



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

CERTIFICATE IN MAINTENANCE & NETWORK TECHNOLOGY
CERTIFICATE IN INFORMATION TECHNOLOGY – CMNT 2K 11M

AMA 1113: FUNDAMENTAL OF MATHEMATICS

END OF SEMESTER EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

This paper consists **TWO** sections **A** & **B**. Attempt question **ONE (COMPULSORY)** from section **A** and any other **TWO** from Section **B**

This paper consists of **FOUR** printed pages

SECTION A (COMPULSORY) – Answer all questions in this section

Question 1 (Compulsory)

a) Solve the following

i)
$$\frac{2}{x+1} - \frac{1}{x-2} = -1$$
 (4 marks)

ii)
$$\begin{aligned} -3x + y &= 1 \\ 6x - 3y &= -4 \end{aligned}$$
 (4 marks)

b) Rationalize and simplify the expressions

i)
$$\frac{1+2}{1-\sqrt{2}}$$
 (4 marks)

ii)
$$\frac{1-\sqrt{3}}{2+\sqrt{8}}$$
 (3 marks)

c) Without using mathematical calculator, determine the exact value of:

i) $\cos 75^\circ$ (4 marks)

ii) $\tan 30^\circ$ (3 marks)

d) An angle at the centre of a circle subtends an arc of 31cm. determine the radius of the circle if the angle subtending the arc is 0.7 radians (3 marks)

e) Determine the inverse matrix of $\begin{pmatrix} 2 & 5 \\ 7 & -1 \end{pmatrix}$ (2 marks)

f) A student at a certain college has 60% chance of passing an examination at the first attempt. Each time a student fails and repeats the examination; his chances of passing are increased by 15%. Calculate the probability that a student passes the examination at the second or at the third attempt (3 marks)

SECTION B (Answer any TWO questions in this section each is 20 marks)

Question 2

a) Evaluate the following

(i) $110111_2 \div 1000_2$ (3 marks)

(ii) $110101_2 \times 10111_2$ (3 marks)

(iii) $111011_2 + 10110_2 + 11011_2$ (2 marks)

b) Convert the following numbers as required:

i) 297 to Base 16 number (3 marks)

ii) $9E7_{16}$ to Binary number (2 marks)

iii) 765_8 to Hex-decimal number (3 marks)

c) Determine the weighted values of the digit 7 in the numbers given below:

i) $2A7E2_{16}$ (2 marks)

ii) 7457_8 (2 marks)

Question 3

a) If $A = \begin{pmatrix} 3 & 7 \\ 5 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} -2 & 3 \\ 4 & 0 \end{pmatrix}$. What is the value of

i) $A + B$ (3 marks)

ii) $A \times 3B$ (6 marks)

b) Name any **FOUR** methods of data collection (4 marks)

c) Two balls are drawn successively without replacement from a box which contains 4 white balls and 3 red balls. Find the probability that:

i) Both balls are red (3 marks)

ii) The first ball drawn is white and the second one is red (4 marks)

Question 4

a) A clock strikes the number of times of the hour. How many strikes does it make in one day?
(4 marks)

b) Given the series 5, 15, 45, 13,.....

i) Determine the value of the 50th term (3 marks)

ii) What is the sum of the second 5 terms (7 marks)

Using the binomial theorem, estimate the value of $(0.97)^4$ to 3 dp. (6 marks)

Question 5

$$\frac{3}{\sqrt{2} - \sqrt{3}}$$

a) Rationalize and simplify the expression (5 marks)

b) Without using mathematical calculator, determine the exact value of:

i) $\cos 45^\circ$ (3 marks)

ii) $\tan 30^\circ$ (3 marks)

c) Given a triangle with sides $a = 7$: $b = 9$ and angle $ACB = 57^\circ$. Determine

i) The length of line c (5 marks)

ii) The size of angle ABC (4 marks)