



TECHICAL UNIVERSITY OF MOMBASA
**Faculty of Applied & Health
Sciences**

DEPARTMENT OF MATHEMATICS & PHYSICS

DIPLOMA IN MEDICAL LABORATORY SCIENCES (DMLS 12S)

DIPLOMA IN PHARMACEUTICAL TECHNOLOGY (DPT 12S)

DIPLOMA IN ANALYTICAL CHEMISTRY (DAC 12S)

AMA 2101: MATHEMATICS FOR SCIENCE

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: FEBRUARY 2013

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consist of **FIVE** questions in **TWO** sections **A & B**
 Answer question **ONE (COMPULSORY)** and any other **TWO** questions
 Maximum marks for each part of a question are as shown
 This paper consists of **THREE** printed pages
SECTION A (COMPULSORY)

Question One (20 marks)

$$10x + 11x - 6 = 0$$

a) Solve by factorization given **(2 marks)**

$$\frac{x}{2} + \frac{x-1}{3} = 6$$

b) Solve **(3 marks)**

c) Find how many terms of an arithmetic progression are needed to give a sum of -720 . Given the A.P
 $15, 7, -1, \dots$ **(3 marks)**

$$y = x^3 \qquad x = 2$$

d) Find the equation of the tangent and normal to the curve at the point where **(4 marks)**

$$\int_1^5 \frac{dx}{x^2}$$

e) Evaluate **(2 marks)**

$$\cot^2 A + 1 = \operatorname{cosec}^2 A$$

f) Show that **(3 marks)**

g) Find the standard deviation of the following height in cm: 125, 130, 135, 140, 135, 140, 145, 140, 150, 155, 150, 140, 130, 135, 145, 145 **(4 marks)**

SECTION B (Answer any TWO questions from this section)

Question Two (20 marks)

$$x = \sqrt{\frac{s-a}{s-b}}$$

a) Make s the subject of **(4 marks)**

$$y^3 + x^2 y^5 - x^4 = 27 \qquad (0,3)$$

b) Differentiate and find the gradient of the point **(5 marks)**

$$7^x = 3.75$$

c) Solve **(4 marks)**

d) Use Cramer's rule to solve:

$$x - 2y - 3z = 0$$

$$3x + 5y + 2z = 0$$

$$2x + 3y - z = 0$$

(7 marks)

Question Three (20 marks)

Given $\log_a 2 = 0.301$ and $\log_a 3 = 0.477$ find: (i) $\log_a \frac{2}{3}$ (3 marks)

(ii) $\log_a 81$ (3 marks)

b) Evaluate $\int_a^3 x \ln x dx$ (3 marks)

c) Use matrix method to solve $3x - 5y = 3$ and $4x + 7y = 1$ (5 marks)

d) Find the sum to infinity given $1 + \frac{1}{2} + \frac{1}{4} + \dots$ (4 marks)

Question Four (20 marks)

$$0.74V - 3.81 \frac{dv}{dt} = 0$$

a) Solve (5 marks)

b) A bag contains 7 red and 5 black balls. Two balls are picked in succession without replacement. Find the probability that a black ball and a red ball has been picked in any order. (4 marks)

c) Rationalize $\frac{1}{3 - 2\sqrt{5}}$ (3 marks)

d) Solve $\log 2x^3 - \log x = \log 16 - \log x$ p

e) Find $\int e^x x dx$ (4 marks)

Question Five (20 marks)

a) Differentiate $y = x^5$ from first principles.

b) Given length cm number of plants

Given Length cm	Number of Plants
8 – 10	4
11 – 13	7
14 – 16	11

17 – 19	15
20 – 22	8
23 – 25	5

Estimate: (i) The mean **(3 marks)**
(ii) The variance **(3 marks)**
(iii) The standard deviation **(3 marks)**

c) Solve by quadratic formula. **(4 marks)**
 $3x^2 + 4x - 5 = 0$