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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FIRST YEAR, SECOND SEMESTER EXAMINATION
FOR THE DIPLOMA IN PROCUREMENT AND SUPPLIES MNGEMENT
DBA 1104:QUANTITATIVE METHODS

Date: 16th August 2023
Time: 2.30pm-4.30pm

INSTRUCTIONS TO CANDIDATES:

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) The data below shows the marks obtained by ten students in a test.
71, 55, 69, 45, 65, 57, 71, 82, 55, 50
Find the Lower and upper quartiles. (2 marks)
- b) Solve the following equation by any suitable method (3 marks)

$$\begin{aligned}4x - y &= 5 \\ 3x + 2y &= 6\end{aligned}$$

- c) Solve the following quadratic equation $3x^2 - 7x + 2 = 0$ (3marks)
- d) Determine the derivative of each of the following functions with respect to x
 $y = (4x^3 - 3x)(9x + 2)$ (3 marks)
- e) The following data shows marks obtained by student during a test

Marks	10	15	20	25	30	35	40
No. of student	5	10	8	11	9	4	6

Calculate the following

- (i) Mean (2 marks)
(ii) Median (3 marks)
(iii) Mode (2 marks)
- f) A bag containing 5 white and 4 black balls. A man picks 2 balls at random with replacement. What is the probability of picking 2 balls of different colors? (4 marks)

g) Given the matrices $S = \begin{bmatrix} 11 & 4 & 5 \\ 5 & 13 & -4 \\ 7 & 3 & 4 \end{bmatrix}$, $R = \begin{bmatrix} 3 & 4 & 8 \\ 2 & 1 & 0 \\ 1 & 6 & 12 \end{bmatrix}$

Determine

- (i) RS (2 marks)
(ii) $S + R$ (2 marks)
- h) Construct simple index number from numbers from the following data by using Chain base method (4 marks)

Year	2009	2010	2011	2012	2013	2014	2015	2016
Price (Sh 000)	80	90	60	50	70	88	110	130

QUESTION TWO (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. (2marks)

b) The following data give the test scores and sales made by 9 salesmen during the last one year

Test scores	14	19	24	21	26	22	15	20	19
Sales(millions)	31	36	48	37	50	45	33	41	39

Obtain

- i. The regression equation of test scores on sales (5 marks)
- ii. The regression equation of sales on test scores (5 marks)

QUESTION THREE (20 MARKS)

Study the data below and use to:

Wages	120-129	130-139	140-149	150-159	160-169	170-179	180-189
No of employees	8	10	13	11	9	6	3

Calculate:

- a) Mean (3 marks)
- b) Median (3 marks)
- c) Mode (3 marks)
- d) Quartile deviation (3 marks)
- e) Standard deviation (5 marks)
- f) Coefficient of variation (3 marks)

QUESTION FOUR (20 MARKS)

a) An examination of eight applicants for clerical post was taken by a firm. From the marks obtained by the applicants in the Accountancy and Statistics papers, compute rank coefficient of correlation. (8 marks)

Applicant	A	B	C	D	E	F	G	H
Marks in Accountancy	15	20	28	12	40	60	24	80
Marks in Statistics	40	32	50	35	20	10	30	60

b) Use Completing square method to solve for x in (4 marks)

$$0 = 5x^2 - 9x + 6$$

c) Solve the following equations using the stated method.

$$\begin{aligned} 4x - 2y &= 6 \\ 3x + 4y &= 3 \end{aligned}$$

- i. Elimination method (3 Marks)
- ii. Substitution method (3 Marks)

d) Determine the derivative of each of the following functions with respect to x

$$y = \frac{3-2x^2}{3+2x}$$

(3

marks)

QUESTION FIVE (20 MARKS)

a) From the following data, calculate index numbers for 2018 taking 2015 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	2015		2018	
	Prices (Shs)	Quantity (Bags)	Price (Shs)	Quantity (Bags)
A	65	20	155	35
B	95	8	190	11
C	150	5	380	18

b) In a science class, $\frac{2}{3}$ of the class are boys and the rest are girls. **80%** of the boys and **90%** of the girls are right-handed. The probability that the right-handed student will break a test tube in any session is $\frac{1}{10}$ and that for the left-handed student is $\frac{3}{10}$, regardless of whether boy or girl.

- I.** Draw a tree diagram to represent this information. (2 marks)
- II.** Using the tree diagram drawn, find the probability that:
 - (i) A student chosen at random from the class is left-handed (2 marks)
 - (ii) A test tube is broken by a right-handed student. (2 marks)
 - (iii) A test tube is not broken in any session (2 marks)