TECHNICAL UNIVERSITY OF MOMBASA
FACULTY OF HEALTH AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS AND PHYISICS
UNIVERSITY EXAMINATION FOR:

UPGRADING MATHEMATICS

AMA 1001: ALGEBRA

END OF SEMESTER EXAMINATION

SERIES: MAY SERIES

TIME: 2 HOURS

DATE: MAY 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of 5 questions. Attempt question one compulsory and any other two questions

Do not write on the question paper.

Question ONE (30 MARKS)

a) Determine the value of

$$\frac{7}{6} of \left(3\,1/2 - 2\,1/4\right) + 5\,1/8 \div 3/16 - \frac{1}{2}$$ (4 mks)

b) A block of alloy consists of 70% nickel and 30% copper. if it contains 88.2g of nickel, determine the total mass of dyes used. (2 mks)

c) When mixing a quantity of paints, dye of four different colors are used in the ratio of 7:3 :19 : 5.if the mass of the 1st dye used is 3½g. Determine the total mass of the dyes used. (2mks)

d) Convert the following binary number into decimal numbers

(i). 10111.011_2 (3mks)

(ii) 11010101.10111_2 (3mks)

e) Add the following binary numbers $110011_2 + 11101_2$

Convert your answer to decimal number (5 mks)

f) Convert decimal numbers into binary number

i. 31.28125 (4 mks)

ii. 45.21875 (4 mks)

g) Solve for x

$$\frac{x}{4} - \frac{x+6}{5} = \frac{x+3}{2}$$ (3 mks)

Question TWO (20 MARKS)

a) Evaluate

i. $$\frac{4^{1.5} \times \left(8^{\frac{1}{3}}\right)^2}{2^2 \times 32^{-\frac{2}{5}}}$$ (3mks)

ii. $$\frac{8^{-2} \times 5^2 \times 3^{-4}}{25^2 \times 2^4 \times 9^{-2}}$$ (3mks)

b) Solve the equation

i. $\text{Log}_4 x = -2\ ¼$ (2mks)

ii. $2^x = 5.5$ (2mks)

c) Solve following indical equations for x each giving your answer correct to 4 significant figures.

i. $5^{x-1} = 3^{2x-1}$ (3mks)

ii. $X^{-0.25} = 0.792$ (2mks)

iii. $X^{1.5} = 14.91$ (2mks)

iv. $3^{2t-1} = 7^{t+1}$ (3mks)

Question THREE (20 MARKS)

a) Solve the following equations

i. $\frac{3}{t-2} = \frac{4}{3t+4}$ (2mks)

ii. $\frac{1}{3}(3m-6) - \frac{1}{4}(5m+4) + \frac{1}{5}(2m-9) = -3$ (3mks)

iii. $\frac{x+3}{4} = \frac{x-3}{5} + 2$ (3mks)

b) Solve the following simultaneous equations

i. By elimination

$$\frac{x}{2} + \frac{y}{3} = 4$$

$$\frac{x}{6} - \frac{y}{9} = 0$$

(3 mks)

ii. By substitution

$$\frac{a}{2} - 7 = -2b$$

$$12 = 5a + \frac{2}{3}b$$

(3 mks)

c) Solve following quadratic equation

i. By factorization

$15x^2 + 2x - 8 = 0$ (3mks)

ii. By use of quadratic formulae

$2x^2 - 7x = 4 = 0$ (3 mks)

Question FOUR (20 MARKS)

a) Find the sum of all the numbers between 0 and 207 which are exactly divisible by 3

(4 marks)

b) Which term of the series 2187, 729, 243… Is $\frac{1}{9}$ (4 mks)

c) Evaluate

i. $^9C_6$ (2mks)

ii. $^8C_5$ (2mks)

d) Evaluate

i. $^8P_5$ (2mks)

ii. $^{10}P_3$ (2mks)

e) Expand $(2a + 3b)^5$ using Pascal's triangle (4 mks)

Question FIVE (20 MARKS)

a) Solve the given simultaneous equation graphically

$$x + y = 2$$
$$3y - 2x = 1$$

(8 mks)

b) Solve the quadratic equation $y = 4x^2 + 4x - 15 = 0$ graphically given that the solution lies in the range x = -3 to x = 2

Determine also the coordinates and nature of turning point of the curve. (9 mks)

c) Without plotting graph give the gradient and y axis intercept of the given functions.(3mks)

$y = 5 - 4x$

$y - 6x = 3$

$3y - 2x = 1$