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KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FIRST YEAR, FOURTH SEMESTER EXAMINATION
FOR THE DIPLOMA IN BUSINESS INFORMATION TECHNOLOGY
DBA 1104 – QUANTITATIVE METHODS

Date: 16TH December 2023
Time: 2:30PM – 4:30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) A profit of Ksh. 426000 is shared among three business partners, Ann, Bett and Charles. Charles gets Ksh. 9000 more than Bett while Ann gets twice as much as Charles. Find how much each gets. (3 Marks)

b) Monthly earnings of Sanlo limited for a period of six months were as follows: 45000, 78000, 63000, 89000, 36000, 98000. Find the average monthly earnings (3 Marks)

c) Given a set of data: 5, 11, 7, 6, 9, 12, calculate the harmonic mean, median, inter-quartile range and standard deviation (5 Marks)

d) The cost of three sheep and two goats is Ksh. 7200. If four sheep and a goat costs Ksh 7600, find the cost of two goats and a sheep. (4 Marks)

e) Construct chain base index numbers from the following prices

Year	2002	2003	2004	2005	2006	2007
Prices (Shs)	120	122	116	120	125	135

(3 Marks)

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

   i) $y = \frac{3 - 2x^2}{2x}$ (3 Marks)

   ii) $y = (4x^2 - 5x^3)(6x + 4)$ (3 Marks)

g) Find the integrals of the following polynomial functions with respect to x

   i) $y = 5x^3 - 5x^2 - 9x + 6$ (3 Marks)

   ii) $y = 2x^2 - 5x^3 + 7x - 3$ (3 Marks)

QUESTION TWO (20 MARKS)

a) From the following grouped frequency distribution calculate the mode and the median.

Class interval	0.0-8.0	8.0-16.0	16.0-24.0	24.0-32.0	32.0-40.0	40.0-48.0
Frequency	8	7	16	24	15	7

(6 Marks)

b) Calculate the median from the following frequency distribution

Grade	50-59	60-69	70-79	80-89	90-99	100-109	110-119
Frequency	7	81	192	312	218	82	18

(4 Marks)

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

Sales (Sh. M)	8.5	9.2	7.9	8.6	9.4	10.1
Advertising expenditure (Sh. M)	210	250	290	330	370	410

   Calculate the Karl Pearson's correlation coefficient between sales revenue and advertising expenditure. Comment on the results. (4 Marks)

d) A sample of students had a mean age of 35 years with a standard deviation of 5 years. A student was randomly picked from a group of 200 students. Assuming a normal distribution, find the probability that the age of the student turned out to be as follows
   i) Lying between 35 and 40 (3 Marks)
   ii) Lying between 30 and 40 (3 Marks)

QUESTION THREE (20 MARKS)

a) A sample comprises of the following observations: 14, 18, 17, 16, 25 and 31. Determine the standard deviation of this sample (5 Marks)

b) If $A = \begin{pmatrix} 3 & -5 \\ -8 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -3 \\ 9 & 8 \end{pmatrix}$, find $2A + \frac{17}{23}B$ (3 Marks)

c) Calculate the mode from the data given below

Daily wages (Shs)	30-35	35-40	40-45	45-50	50-55	55-60
No. of workers	5	8	10	6	3	2

(4 Marks)

d) From the following distribution, calculate
   i) Geometric mean (4 Marks)
   ii) Harmonic mean (4 Marks)

Class Intervals	Frequency
0-4	6
4-8	15
8-12	22
12-16	28
16-20	45
20-24	25
24-28	13
28-32	6

QUESTION FOUR (20 MARKS)

a) From the following data, calculate index numbers for 2007 taking 2000 as the base and using the following formulae:
   i) Laspeyre's method (3 Marks)
   ii) Paasche method (2 Marks)
   iii) Fisher method (2 Marks)
   iv) Marshall-Edgeworth method (2 Marks)

	2000		2007	
Commodity	Prices (Shs)	Quantity (Bags)	Price (Shs)	Quantity (Bags)
Maize	65	20	135	30
Wheat	95	8	160	7
Beans	150	5	320	8

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

Sales (Sh. M)	8.5	9.2	7.9	8.6	9.4	10.1
Advertising expenditure (Sh. M)	210	250	290	330	370	410

Calculate the Karl Pearson's correlation coefficient between sales revenue and advertising expenditure. Comment on the results. (5 Marks)

c)   Given two matrices A and B

$$A = \begin{pmatrix} -5 & -6 \\ 2 & -3 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 3 \\ 2 & -9 \end{pmatrix}$$

Determine the following;
i)   Transpose of A (1 Mark)
ii)   A+5B (2 Marks)
iii) $B^T + 2A$ (3 Marks)

QUESTION FIVE (20 MARKS)

a)   Calculate the mean deviation and co-efficient of mean deviation from the following data

X	10	11	12	13	14
F	3	12	18	12	3

(4 Marks)

b)   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.

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

(8 Marks)

c)   The following table indicates the increase of cost of living in Kenya for a working class over a period of 3 years and the weights assigned to the various groups:

Group	Percentage increase	Weights
Food	29	7.5
Rent	54	2.0
Clothing	97.5	1.5
Fuel and lighting	75	1.0
Other items	75	0.5

Calculate the weighted arithmetic mean of the increase in the cost of living (8 Marks)