

Kasarani Campus Off Thika Road P. O. Box 49274, 00101 NAIROBI Westlands Campus Pamstech House Woodvale Grove Tel. 4442212 Fax: 4444175

KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR FIRST YEAR, FIRST SEMESTER EXAMINATION FOR THE DIPLOMA IN HOSPITALITY MANAGEMENT <u>DBA 1104 QUANTITATIVE METHODS</u>

Date: 14th August 2024 Time:2.30pm-4.30pm

IN	STRUCTIONS TO CANDIDATES	
AN	NSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO Q	UESTIONS
Q	UESTION ONE (30 MARKS)	
a)	Solve the following equation $5x^2 + 17x + 12 = 0$.	(3 marks)
b)	Solve the following simultaneous equations by using matrix algebra.	(3 marks)
	3x + 4y = 18	
	5x - 2y = 4	
c)	Find out the derivative of the following function.	(2 marks)
	$y = (x^4 + 3)(2x^3 - x)$	
d)	Evaluate $\int (3x^2 + 2x + 1)dx$	(2 marks)
e)	Consider the following data;	
	22, 14, 28, 50, 30, 45, 32, 18, 27, 15, 23	
	Compute;	
	i) Median.	(2 marks)
	ii) Quartile deviation.	(3 marks)
	iii) Mean.	(2 marks)
	iv) Standard deviation.	(2 marks)

f) The data below show the price of an item for several consecutive years

Year	2014	2015	2016	2017	2018
Price	160	152	139	172	159

Compute the chain base index numbers.

g) From a bag containing 5 white and 6 black balls, a man draws 2 balls at random, one at a time and without replacement. Find the probability of drawing balls of the same colour?

(3 marks)

(3 marks)

). Find
(2 marks)
(3 marks)

QUESTION TWO (20 MARKS)

a) The following data relate to advertisement expenditure (in thousands of shillings) and their corresponding sales (in a hundred thousand shillings)

Advertisement (X)	40	50	38	60	65	50	33
Sales (Y)	38	60	55	63	70	48	30

- i) Fit a linear regression equation for sales on advertisement expenditure. (8 marks)
- ii) Estimate the sales corresponding to advertising expenditure of KES 30, 000. (2 marks)
- iii) Determine and interpret the Pearson's correlation coefficient. (5 marks)
- b) A study is conducted for 10 days to investigate the association between price per unit and units supplied for a certain commodity at a specific market.

Price (KES)	20	23	8	29	14	12	11	25	17	18
Supply (units)	30	35	11	34	23	16	13	32	25	26

Determine the Spearman's rank correlation coefficient.

(5 marks)

QUESTION THREE (20MARKS)

a) Consider the data given in the following table

Itoms	202	20	202	23
Items	Price	Qty	Price	Qty
Rice	30	100	40	120
Maize	16	80	25	135
Sugar	10	150	20	220
Salt	5	50	8	70

Taking 2020 as the base year, compute;

- i) Laspeyre's price index.
- ii) Paasche's price index.
- iii) Fisher's price index.
- iv) Marshall-Edgeworth price index.
- b) Given two matrices A and B

$$\mathbf{A} = \begin{bmatrix} 2 & 3 \\ 1 & 4 \\ 5 & 2 \end{bmatrix} \quad \mathbf{B} = \begin{bmatrix} 5 & 3 & 8 \\ 1 & 6 & 2 \end{bmatrix}$$

(3 marks)

- (3 marks)
- (3 marks)
- (3 marks)

Determine the following;

i)	\boldsymbol{B}^T	(1 marks)
ii)	$(BA)^{-1}$.	(4 marks)
iii)) $3B^T + 2A$.	(3 marks)

QUESTION FOUR (20 MARKS)

a) Solve the following simultaneous equations using the method indicated.

i)	3x + 2y = 23	
	5x + 3y = 37, by elimination method.	(3 marks)

- ii) 4x + 3y = 27
 - x + 2y = 8, by substitution method. (3 marks)
- b) Solve the following quadratic equations using the stated method.
 - i) $6x^2 17x + 12 = 0$, by factorization. (3 marks)
 - ii) $6x^2 + 7x 20 = 0$, by complete square method. (3 marks)
 - iii) $7x^2 + 17x 12 = 0$, using quadratic formulae. (2 marks)
- c) Differentiate the following functions with respect to *x*.

i)
$$y = (x^2 + 2x)(3x + 8)$$
 (3 marks)
 $2x-1$

ii)
$$y = \frac{2x}{x^2 + 3}$$
 (3 marks)

QUESTION FIVE (20 MARKS)

a) The table below shows the scores of 100 students in a continuous assessment test marked out of 40.

_							
	Scores	10-14	15-19	20-24	25-29	30-34	35-39
	No. of Students	9	17	32	18	14	10
C	Compute						
i) Mode.						
i	i) Median.						
i	ii) Quartile deviat	ion.					
i	v) Mean.						
۷	v) Standard devia	tion.					
) H	Evaluate $\int_{1}^{2} (3x^2 - x^2) dx^2$	-2x + 5	b)dx.				