) Anne Mtile purchased a car at the beginning of year 2012 at sh. 200,000. She decided to use it in her business operations. All motor vehicles for her business are depreciated at the rate of 20% using the reducing balance. Determine the number of years which the value of the car will reduce to sh. 65,536. (4mks).

(d) A publisher is planning to publish a new textbook. The fixed costs are sh. 400,000 and the variable costs are sh. 35 per book. The wholesale price will be sh. 45 per book. How many books must the publisher sell to break-even? (5mks)

(e) Solve for x in $2^{x+3} + 2^{x+1} = 320$. (5mks)

(f) Jane bought a Dell computer model on hire purchase for sh. 27,400. A customer who pays cash is given 15% discount on the hire purchase price. Jane paid sh. 5,650 as down payment and paid the balance in 15 equal monthly installments.

(i) Find the amount that Jane paid for the computer per month. (3mks).

(ii) The amount of money that could be saved if Jane had bought the computer on cash basis. (2mks).

QUESTION TWO (20 MKS).

(a) Solve for x in $6x^{1/3} + x^{-1/3} = 5$ (5mks).

(b) Without using tables show that $\frac{log\sqrt{27} \times log\sqrt{8} - log\sqrt{125}}{log6 - log5} = \frac{3}{2}$ (4mks).

(c) Firm A starts producing 400 units and decreases production by 50 units annually. Firm B starts by producing 250 units and increases production by 25 units annually. Assuming that both the firms grow/decay in an arithmetic progression.

Find

(i) In which year will both produce the same amount? (4mks).

(ii) When will Firm A produce Zero output? (2mks).

(iii) What will be the production of firm B in the year when firm A produces nothing? (2mks).

(d) Evaluate the limit $\lim_{n\to\infty}\left(\frac{x2+2x+4}{x+2}\right)$ (3mks).

QUESTION THREE (20mks)

(a) Mr. Yusuf purchased a grinding machine at a cost of sh. 513,000 estimated useful life of the machine is 10 years with an estimated value of sh. 10,000.

(i) Find the annual rate of depreciation using reducing balance method. (4mks).

(ii) Determine the book value of the machine as at the end of the 4^{th} year. (2mks).

(b) The manager of an oil refinery must decide on the optimum mix of 2 possible blending processing of which the inputs and output production run are as follows.

Process	Input		output	
	Crude A	Crudes	Gasoline x	Gasoline y
1	6	4	6	9
2	5	6	5	5

The maximum amounts available of crudes A and B are 250 units and 200 units respectively. Market demand shows that at least 150 units of gasoline x and 130 units of gasoline y must be produced. The profits per production run from process 1 and 2 are sh. 4 and sh. 5 respectively. Formulate the linear programming problem for maximizing the profit. 6mks).

(c) The fifth term of a GP is 81 and the second term is 24. Find the series. (5mks)

(d) Explain the following terms as used in set theory. (3mks).

(i) Subset

(ii) Number of a set.

(iii) Disjoint of set.

QUESTION FOUR (20mks).

(a) The cost accountant of Kalma manufacturing ltd has determined that the total cost and revenue functions vary according to the units produced and sold in a quadratic nature. The following table shows the production in units and the associated total revenue and costs.

Quantity (units)	Total revenues (sh"000")	Total cost (sh"000")
20	13,000	9,900
35	20,125	8,475
40	22,000	9,100

Determine

(i) The revenue function. (5mks).

(ii) The total cost function. (5mks).

(b) Mbula intends to purchase a Posho-mill costing sh. 344,960 in the year 2016. She would like to invest a certain sum of money in Fanikisha Bank on 1st January 2014, such that as at 31st December 2014 the sum of money will amount to sh. 308 and as at 31st December 2015, the amount will be enough to buy a Posho mill.

(i) Find the amount of money that Mbula should invest in Fanikisha Bank if compounding is done annually. (5mks)

(ii) Find the amount that Mbula should invest in Fanikisha Bank if compounding is done quarterly. (5mks)