

PAN AFRICA CHRISTIAN UNIVERSITY

CERTIFICATE IN INFORMATION AND COMMUNICATION TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT: COMPUTING AND INFORMATION TECHNOLOGY

COURSE CODE: CICT0114

COURSE TITLE: ELEMENTARY MATHEMATICS

EXAM DATE: XXXXX XXXXX/AUGUST,2021

TIME: XXXXX

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other Three questions in Section **B**.
- Write only your **student number** on the answer booklet provided.

SECTION A
(Answer ALL questions in this section)

Question 1:

a) Convert the following:

[4 Marks]

i. $94B_{16}$ to decimal equivalent

ii. 145_{10} to binary number

b) Given set $A = \{1,2,3,4\}$ and $D = \{4,5,6\}$. Find $A \cup D$

[1 Mark]

c) Given the matrices below;

$$A = \begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 0 & -4 \\ 3 & -2 & 6 \end{bmatrix}.$$

Find:

i. $A+B$

[2 Marks]

d) Given the following sets.

$$A = \{5,6\} \quad B = \{a,b,c\}$$

Find the:

i. Cardinality of set B

[1 Mark]

ii. Powerset of set B

[2 Marks]

SECTION B
(Answer any FOUR (4) questions in this section)

Question 2:

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

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

Find:

i. $A \cap B$

[2 Marks]

ii. A/B

[2 Marks]

iii. $(A \cup C)^c \cap B$

[3 Marks]

iv. $(A/C)^c$

[3 Marks]

Question 3:

a) Construct the truth table of $\neg p \wedge q$.

[4 Marks]

b) Prove that the proposition $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a tautology.

[6 Marks]

Question 4:

Let $A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 0 \\ -6 & 7 \end{bmatrix}$

Find:

i. $A - B$

[2 Marks]

ii. BA

[4 Marks]

iii. Inverse of B

[4 Marks]

Question 5:

a) Evaluate the following:

[4 Marks]

i. 6P_4

ii. ${}^{15}C_8$

b) A pair of dice is tossed. Find the number of elements in each of the following event:

i. Two numbers are equal

[2 Marks]

ii. Sum is 9 or more

[2 Marks]

iii. 3 appears on at least one die

[2 Marks]

Question 6:

A survey on a sample of 25 new cars being sold at a local auto dealer was conducted to see which of three popular options, air-conditioning (A), radio (R), and power windows (W), were already installed. The survey found:

15 had air-conditioning (A), 12 had radio (R), 11 had power windows (W), 5 had A and W , 9 had A and R , 4 had R and W , 3 had all three options.

a) Fill in the correct number of cars in each of the regions on the Venn diagram.

[5 Marks]

b) Find the number of cars that had:

i. Only R

[1 Mark]

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ii. Only one of the options

[2 Marks]

iii. None of the options

[2 Marks]

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