

PAN AFRICA CHRISTIAN UNIVERSITY

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT: COMPUTING AND INFORMATION TECHNOLOGY

COURSE CODE: DICT0114

COURSE TITLE: FOUNDATION MATHEMATICS

EXAM DATE: XXXXX XXXXX/DECEMBER,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. 1010110101_2 to hexadecimal equivalent

ii. 245_{10} to binary number

b) Using the matrices below, calculate $A+B$.

[2 Marks]

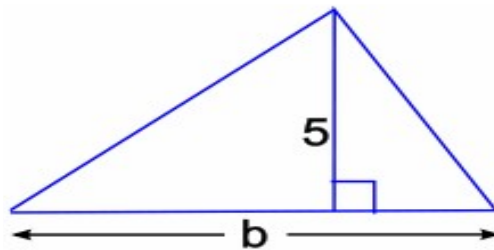
$$A = \begin{bmatrix} 3 & 7 \\ 4 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 3 & -2 \\ 7 & 6 \end{bmatrix}$$

c) Given the set $A = \{1,2,3\}$. Find $P(A)$

[2 Marks]

d) The area of the triangle below is 22.5 cm^2 . Calculate the length of the base of the triangle.

[2 Marks]



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

Question 2:

a) Consider the following universal set $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$,

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

Find the following:

i. $(A \cap B)'$

[2

Marks]

ii. $(A \cup B) \cap C$

[2

Marks]

iii. $A \cap (B \cap C)$

[3 Marks]

b) Find the radius of a circle if its area is 120 M^2 . (Round your answer to the nearest hundredth).

[3 Marks]

Question 3:

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

[4 Marks]

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

[6 Marks]

Question 4:

Wananchi Agency Limited deals with the distribution of three types of newspapers namely: Neno, Imani and Upendo. The company recently conducted a market survey to determine the newspaper preferences of 100 households in a certain town. The following results were obtained from the survey.

48 Households read Neno newspaper

18 Households read Imani newspaper

26 Households read Upendo newspaper

8 Households read Neno and Upendo newspapers

8 Households read Neno and Imani newspapers

3 Households read Upendo and Imani newspapers

3 Households read the three newspapers

a) Represent the above information using a venn diagram.

[4 Marks]

b) Find the number of households that:

i. Read only one of the newspaper.

[2

Marks]

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- ii. Read Upendo newspaper and the Imani newspaper but did not read the Neno newspaper. [2

Marks]

- iii. Read none of the newspapers. [2

Marks]

Question 5:

- a) Evaluate the following: [4 Marks]

i. 8P_3

ii. ${}^{12}C_6$

- b) There are 6 oranges, 5 apples and 8 mangoes in a basket. Peter picked 3 oranges, 2 apples and 4 mangoes from the basket. Find the number of choices peter has in selection of fruits. [3 Marks]

- c) There are 8 men and 10 women and you need to form a committee of 5 men and 6 women. Compute in how many ways can the committee be formed. [3 Marks]

Question 6:

- a) Given the following arithmetic sequence 2, 7, 12, 17... Calculate the:

i. 10^{th} term [2 Marks]

ii. sum of first 12 terms of the arithmetic sequence [3 Marks]

- b) Find the determinant of the 3×3 matrix below. [5 Marks]

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

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