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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
DBA 1104: QUANTITATIVE METHODS

Date: 18th April, 2024
Time: 2.30pm –4.30pm

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Given a set of data: 71, 55, 69, 45, 65, 57, 71, 82, 55, 50 calculate the variance (4 Marks)

- b) Determine the derivative of the following polynomial functions with respect to x
$$y = 2x^4 - 2x^{-3} + 5x^2 - \frac{1}{3}x^3$$
 (3 Marks)

- c) Study the data below and use to:

Weight	120-129	130-139	140-149	150-159	160-169	170-179	180-189
Frequencies	8	10	13	11	9	6	3

Find out the following

- i) Mean (3 Marks)
ii) Median (4 Marks)
iii) Mode (2 Marks)
- d) A bag containing 3 white balls, 5 red and 4 black balls. A man picks 2 balls at random with replacement. Using a tree diagram, find the probability that the balls are of same color? (3 Marks)
- e) Use Elimination method to solve the simultaneous equations. (3 Marks)

$$4x - 5y = 13$$

$$3x - 2y = 8$$

- f) Given the matrices $A = \begin{bmatrix} 4 & 5 & 3 \\ 6 & -3 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 3 \\ 1 & -2 \\ -5 & 2 \end{bmatrix}$

Determine

- i) B^T (1 marks)
ii) $A^T - 2B$ (2 Marks)
iii) AB (2 marks)
- g) Construct simple index number from numbers from the following data by using Fixed base method (2012 as base year) (3 Marks)

Year	2012	2013	2014	2015	2017	2018	2019
Price (Shs. 000)	85	72	60	58	78	110	140

QUESTION TWO (20 MARKS)

a) Study the data below and use to:

Wages	120	130	140	150	160	170	180
No of employees	8	10	13	11	9	6	3

Find the following

- i) Geometric Mean (4 marks)
 ii) Standard deviation (4 marks)
 iii) Mean Absolute Deviation (4 marks)

b) Given below is the data on staffing and running cost in each of the regions for a certain non-governmental organization.

Number of staff (X)	10	8	14	12	11	9
Running cost ('000')	102	93	143	121	118	99

- i) Determine the regression equation which may associate the number of staff to running costs (6 marks)
 ii) Using the equation in (i) above, estimate the cost of running an office with 10 employees (2 marks)

QUESTION THREE (20 MARKS)

a) Two soccer judges were assigned the task of assessing 10 players of a team and each judge awarded each player points as shown in the table

Player No.	1	2	3	4	5	6	7	8	9	10
Judge A	34	30	44	8	12	41	38	18	26	28
Judge B	26	22	42	10	18	32	46	17	12	30

Compute the Spearman's Rank Coefficient of Correlation between the points awarded by the two soccer judges.

b) Use Completing square method to solve for x in (6 Marks)

$$0 = 5x^2 - 9x + 4 \quad (3 \text{ Marks})$$

c) Solve the following equations using the stated Substitution method. (3Marks)

$$4x - 2y = 6$$

$$3x + 4y = 3$$

d) Find the first derivatives of the following function:

$$f(x) = x^{-3} + 5x^4 + 1 \quad (2 \text{ Marks})$$

e) Integrate the following functions

i) $\int (3x^2 + 2x + 2)dx$ (3 Marks)

ii) $\int (x^2 + 1)(2x + 4)dx$ (3 Marks)

QUESTION FOUR (20 MARKS)

a) From the following data, calculate index numbers for 2020 taking 2018 as the base and using the following formulae:

- i) Laspeyre's method (4 marks)
- ii) Paasche method (4 marks)
- iii) Fisher method (4 marks)

Commodity	2018		2020	
	Prices (Shs)	Quantity (Bags)	Price (Shs)	Quantity (Bags)
Wheat	65	20	155	35
Beans	95	8	190	11
Rice	150	5	380	18

b) A patient has a chance of 0.6 of finding a doctor in his surgery on a random visit. On the next three visits what is the probability that the patient finds the doctor:

- i) in exactly one visits (3 marks)
- ii) in all visits (2 Marks)
- iii) on at least two visits (3 marks)

QUESTION FIVE (20 MARKS)

a) The following data have been collected regarding sales and advertising expenditure

Sales (Sh. M)	8	9	7	8	9	10
Advertising expenditure (Sh. M)	21	25	29	33	37	41

- i) Calculate the Karl Pearson's correlation coefficient between sales revenue and advertising expenditure. (8 marks)
- ii) Comment on the results. (2 marks)

b) A company takes a random sample of 200 orders from its order book the value of the orders was distributed as shown in the table below.

Value of Order (In thousands Kshs)	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Percentage of Orders (%)	22	25	21	14	8	7	3

Calculate the

- i) Quartile deviation (5 marks)
- ii) coefficient of variance (5 marks)