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) Simplify

i. $\frac{1}{4}\times\frac{1}{3}-\frac{1}{3}\div\frac{3}{5}+\frac{2}{5}$ (2 mks)

ii. $\frac{1}{(4/7\times 2\,1/4)}\div\left(\frac{1}{3}+\frac{1}{5}\right)+2\,2/24$ (2mks)

b) Determine how much of copper and how much zinc is needed to make a 99kg brass ingot, if they have to be in the proportion copper: zinc 8:3 respectively (2 mks)

c) If 3 people can complete a task in 4 hours, how long will it take 5 people to complete the same task assuming rate of work remains the same. (2 mks)

d) Convert the following binary numbers into decimal number

i. 10111.00111_2 (3 mks)

ii. 101101.11001_2 (3 mks)

e) Convert decimal numbers into binary numbers

i. 58.3125_{10} (4 mks)

ii. 51.34375_{10} (4 mks)

f) Solve for x in the equation

i. $\text{Log}_8 x = -4/3$ (2mks)

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

g) Evaluate

$$\frac{(2^4)^2 \times 3^{-2} \times 4^4}{2^3 \times 16^{\frac{1}{2}}}$$ (2mks)

h) Solve

$8+ 4 (x-1) – 5 (x-3) =2(5-2x)$ (2mks)

Question TWO (20 MARKS)

a. Solve for the unknown

(i). $\frac{1}{3a-2} + \frac{1}{5a+3} = 0$ (3mkS)

(ii). $\frac{3\sqrt{t}}{1-\sqrt{t}} = -6$ (3mks)

b) Solve the following simultaneous equation elimination

$1.5x – 2.2y = -18$

$2.4x + 0.6y = 33$ (5 mks)

c) Solve following quadratic equation

i. By completing square

$2x^2 + 9x + 8 = 0$ (5 mks)

ii. By factorization

$3x^2 - 11x - 4 = 0$ (4mks)

Question THREE (20 MARKS)

a. Evaluate using laws of indices

(i). $\dfrac{\left(3^2\right)^{\frac{3}{2}} \times \left(8^{\frac{1}{3}}\right)^2}{\left(3^2\right)^{\frac{3}{2}} \times \left(4^3\right)^{\frac{1}{2}} \times 9^{-\frac{1}{2}}}$ (2mks)

(ii). $\dfrac{8^{-2} \times 5^2 \times 3^{-4}}{25^2 \times 2^4 \times 9^{-\frac{1}{2}}}$ (2mks)

b. Solve the following indical equations

i. $4^{2x-1} = 5^{x+2}$ (3 mks)

ii. $2^{x+1} = 3^{x+2}$ (3mks)

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

c. Evaluate

i. $^{10}C_6$ (2mks)

ii. $^{7}C_2$ (2mks)

d. Evaluate

i. $^{9}P_6$ (2mks)

ii. $^{8}P_3$ (2mks)

Question FOUR (20 MARKS)

a) Expand using Pascal's triangle

$(2p - 3q)^5$ (5 mks

b) The 6^{th} term of an AP is 17 and the 13^{th} term is 38.determine the 19^{th} term (3mks)

c) Find the 15th term of an AP if the 1^{st} term is 2.5 and the 16^{th} term is 16 (2mks)

d) The 1^{st}, 12^{th}, and the last term of an AP is 4, 31, and 376.5 respectively. Determine the number of terms in the series, the sum of all terms and the 80^{th} term
(5mks)

e) Find the sum to infinity of the series 3, 1, 1/3…….. (2 mkS)

f) The 1^{st} term of a GP is 12 and the 5^{th} term is 55.determine the 8^{th} and 11^{th} term. (3mks

Question FIVE (20 MARKS)

a) solve the following simultaneous equation graphically

$3x - 2y = 0$

$4x + y + 11 = 0$ (8mks)

b) Solve the following quadratic equation $y = -5x^2 + 9x + 7.2$ graphically given that the solution lies in the range $x = -1$ to $x = 3$.

Determine also the co-ordinates of turning point and nature of turning points. (9 mks)

c) Determine the gradient and y axis intercept of each of the following functions without plotting

i. $Y = 2x + 5$

ii. $Y = 4x - 5$

iii. $Y = 3 - 4x$ (3 mks)