



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
CAMPUS: ROYSAMBU
EXAM DATE: XXXXX XXXXX/JULY,2022
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. 101.11011_2 to decimal equivalent

ii. $D5A8_{16}$ to octal equivalent

b) Determine the power set of $A = \{a, b, c, d\}$. **[2 Marks]**

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

Find:

i. $3A - 4B$ **[2 Marks]**

ii. BA **[2 Marks]**

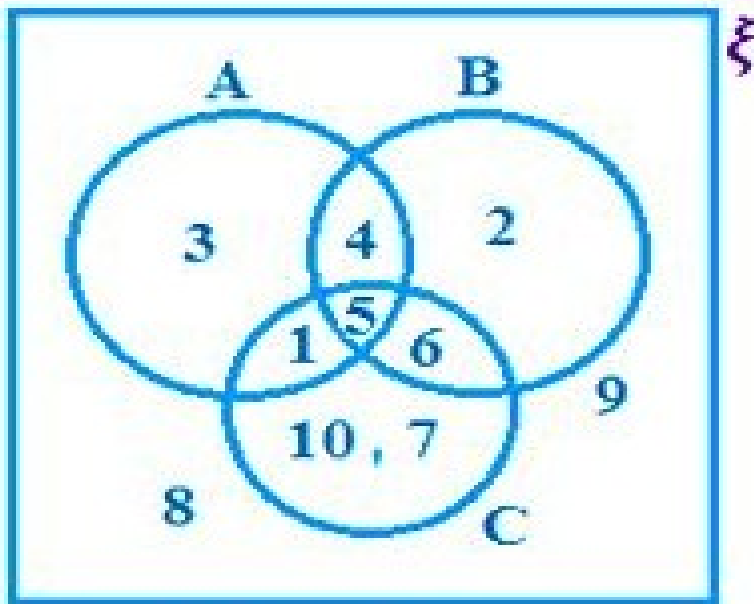
SECTION B
(Answer any THREE (3) questions in this section)

Question 2:

a) Calculate the cartesian product of the following sets: **[2 Marks]**

$A = \{3, 5, 7\}$ $B = \{b, c, d\}$

b) Given the following adjoining Venn diagram;



Find the following sets:

- | | |
|-------------------------|------------------|
| i. $A - B$ | [2 Marks] |
| ii. $A \cup B$ | [2 Marks] |
| iii. $(A \cap B)'$ | [2Marks] |
| iv. $(A \cup B) \cap C$ | [2Marks] |

Question 3:

In a survey of university students, 64 had taken mathematics course, 94 had taken chemistry course, 58 had taken physics course, 28 had taken mathematics and physics, 26 had taken mathematics and chemistry, 22 had taken chemistry and physics course, and 14 had taken all the three courses.

Required

- | | |
|---|------------------|
| a) Fill in the correct number of students in each of the regions on the Venn diagram. | [4 Marks] |
| b) Compute the number of students who: | |
| i. Took at least one of the three courses. | [2 Marks] |
| ii. Took only one course. | [2 Marks] |
| iii. Do not take any of the above course. | [2 Marks] |

Question 4:

a) 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. 4 appears on at least one die **[2 Marks]**

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

i. 7P_4

ii. ${}^{10}C_6$

Question 5:

a) Construct a truth table for $(P \rightarrow Q) \wedge (Q \rightarrow R)$ **[5 Marks]**

b) Prove that the statement $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a tautology. **[5**

Marks]

Question 6:

a) Compute the determinant of matrix B: **[5 Marks]**

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

b) Find x, y, z, t , where $3 \begin{bmatrix} x & y \\ z & t \end{bmatrix} = \begin{bmatrix} x & 6 \\ -1 & 2t \end{bmatrix} + \begin{bmatrix} 4 & x+y \\ z+t & 3 \end{bmatrix}$

[5 Marks]

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EXAMINATIONS PAPER**



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