FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MATHEMATICS AND PHYSICS

CERTIFICATE IN INFORMATION COMMUNICATION AND MAINTENANCE

AMA 1152 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

Q.1 {a) Convert into binary

(i) 75_{10} (3marks)

(ii) 71_8 (3marks)

(b)

(i) Add 1101_2 to 1011_2 (2marks)

(ii) Multiply 1011_2 by 111_2 (2marks)

(c) Rationalize

(i) $\dfrac{1}{1+3\sqrt{2}}$ (2marks)

ii) $\dfrac{\sqrt{2}}{1-2\sqrt{3}}$ (2marks)

d) Solve by quadratic formula $3x^2+4x+1=0$ by

Quadratic formula   (3marks)

e)Find

i) The inverse matrix of A = $\begin{pmatrix} 7 & 1 \\ 5 & 2 \end{pmatrix}$ (2marks)

ii) The sum of $3A + A^{-1}$ (2marks)

f) Convert from radian measure to degrees

i) $5/6\ \pi^c$ (2marks)

ii) $2/3\pi^c$ (2marks)

ii) 2.756^c (2marks)

g) Write down $5AF.C_{16}$ in base ten.   (3marks)

Q2.

a) Solve $3^x=4$ (4marks)

b) Solve by elimination

$$3x+y=7$$

$$2x+3y=5$$ (3marks)

c) A triangle ABC has sides a=6cm, b=4cm and c=5cm. Find angle A (4marks)

d) Find the mean, mode and Standard deviation of the following data

$$3,7,5,3,3,5,4.$$ (4marks)

Q3

a) Solve by matrix method given $3x+2y=5$

$$x+5y=6$$ (3marks)

b) Given $1/2, 1/4, 18, ...$

Find i) a_7 (2marks)

ii) S_{10} (2marks)

iii) S_∞ (2marks)

c) Given 5 red balls and 7 blue balls find using a tree diagram, the probability of picking a red or a blue ball with replacement. (3marks)

d) Convert 214.31_8 to base ten (3marks)

Q4.

a) Given sinA =3/5, find the other five trigonometric ratios   (3marks)

b) Convert into radian measure

   i) 120°   (2marks)

   ii) 270°   (2marks)

   iii) 150°   (2marks)

c) Solve by factorisation

   i) $x^2 + 10x = -21$ (1mark)

   ii) $2x^2 + 10x + 8 = 0$ (2marks)

d) Show that the sum of the first n terms of an arithmetic progression is given by $S_n=n/2\{2a +(n-1)d\}$ hence use to find S_{10} given 3+5+7+.......   (3marks)

Q5.

 a) Solve by matrix method given 3x+y =2

                                    2x+3y =5   (3marks)

b) Convert into base twelve given 384_{10} (4marks)

c) Expand $(3x-y)^5$ (4marks)

d) A single card is picked from a pack of 52 playing cards. If A is the event of picking an ace and B is the event of picking a seven, find p(A or B).

                                                                    (4marks)