



MURANGA UNIVERSITY COLLEGE

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

MAIN CAMPUS

SPECIAL UNIVERSITY EXAMINATIONS

2015/2016 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF COMMERCE**

COURSE CODE: HBC2103

COURSE TITLE: MATHEMATICS FOR BUSINESS

DATE: TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is Compulsory
Answer ANY OTHER TWO (2) questions

MRUC observes ZERO tolerance to examination irregularities

This Paper Consists of 3 Printed Pages. Please Turn Over. ►

QUESTION ONE (30mks).

- (a) Mention three properties of inequalities. (3mks).
- (b) Define the following terms as used in set theory. (3mks).
(i) Units of set.
(ii) Intersection of set.
(iii) Complement of set.
- (c) Solve the inequality
 $-2 < 2x - 3 < 7$ (3mks)
- (d) A club consists of members whose ages form an AP the common difference being 3 months. If the youngest member of the club is just 7 years old and the sum of the ages of all the members is 250 years, find the number of members in the club? (6mks).
- (e) Differentiate the function
 $y = \frac{x^3+3}{3x+1}$ with respect to x. (4mks).
- (f) If the demand function for a product is given by $P^2 + 2q = 1600$ and the supply function is given by $200 - p^2 + 2q = 0$, find the equilibrium quantity and equilibrium price. (6mks)
- (g) Solve for x in $\log_3 (x + 6) + \log_3 (x - 2) = 2$. (5mks).

QUESTION TWO (20mks).

- (a) Solve the simultaneous linear equations using Cramer's rule. (9mks)
 $2x + 3y - z = 1$
 $4x + y - 3z = 11$
 $3x - 2y + 5z = 21$
- (b) One number is 3 more than another; the sum of their squares is 149. Find the numbers. (4mks).
- (c) Solve for x in $6x^{1/3} + x^{-1/3} = 5$. (7mks).

QUESTION THREE (20mks).

- (a) Find the sum of the first 50 terms of the sequence
1, 3, 5, 7, 9, ... (4mks).
- (b) The demand function for a manufacturer's product is $x = 70 - 5p$, where x is the number of units and P is the price per unit. At what value of x will revenue be maximum? What is the maximum revenue? (5mks).

- (c) A green grocer has a stock of fruits comprising 900 boxes of oranges, 700 boxes of grapes and 400 boxes of pears. The table shows the market prices per box of the different types of fruits in four towns namely: Nairobi, Nakuru, Kisumu and Mombasa.

Town	Market price per box (sh. "000")		
	Oranges	Grapes	Pears
Nairobi	4	2	3
Nakuru	5	1	2
Kisumu	4	3	2
Mombasa	3	2	5

Using matrix algebra, advice the green grocer on the two in which the stock of fruits should be sold in order to realize the maximum gross sales revenue. (8mks).

- (d) Find the solution of the inequality
 $3x^2 - 7 \leq 41$ (3mks).

QUESTION FOUR (20mks)

- (a) A manufacturing company finds that the daily cost of producing x items of a product is given by $C(x) = 210x + 7000$.
- (i) If each item is sold for sh. 350, find the minimum number that must be produced and sold daily to ensure no loss. (3mks).
- (ii) If the selling price is increased by sh. 35 per piece, what would be the break-even point? (2mks).

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

- (c) News Agency Limited deals in the distribution of three types of magazines namely; Newline informer and update. The company recently conducted a market survey to determine the magazine preferences of 100 households in a certain town, the following results were obtained from the survey.

48 households read the Newline magazine.
 18 households read the Informer magazine.
 26 households read the Update magazine.
 8 households read the Newline and the Update magazines.
 8 households read the Newline and the Informer magazines
 3 households read the Update and the Informer magazines.
 3 households read the three magazines.

- (i) Present the above information using a Venn diagram. (4mks).
- (ii) Find the number of households that read the Newline magazine but did not read the informer magazine. (2mks).
- (iii) Find the number of households that read the update magazine and the informer but did not read Newline magazine. (2mks).
- (iv) The number of households that read none of the magazines. (2mks).