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# KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
## UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR
## FOR THE CERTIFICATE IN BUSINESS MANAGEMENT
## CBM 017: BUSINESS CALCULATIONS AND STATISTICS

Date: 14th December 2022
Time: 11:30am -1:30pm

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

**QUESTION ONE (30 MARKS)**

a) Outline four qualities of a good measure of dispersion (4 Marks)

b) The Marks of 15 students of a college in statistics are given below:
49, 62, 51, 74, 55, 80, 56, 64, 34, 42, 56, 67, 10 and 46. Find out the mean mark. (3 Marks)

c) Let $A=\begin{pmatrix} 3 & 2 \\ -1 & 6 \end{pmatrix}$ and $B=\begin{pmatrix} 1 & -9 \\ 11 & 6 \end{pmatrix}$. Find $-\frac{4}{7}A-13B$ (4 Marks)

d) Monthly earnings of 10 employees of Brookside limited are:
Sh 70000, 11200, 4300, 8100, 6090, 1010, 1500, 1900, 1700, 2000. Calculate the average wage. (4 Marks)

e) Solve the following equation $4x^2 - 7x + 3 = 0$
i) Formula (3 Marks)
ii) Factorization (3 Marks)

f) From the data given below calculate

| Marks | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 |
|---|---|---|---|---|---|---|---|---|
| Number of students | 5 | 6 | 15 | 10 | 5 | 4 | 2 | 2 |

i) Mean (4 Marks)
ii) Median (3 Marks)
iii) Mode (4 Marks)

g) A bag contains 4 white beads and 3 black beads. A man pick 2 at random. Find the probability that both beads are of same colour. (3 Marks)

**QUESTION TWO (20 MARKS)**

a) The following data shows the Marks of students obtained in a given exam.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
|---|---|---|---|---|---|
| Number of students | 7 | 6 | 15 | 12 | 10 |

Calculate; (i) Standard deviation (4 Marks)
(ii) Coefficient of variation (3 Marks)

b) With examples discuss three types of matrices (3 Marks)

c) The following data relate to sizes of shoes sold at a store during a given week.

| Size of Shoes | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 |
|---|---|---|---|---|---|---|---|---|---|
| No of pairs | 1 | 2 | 4 | 5 | 15 | 30 | 60 | 95 | 82 |

Find the median size. (3 Marks)

d) Given two matrices A and B

$A=\begin{bmatrix} 5 & 6 \\ 2 & 3 \end{bmatrix}$ $B=\begin{bmatrix} 1 & 3 \\ 2 & 9 \end{bmatrix}$

Determine the following;

i) Transpose of A (1 Mark)

ii) AB (3 Marks)

iii) $B^T$+A (3 Marks)

**QUESTION THREE (20 MARKS)**

a) Calculate the standard deviation from the following data:

192, 288, 236, 229, 184, 260, 348, 291, 330, 242 (3 Marks)

b) With example explain the meaning of a square matrix. (2 Marks)

c) From the following grouped frequency distribution.

| 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 |

Calculate (i) Mean (4 Marks)

(ii) Mode (3 Marks)

d) Solve the following simultaneous equation by;

$$6x + 3y = 4$$
$$5x + 8y = 6$$

i) Elimination method (4 Marks)

ii) Substitution method (4 Marks)

**QUESTION FOUR (20 MARKS)**

a) 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 |

(3 Marks)

b) Compute the median from the following data: 51, 65, 40, 44, 46, 55, 48, 62 (1 Mark)

c) Kamau got the following Marks in 5 subjects: 75, 55, 48, 72 and x. Determine the value of x if his average mark was 65. (4 Marks)

d) Solve the following equation $4x^2 - 7x + 3 = 0$

i) Completing the square (4 Marks)

ii) Factorization (3 Marks)

e) Find the median wage of the following observations

| Wages | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|---|
| Number of workers | 3 | 5 | 20 | 10 | 5 | 0 |

(5 Marks)

**QUESTION FIVE (20 MARKS)**

a) Given below are the Marks obtain by 9 students; 45, 32, 37, 46, 39, 36, 41, 48 and 36.

Find (i) Standard deviation (2 Marks)

(ii) Coefficient of standard deviation (3 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) Solve by Matrix method (4 Marks)

$$\mathbf{4a + 2b = 5}$$
$$\mathbf{3a + 5b = 1}$$

d) Find the co-efficient of variation from the following data

| Weight (gm) | 110-119 | 120-129 | 130-139 | 140-149 | 150-159 | 160-169 | 170-179 | 180-189 |
|---|---|---|---|---|---|---|---|---|
| Frequency | 5 | 7 | 12 | 20 | 16 | 10 | 7 | 3 |

(3 Marks)

e) From the following grouped frequency distribution.

| 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 |

Calculate (i) Mean (3 Marks)

(ii) Median (2 Marks)