**CHUKA**  **UNIVERSITY**



**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER**

**COSC 0172: MATHEMATICS AND COMPUTING II**

**STREAMS: DIP. COMP** **TIME: 2 HOURS**

**DAY/DATE: MONDAY 06/04/2020** **11.30 A.M. – 1.30 P.M.**

**Instructions:**

- **Answer ALL questions in section A and any other TWO in section B**
- **Do not write anything on the question paper**
- **Non-programmable electronic calculators may be used**

## SECTION A

## QUESTION ONE (30 MARKS)

(a) State the properties of good measure of central tendencies [5 marks]

(b) Given $A = \begin{bmatrix} 4 & 1 & 8 \\ -2 & 4 & 2 \\ 3 & 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & -1 & 3 \\ 1 & 0 & 1 \\ 1 & 1 & 3 \end{bmatrix}$, find

$A^{-1}, B^{-1}$ and AB [11 marks]

(c) The mean of the data below is 2.5. Find the missing value and determine the standard deviation [5 marks]

| x | 2.0 | 2.2 | 2.3 | 2.8 | 3.0 |
|---|---|---|---|---|---|
| f | 2 | 4 | y | 3 | 5 |

(d) Solve for x in the linear inequality and state its property

$2(4X + 2) - 20 > 8(2x - 3)$ [3 marks]

(e) If we have 12 soft-centered and 8 hard centered chocolates in a box, draw a tree diagram and use it to find

(i) $P(soft\ centred\ and\ soft\ centered)$ [2 marks]

(ii) $P(hard - \ centred\ and\ soft - centered\ or\ centered\ hard\ centered)$

[2 marks]

**SECTION B**

**QUESTION TWO (20 MARKS)**

(a) State three advantages and three elements of arithmetic mean [6 marks]

(b) Use the data given to find $D_7, P_{69,}$ mean, median, semi-interquartile, MAD and standard deviation [14 marks]

| Class interval | F |
|---|---|
| 0 – 9 | 5 |
| 10 – 19 | 8 |
| 20 – 29 | 7 |
| 30 – 39 | 12 |
| 40 – 49 | 28 |
| 50 – 59 | 20 |
| 60 – 69 | 15 |
| 70 – 79 | 5 |

**QUESTION THREE (20 MARKS)**

(a) The question do you "pray?" was asked of 100 people and the results were as shown in the table

| Respondents | Yes | No | Total |
|---|---|---|---|
| Male | 17 | 40 | 57 |
| Female | 14 | 29 | 43 |
| Total | 31 | 69 | 100 |

(i) What is the probability of randomly selecting an individual being a male who pray? [2 marks]

(ii) What is the probability of randomly selecting an individual being a female who don't pray? [2 marks]

(iii) What is the probability of selecting an individual who don't pray? [2 marks]

(iv) What is the probability of selecting a male or female who pray? [2 marks]

(v) What is the probability of randomly selecting a female who pray? [2 marks]

(b) Solve the following inequalities graphically and identify the unwanted regions [10 marks]

$2x \leq y + 6$
$x + y \leq 4$
$y \geq x + 9$
$0.5x \leq 2y + 4$
$y > 3$
$x \leq 9$

**QUESTION FOUR (20 MARKS)**

(a) Using a graph solve the following equation and find the coefficient of $x$ [10 marks]

$x^4 - 13x^2 + 36$

(b) Show that $(x + 3)$ is a factor of $x^3 + 6x^2 - x - 30$. Then find the remaining factors of the polynomial [6 marks]

(c) Define the following terms as used in probability

(i) Classical probability [2 marks]

(ii) Empirical probability [2 marks]

**QUESTION FIVE (20 MARKS)**

(a) Given $A = \begin{bmatrix} 0 & -1 & 2 \\ 1 & -1 & -2 \\ -2 & 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 11 & 5 \\ 1 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

Find AB [3 marks]

(b) Hence, solve the simultaneous equations [5 marks]

$4x + 11y + 5z = 2$

$x + 4y + 2z = 1$

$x + 2y + z = 4$

(c) For the following read estate prices, calculate semi-interquartile range [5 marks]

389950, 230500, 479000, 114950, 5500000, 387000, 659000, 575000, 488800, 1095000

(d) Find the mean and the standard deviation of the data [7 marks]

| Class interval | F |
|---|---|
| 0 – 2 | 1 |
| 3 – 5 | 6 |
| 6 – 8 | 10 |
| 9 – 11 | 7 |
| 12 – 14 | 0 |
| 15 – 17 | 2 |

---