



PAN AFRICA CHRISTIAN UNIVERSITY

EXAMINATIONS PAPER

CERTIFICATE IN INFORMATION AND COMMUNICATION

TECHNOLOGY

END-OF-SEMESTER EXAMINATION

DEPARTMENT: COMPUTING AND INFORMATION TECHNOLOGY

COURSE CODE: CICT0114

COURSE TITLE: CICT 0114 ELEMENTARY MATHEMATICS

DATE: AUG 2023

ELEMENTARY MATHEMATICS

SECTION A: (Answer ALL questions in this section)

Question 1:

a) Evaluate $\frac{6!}{(2! \times 4!)}$ **[2 Marks]**

b) Solve for x and y. **[3 Marks]**

$$7x + y = 25$$

$$5x - y = 11$$

I. Express $\frac{1}{\sqrt{32}}$ as a power of 2 **[1 Mark]**

II. The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of the 2nd hour, 4th hour, and nth hour?

[2

Marks]

c) Three coins are tossed, find the probability that two heads are Obtained. **[2 Marks]**

SECTION B: (Answer any THREE (3) questions in this section)

Question 2:

a) Write the truth table for $(p \text{ and } q) \vee (p \text{ or } q)$ **[5 Marks]**

b) Prove that the proposition $(p \rightarrow q) \wedge (p \rightarrow r) \equiv p \rightarrow (q \wedge r)$ is a Logical Equivalence. **[5 Marks]**

Question 3:

a) Evaluate the following: **[4 Marks]**

i. ${}^{10}P_3$

ii. ${}^{10}C_4$

b) A box contains 3 red marbles, 5 yellow marbles, and 2 blue marbles. If a marbles is picked at random from the box, what is the probability that a ball picked is a yellow marbles? **[2 Marks]**

c) How to shade the union, intersection and complement of two sets? [4 Marks]

1. $A \cup B$

2. $A' \cap B'$

Question 4:

a) Let $U = \{a, b, c, d, e, f, g, h, i, j\}$ be the universal set and let

$A = \{a, b, c, d, e, f, g\}$, $B = \{b, d, f, i, j\}$, $C = \{a, c, f, j\}$.

Calculate:

i. $A \cap B$ [2 Marks]

ii. $(A \cup C)' \cap B$ [3 Marks]

iii. $(A \cap C)'$ [2 Marks]

b) Prove that $(A' \cup C') = (A \cap C)'$ 3 Marks]

$A = \{5,6,7\}$ $B = \{1,2,3,4,5,6\}$ $C = \{6,7,8,9,10\}$

Question 5:

a) Given the 3X3 Matrix below, calculate the determinant of matrix A below. [4 Marks]

$$\begin{bmatrix} 1 & -2 & 3 \\ 2 & 0 & 3 \\ 1 & 5 & 4 \end{bmatrix}$$

b) Given two matrices: $A = \begin{bmatrix} 1 & 5 \\ 7 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 12 & -1 \\ 0 & 9 \end{bmatrix}$

Find:

I. AB [2 Marks]

II. $2A + 3B$ [2 Marks]

III. $A - B$ [2 Marks]

Question 6:

a) In a survey conducted at PAC University, 200 students are randomly selected. 140 take Geography, 120 take Algebra, and 80 take both Geography and Algebra.

- I. How many students take only Geography? **[1 Mark]**
- II. How many students take only Algebra? **[1 Mark]**
- III. How many students take neither Geography nor Algebra? **[1 Mark]**
- IV. How many students take only one of Geography or Algebra? **[1 Mark]**
- V. How many students take at least one of the beverages? **[1 Mark]**
- VI. Draw a Venn diagram to represent the information above **[5 Marks]**