



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A CONSTITUENT COLLEGE OF JKUAT)

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSICS

DIPLOMA IN MEDICAL LAB SCIENCE

DIPLOMA IN DAC

DIPLOMA IN DNS

DIPLOMA IN DNH

DIPLOMA IN DIMBT

AMA 2101: MATHEMATICS FOR SCIENCE

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: OCTOBER 2011

TIME: 2 HOURS

INSTRUCTIONS:

You should have the following for this examination

- *Answer booklet*

This paper consists of **FIVE** questions

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

This paper consists of **FOUR PRINTED** pages

QUESTION ONE (Compulsory)

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

(b) Rationalize $\frac{1}{1+\sqrt[2]{3}}$ **(3 marks)**

(c) Simplify $\frac{32^{3/4} \times 16^0 \times 8^{5/4}}{128^{3/2}}$ **(3 marks)**

(d) Solve $\log_4 x - \log_4 \log_4 (x-2) = 0.5$ **(3 marks)**

(e) Solve $\frac{x-3}{5} - \frac{x+1}{8} = 2$ **(3 marks)**

(f) Solve by Quadratic formula

$$2x^2 - 5x - 2 = 0$$

(3 marks)

(g) Write down the first four terms of the expansion of $(1+x)^{10}$ **(10 marks)**

(h) (i) In how many ways can you select a 3 – member committee from 5 clients members?

$${}^{m-1}C_2 = \frac{(m-1)(m-2)}{2}$$

(ii) Show that **(3 marks)**

(iii) In how many ways can you arrange the letters in the word MATH? **(4 marks)**

ANSWER ANY TWO QUESTIONS

QUESTION TWO

- (a) Show that the sum of the first terms of an arithmetic Progression is given by

$$S_n = \frac{1}{2} n[2a+(n-1)d]$$

(4 marks)

- (b) Expand $(2x - 3y)^4$ (4 marks)

- (c) Prove that $1 + \tan^2 x = \sec^2 x$ (4 marks)

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

- (e) Solve by completing the square method $3x^2 + 7x + 4 = 0$ (4 marks)

- (f) Given $x = 0.181\ 818\dots$
Express it as a fraction. (4 marks)

QUESTION THREE

- (a) (i) Write down the binomial expansion of $\frac{1}{1-x}$ up to x^3 (4 marks)

- (ii) Solve $2^x = 7.91$ (3 marks)

- (b) One square Petri dish field has a side that is 12 cm longer than the side of a smaller square field. The total area of the two fields is 1224 cm². Find the side of each field. (3 marks)

- (c) In a right angled triangle, AC=53 cm and Angle B is 65.1°. Find a, c and angle A (3 marks)

- (d) Find x if the following is an arithmetic progression.

$$x+3, 2x+4, 4x, \dots \quad (3 \text{ marks})$$

(e) Solve $\log_2(x^2 - 9) = 3\log_2 2 + 1$ (4 marks)

QUESTION FOUR

(a) State the Remainder Theorem and use it to find the remainder when

$$f(x) = x^3 + x^2 - 10x + 8$$

is divided by $(x-5)$ (3 marks)

(b) Find the factors of $f(x) = x^3 + x^2 - 10x + 8$ (6 marks)

(c) Evaluate $\frac{16^{1/3} x 4^{1/3}}{8}$ (4 marks)

(d) Solve by quadratic formula given $2x^2 + 5x - 2 = 0$ (4 marks)

QUESTION FIVE

(a) Simplify $(2 + \sqrt{3})(4 - \sqrt{12})$ (3 marks)

(b) Express 30° in radians (2 marks)

(c) Two dice are rolled and the total score is recorded. What is the probability of scoring an even sum? (4 marks)

(d) Plot the graph of $y = x^2 - 2x - 2$ for $-4 \leq x \leq 4$ and use it to solve

$$x^2 - 2x - 2 = 0$$

(4 marks)

(e) The maximum temperature in a town is recorded every day as follows.

Temperature °F	$40 \leq F < 50$	$50 \leq F < 60$	$60 \leq F < 65$	$65 \leq F < 70$	$70 \leq F < 80$
Frequency					