



MURANGA UNIVERSITY COLLEGE

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

MAIN CAMPUS

ORDINARY UNIVERSITY EXAMINATIONS

2014/2016 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF PURCHASING AND SUPPLIES MANAGEMENT

COURSE CODE: HPS22205

COURSE TITLE: QUANTITATIVE METHODS I

DATE: 15TH DECEMBER, 2015

TIME: 2 HOUR

INSTRUCTIONS TO CANDIDATES

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

MRUC observes ZERO tolerance to examination irregularities

QUESTION ONE (30mks).

- (a) In an industry comprising 80 corporates, each firm adopts at least one strategy out of the following three corporate growth strategies.

Intensification strategy.

Integration strategy.

Diversification strategy.

10 corporates adopt Intensification strategy only.

10 corporates adopt Integration strategy only.

6 corporates exercise Diversification strategy only.

40 corporates employ diversification and intensification.

20 take recourse to diversify and integrate

60 prefer the diversification strategy.

How many corporate employ the Intensification strategy. (5mks).

- (b) Mention four limitations of statistics. (4mks).

- (c) Solve for x in

$$\log x + \log (2x - 1) = \log 6 \quad (4 \text{ mks}).$$

- (d) The data below shows the distribution of profits realized by 1000 Airtel agents within Nairobi for the financial year ended 30th June 2015.

Profits (sh. Million)	frequency.
30 – 96	17
96 – 112	53
112 – 128	199
128 – 144	194
144 – 160	327
160 – 176	203
176 – 192	7

Find the mean annual profit. (4mks).

(e) Calculate the Fisher's Ideal index number from the following data, using 2013 data as base year.(5mks)

<u>2013</u>	<u>2014</u>			
Commodity	Price (sh).	Quantity (kg)	Price (sh).	Quantity (kg)
A	4	10	5	12
B	6	8	7	10
C.	10	5	12	4
D	8	12	4	15
E	6	7	5	8

(f) A small factory employs people at two rates of pay. The maximum number of people which can be employed is 10. More workers are employed in the lower rate than in the higher rate. Formulate the inequalities to describe this situation. (3mks).

(g) A machine was purchased for shs 10 million in 2009. Depreciation on the diminishing balance was charged at 40% in the first year, 25% in the second year and 10% per annum during the next three years. What is the average depreciation charge during the whole period? (5mks)

QUESTION TWO (20mks).

(a) Mention five assumptions of Linear programming. (5mks).

(b) Solve for x in the equation $x + \sqrt{x} = \frac{6}{25}$. (5mks)

(c) A purchasing agent obtained samples of 60 watt bulbs from two companies. He had the samples tested in his own laboratory for length of life with the following results.

Length of life (in hours)	Company A	Company B
1,700 – 1,900	10	3
1,900 – 2,100	16	40
2,100 – 2,300	20	12
2,300 – 2,500	8	3
2,500 – 2,700	6	2

(a) Which company's bulbs do you think are better in terms of average life? (5mks).

(b) If prices of both types of bulbs are same, which company's bulbs would you buy and why? (5mks).

QUESTIO THREE (20mks).

(a) Mention five characteristics of a good average. (5mks).

(b) The table below shows the distribution of monthly salaries of 300 employees of Karibu Limited.

Monthly Salary (sh. “000”)	Number of employees
5 – 10	16
10 – 15	24
15 – 20	58
20 – 25	100
25 – 30	42
30 – 35	30
35 – 40	20
40 – 45	10

- i. Determine the median monthly salary of the employees. (3mks)
- ii. Determine co-efficient of skewness. (7mks)

c. A company sells x cartons of biscuits each day at Shs.400 a carton. The cost of producing these cartons is Sh. 250 per tin plus fixed daily overhead costs of Sh. 18,000.

- (i) Determine the profit function. (1mk)
- (ii) What is the profit of 2000 cartons are produced and sold a day. (2mks)
- (iii) Find out the number of cartons to be produced for break-even to take place. (2mks)

QUESTION FOUR (20 MKS).

(a) Explain the following terms as used in set theory. (4mks).

- (i) Sub set
- (ii) Set equality.
- (iii) Universal set.
- (iv) Null set.

(b) A dealer deals in only two items: sewing machines and table fans. He has Sh. 57,600 to invest and a space to store at the most 20 items. A sewing machine costs Sh. 3,600 and a table fan Sh. 2,400. He can sell a sewing machine at a profit of Sh. 220 and a

table fan at a profit of Sh. 180. Formulate linear inequalities to represent the above inequalities. (4mks)

- (c) The table below shows the quantities of four types of cereals consumed by a certain household in the year 2012 and 2013 and the unit price for each type of cereals.

Type of cereal	2012		2013	
	Price Per Kg (sh.)	Quantity (kg)	Price Per (sh.)	Quantity (kg)
Maize	50	100	80	120
Rice	80	140	100	120
Beans	40	150	80	110
Peas	50	100	90	100

Using the year 2012 as the base year, calculate.

- (i) Laspeyre's price index number. (4mks).
- (ii) Paasche's price index number. (4mks).
- (iii) Fisher's Ideal price index number. (2mks).
- (iv) Explain the advantage of using Paasche's price index number over Laspeyre's price index number. (2mks).