



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

PRECERTIFICATE IN INFORMATION TECHNOLOGY (PRE CIT 12J)

AMA 1000: FUNDAMENTALS OF MATHEMATICS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: MAY/JUNE 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consist of **FIVE** questions

Answer any **THREE** questions. Question **ONE** is Compulsory

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

SECTION A (Compulsory - 20 marks)

Question One (20 Marks)

a) Solve the following equations

$$2x - 5y = 6 \text{ and } 4x + 3y = 6$$

i) (3 marks)

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

ii) (4 marks)

b) Rationalize and simplify (3 marks)

$$\frac{\sqrt{7}}{3 - \sqrt{7}}$$

(3 marks)

c) What is the equivalent value of the following in decimal

i) $CI3A_{16}$ (2 marks)

ii) 56341_8 (2 marks)

d) Determine the exact value of the following

i) $\sin 45^\circ$ (2 marks)

ii) $\tan 60^\circ$ (2 marks)

e) Evaluate

$$\log_x 729 = 3$$

(2 marks)

SECTION B (Answer any TWO questions – 40 Marks)

Question Two (20 marks)

$$y : \text{given } x = \log b \text{ and } y = 2 \log a$$

a) Express in form of x and y: given

i) $\log ab + \log a/b - \log 2a - \log 0.01 b$ (3 marks)

ii) $\log 10a^2 - \log_a 10 + \log b^2$ (4 marks)

b) Solve for x:

$$16^{x+3} = 2 \times 8^{2x}$$

i) (3 marks)

ii) $\log 512 = (3x + 9) \log 2$ (5 marks)

iii) $3 \log_2 x - \log_x 2 = 2$ (5 marks)

Question Three (20 marks)

$$(\sqrt{3} + \sqrt{7})(\sqrt[3]{3} + \sqrt{5})$$

a) Explain and simplify (3 marks)

$$3x^2 - 7x = 0$$

b) Solve for x with completing square method: (5 marks)

- c) A couple walked into a prestigious hotel in a town, the Man ordered 3 plates of chips and 2 pieces of fish while the Woman took 1 plate of chips and 4 pieces of fish, if they paid 224 and 208 respectively, what is the cost of 1 plate of chips and a piece of fish. (6 marks)
- d) The sum of the area of a square and its perimeter is equal to 12, determine the size of each side of the square (6 marks)

Question Four (20 marks)

- a) What is the exact value of:
- i) $\cos 45^\circ$ (3 marks)
 - ii) $\sin 145^\circ$ (3 marks)
- b) A right angle triangle has the longest side 5cm and one other side 3cm determine the Cosecant of the angle between the two give sides. (4 marks)
- c) Determine the angle at the centre that makes as an arc length of 29cm if the radius line is 7cm? (3 marks)
- d) Complete the triangle whose, angle $ABC = 57^\circ$ and angle $ACB = 39^\circ$ with the length of line $a = 7\text{cm}$. (7 marks)

Question Five (20 marks)

- a) Determine the position and weighted value of the digit 7 in the given numbers;
- i) 7301 (2 marks)
 - ii) 3743_8 (3 marks)
- b) Expand: $(x - 2y)^4$ (4 marks)
- c) What is the value of the 13th term of the series, 1, 3, 9, 27,.... (4 marks)
- d) What is the total between the numbers 3 and 37 not including the even numbers? (4 marks)