



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES
DEPARTMENT OF MATHEMATICS & PHYSICS
UNIVERSITY EXAMINATION FOR:
UPGRADING MATHEMATICS
AMA 1101: ALGEBRA
SPECIAL/ SUPPLIMENTARY EXAMINATIONS
SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Pick Date Sep 2018

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- a). Express in logarithmic form $x^m = b$ (2 marks)
- b). Express $\frac{\sqrt{5} - 2\sqrt{3}}{\sqrt{3} + \sqrt{5}}$ in the form $a + b\sqrt{c}$ where a, b, and c are real numbers. (4 marks)
- c). Express $13\frac{3}{8}$ in binary form (4 marks)
- d). Simplify $\sqrt{50} + \sqrt{2} - 2\sqrt{18} + \sqrt{8}$ (5 marks).
- e). Evaluate $\frac{\frac{9}{4} + \frac{7}{3}}{4} \times \frac{4}{\frac{13}{4} - \frac{7}{3}}$ (4 marks)
- f). Make x the subject $\frac{5}{2x+5} = \frac{3}{x+4}$ (3 marks).
- g). Find the common ratio and sum of the series $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} \dots \dots$ (5 marks)

h). Determine how many different arrangements can be made using 5 letters of the word POWDERY.

(3 marks).

Question TWO

a).Expand the function $(1 - 2x)^5$ upto the 3rd term, hence find the value of $(0.98)^5$ correct to 3 decimal places. (8 marks).

b).Solve for x using completing the square method $2x^2 + 9x - 5 = 0$ (6 marks)

c). Find x , $\log(4 - 2x) = \log(x + 3) + 2 \log 2$ (3marks)

d). Find ${}^9C_3 + 8P_3$ (3marks)

Question THREE

a) .Determine the type of the series $8+5+2\dots$.And hence find the sum of the first 15 terms. (6 marks).

b).Draw the graph of y against x and determine the law connecting the variables

x	0.2	0.4	0.6	0.8
y	0.4	3.2	10.8	25.6

From the graph determine the value of y if $x=0.5$ and x if $y=15$. (7marks)

c).convert into a fraction $11.1\dot{4}\dot{5}$ (5marks)

d).Simplify $ab^2+6a^2b+10a^2b-6ab^2$ (2marks)

Question FOUR

a).Express as a simplified single fraction $\frac{x+3}{4} + \frac{2-x}{3} - \frac{1}{2}$ (4marks)

b).Express $\log_c \frac{\sqrt{b^2 c^n}}{3\sqrt{d}}$ in single logarithms (4marks).

c).The square of y varies directly as the cube of x, When $x=0.4$ and $y=3.2$, find the equation relating x and y. (4marks)

d).ALI and Juma shares some money such that ALI gets 60% of the total. If Ali's amount was ksh.2000 more than what Juma got. Determine the total amount of money shared. (5marks)

e). Make x the subject $y = \sqrt{\frac{x-2}{y-x}}$ and determine x if $y=2$ (3 marks)

Question FIVE

a). Solve the pair of simultaneous equations

$$\begin{aligned} 6x + 7y &= 5 \\ 5x + 3y &= 7 \end{aligned} \quad (4\text{marks})$$

b). Factorize completely $(2y^2 - y - 10) \div (y + 2)$ (4marks)

c). Show that $ay^2 + by + c = 0$ can be expressed in the form $y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (9 marks)

d). Find m ; $\left(\frac{1}{27}\right)^m \times 81^{-m} = (243)^{\frac{3}{2}}$ (3marks)