FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MATHEMATICS AND PHYSICS

DIPLOMA IN INFORMATION COMMUNICATION AND TECHNOLOGY

AMA 2110 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 A= {a, b, c, d} and B= {a, c, d, e, f}

Find: **i) A U B** **(2marks)**

ii) A ∩ B **(2marks)**

iii) A ─ B **(2marks)**

iv) A ∆ B **(2marks)**

b) Given f(x) =$3x^2$+5 and g(x) =5x+8

Find: **i) f(5)** **(1mark)**

ii) f(-7) **(1mark)**

iii) fg(7) **(3marks)**

iv) g^{-1}(x) **(2marks)**

v) f^{-1}(5) **(1mark)**

c) Define: **i) A function** **(1mark)**

ii) Codomain **(1mark)**

iii) Domain **(1mark)**

d) find A^{-1} given A = $\begin{pmatrix} 7 & 5 \\ 3 & 1 \end{pmatrix}$ **(2marks)**

e) Convert 247_{ten} into binary **(2marks)**

f) Add **11001_2**

+ 1111_2 **(2marks)**

g) Multiply **110011_2 x 111** **(3marks)**

Q2. (a) Given A = $\begin{pmatrix} 3 & 4 & 1 \\ 2 & 1 & 5 \\ 3 & 4 & 5 \end{pmatrix}$ **and B=** $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 0 & 2 \\ 3 & 7 & 2 \end{pmatrix}$

Find: **(i) A + B** **(3marks)**

(ii) 2A – 3B **(3marks)**

(b) Given A = (1,2,3,4,5) and B = (1,3,5,7,8)

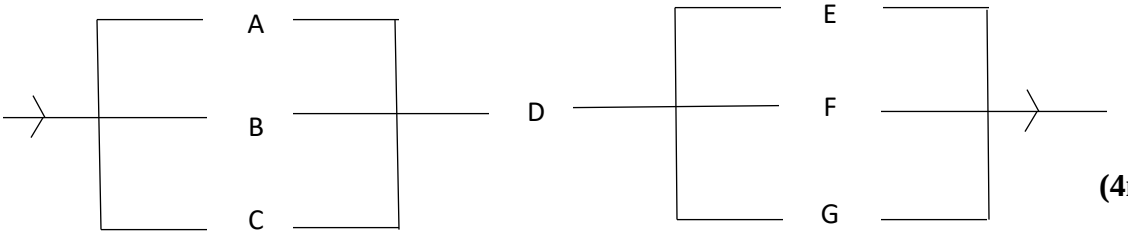
Find (i) A ∪ B **(2marks)**

(ii) A ∩ B **(2marks)**

(iii) A – B **(2marks)**

(iv)Write down all the subjects of B where each element is greater than 3 **(4marks)**

(c) Write down the Boolean function for the circuit



(4marks)

Q3

a) Write down de Morgan's Laws of sets in Boolean Algebra **(4marks)**

b) Convert to base two given

i) 79_{10} **(3marks)**

ii) 65_{8} **(3marks)**

c) Evaluate

i) 6 X 4 – 2(4+7) **(2marks)**

ii) $\frac{x}{2} - \frac{x+4}{3} = 2$ **(3marks)**

(d) Find the determinant, using Cramer's rule given

A=

$$\begin{pmatrix} 1 & 2 & -3 \\ 3 & 5 & 2 \\ 2 & 3 & -1 \end{pmatrix}$$

(4marks)

Q4. (a) Solve by quadratic formula

$3x^2 + 8x + 4 = 0$ **(4marks)**

(b) Given 55,61,57,60,57,60,58,61,59

Determine the median and quartile value of the set **(6marks)**

(c) Find the mean and medial class for the data **(6marks)**

Class	**0-9**	**10-19**	**20-29**	**30-39**	**40-49**	**50-59**
Frequency	**1**	**3**	**8**	**12**	**9**	**2**

Q5. (a) Write down the truth table for the proposition A and 7A **(5marks)**

(b) Complete the table below **(5marks)**

A	B	A and B
T	T	
F	T	
T	F	
F	F	

(c) Prove using venn diagrams

$$A \cup B = \bar{A} \cap \bar{B}$$ **(5marks)**

(d) Write down the condition for the flow of current through