**FACULTY OF APPLIED AND HEALTH SCIENCES**

DEPARTMENT OF MATHEMATICS AND PHYSICS

DIPLOMA IN INFORMATION COMMUNICATION AND TECHNOLOGY

AMA 2110 COMPUTATIONAL MATHEMATICS

END OF SEMESTER EXAMINATION

SERIES DECEMBER 2016

TIME 2 HOURS

INSTRUCTIONS TO CANDIDATES

This paper consists of five questions

Answer question one compulsory and any other two questions
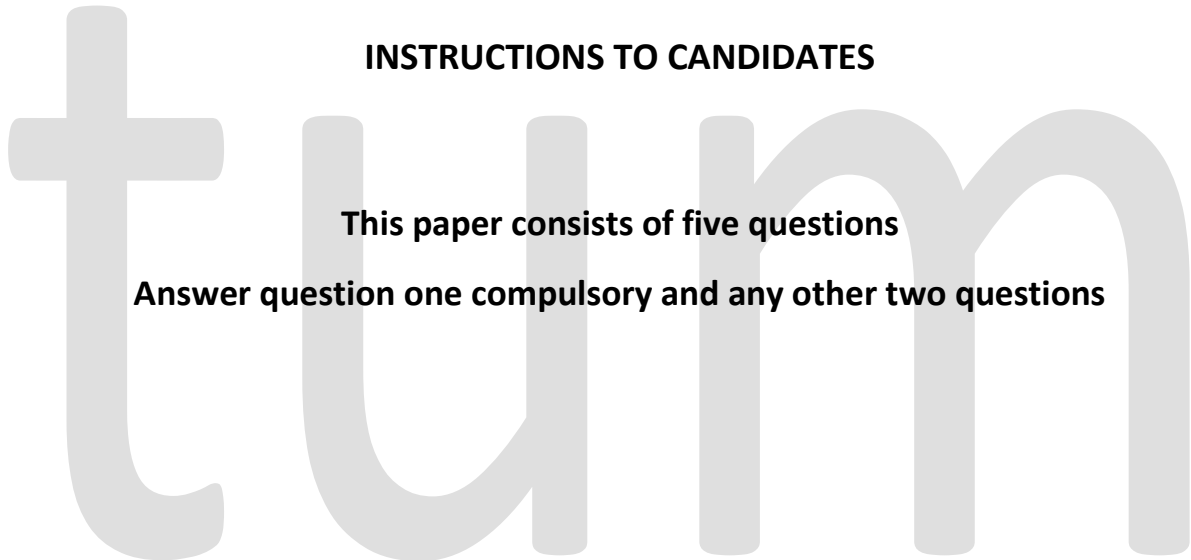
Q1. a) Given f(x) = 8x^2+ 4 find

i) f(5) (2marks)

ii) f(-3) (2marks)

iii) f^{-1}(x) (3marks)

iv) f^{-1}(8) (3marks)

b) Given A= $\begin{pmatrix} 3 & 7 \\ 5 & 2 \end{pmatrix}$ and B= $\begin{pmatrix} 3 & 2 \\ 5 & 1 \end{pmatrix}$

Find (i) 3A-2B (3marks)

(ii)A^{-1} (3marks)

(iii)BA^{-1} (3marks)

c) Convert to binary given

i) 175$_{10}$ (3marks)

ii) 251$_8$ (3marks)

e) Write down all the subsets of A= {2,3,4}. (5marks)

Q2.

a) Given A= {a,e,I,o,u} and B= {a,e,I,u,1,2,3} find

i) A∩B (2marks)

ii) A∪B (3marks)

iii) A-B (3marks)

b) Use Venn diagrams to illustrate

i) A∩B (2marks)

ii)A∪B (2marks)

c) Find $\begin{vmatrix} 2 & 3 & 1 \\ 2 & 0 & 5 \\ 3 & 1 & 1 \end{vmatrix}$ (4marks)

d) Find the standard deviation given

(4marks)

x	f
3	1
6	1
7	1
8	1
11	1
13	1

Q3.

a) Write down the

    i) Commutative   **(2marks)**

    ii) Distributive   **(2marks)**

    iii) Associative   **(2marks)**

Laws of Sets in Boolean algebra

b) Find the)

    Product of A= $\begin{pmatrix} 3 & 7 \\ 2 & 4 \end{pmatrix}$ and B= $\begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$ **(2marks)**

ii) $(AB)^{-1}$ **(2marks)**

c) Multiply i) $1111_2 \times 101_2$ **(2marks)**

       ii) $11101 \times 111_2$ **(2marks)**

d) Convert i) Into base two given 75 in decimal.   **(3marks)**

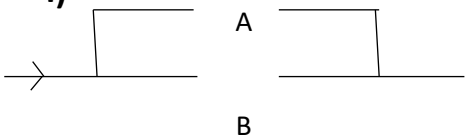   **ii) 0.321_8 to base ten**   **(3marks)**

q4.

a) Prove de Morgan's laws of Boolean algebra

b) Write down the truth tables for

i)   A   **(3marks)**

             B

ii)   A — B   **(3marks)**

c) Given A= {a, b, c, d} and B= {1, 2, b, c}

find

i) A∪B   **(2marks)**

ii) A∩B   **(1mark)**

iii) A-B   **(1mark)**

iv) AΔB   **(2marks)**

d) Convert to decimal

i) 1001.011_2   **(2marks)**

ii) 1014_8   **(2marks)**
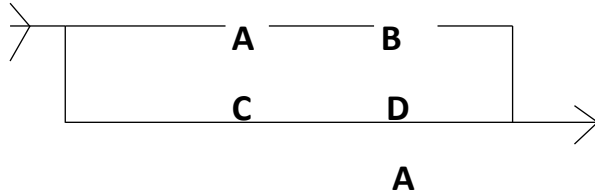
q5.

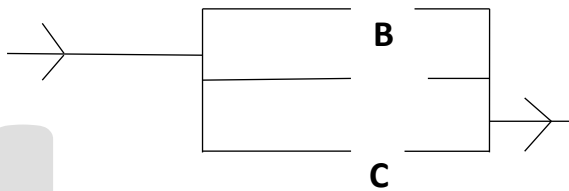**a) Find the Boolean functions for the following circuits**
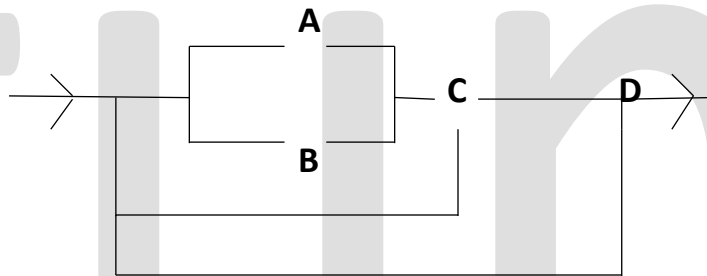
i) (4marks)

ii) (4marks)

iii) (4marks)

b) Use Cramer's rule to solve (4marks)

$x - 2y - 3z = 0$

$3x + 5y + 2z = 0$

$2x + 3y - z = 2$ (8marks)