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: **XXXX, XXXX APRIL, 2021**

TIME: **XXXXXXXXXXX**

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 145_{10} to binary number **[2 Marks]**

b) Consider the sets:

A = {red, green, blue}
B = {red, yellow, orange}
C = {red, orange, yellow, green, blue, purple}

Find the following:

i) $A \cup B$ **[2 Marks]**
ii) $A \cap B$ **[2 Marks]**

c) Given Matrix A below.

$$A = \begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$$

Find the inverse of A. **[2 Marks]**

d) Evaluate the following: **[2 Marks]**

i) ${}^{10}P_5$

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

Question 2:

a) Given the following sets.

P={5,7,9} Q={a,b,c,d}

Find the:

i) Cardinality of set Q **[2 Marks]**

ii) Powerset of set Q **[3 Marks]**

iii) Cartesian product of the above sets **[3 Marks]**

b) Evaluate the following: **[2 Marks]**

${}^{12}C_8$

Question 3:

a) Let **U** = {1,2, …, 9} be the universal set, and let

A = {1, 2, 3, 4, 5}, C= {5, 6, 7, 8, 9}, E= {2, 4, 6, 8},
B = {4, 5, 6, 7}, D= {1, 3, 5, 7, 9}, F = {1, 5, 9}.

Find:

i) $A \cap (D \cup F)^C$ **[3 Marks]**

ii) D/E **[2 Marks]**

iii) $(A/C)^C$ **[2 Marks]**

iv) $(B \cap F) \cup (C \cap E)$ **[3 Marks]**

Question 4:

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

Find:

i)3A – 4B **[4 Marks]**
ii) A+B **[2 Marks]**
iii) BA **[4 Marks]**

Question 5:

a) Convert the following: **[8 Marks]**

i) 111011_2 to decimal equivalent

ii) $84D_{16}$ to decimal equivalent

iii) 105_{10} to binary number

iv) $94B_{16}$ to octal equivalent

b) Find the determinant of the matrix below.

$$B = \begin{bmatrix} -5 & -4 \\ -2 & -3 \end{bmatrix}$$

[2 Marks]

Question 6:

a) Construct the truth tables for $p \rightarrow \neg q$ statement. **[2 Marks]**

b) Show that the proposition $p \vee \neg (p \wedge q)$ is a tautology. **[4 Marks]**

c) Three fair coins are tossed. Find the number of elements in each of the following events:

i) Two or more heads appear **[2 Marks]**

ii) At least one head appear **[2 Marks]**

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