



4

(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2016/2017 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER
MAIN EXAMINATION
FOR THE DIPLOMA IN EDUCATION
MATHEMATICS

COURSE CODE: EDM 108

COURSE TITLE: ALGEBRA

DATE: 14/09/17

TIME: 8.00 AM- 10.00 AM

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO Questions

TIME: 2 Hours

This Paper Consists of 4 Printed Pages. Please Turn Over.

SECTION A

QUESTION ONE (28mrks)

- a. Rationalize the denominator (2mrks)

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

- b. The hypotenuse of a right angled triangle is 13cm long and the perimeter is 30cm. find the length of the other two sides of the triangle (3mrks)
- c. Solve the following quadratic equation $2x^2 + 12x - 10x = -60$ (2mrks)
- d. Use Pascal's triangle to obtain the value of $(1.002)^5$ correct to 6 places of Decimals (3mrks)
- e. Ounga saves sh 100 on his first son's birthday. He saves sh 200 on the second birthday and sh 400 on the third and so on doubling the amount on every birthday. How much will he be saving on the boy's 10th birthday? (3mrks)
- f. Use substitution method to find the unknown:-

$$5x + 4y = 1$$

$$3x - 6y = 2$$

(3mrks)

- (g) Express in factorial notation (2mrks)

$$6 \times 5 \times 4$$

$$n(n-1)(n-2)$$

- (h) In how many ways can 8 people sit at a round table (4mrks)

- (i) Solve $\log_x 3 + \log_x 27 = 2$ (3mrks)

- (j) Make x the subject of the formula. (3mrks)

$$s = \sqrt{\frac{3t(t-x)}{8}}$$

SECTION B

QUESTION TWO (16mrks)

- a. Work out the value of x (3mrks)
 $(2x - 5)^2 = 9$ If the perimeter of a semicircular plate of radius r cm is p cm. Write down a formula connecting p and r .
Hence make r the subject of the formula. (3mrks)
- b. Draw the graph of $y = x^2 + 2x - 2$ and use the graph to find:-
- i. The value of y when $x = 1.5$
ii. The value of x when $y = -1$
iii. The least value of y (10mrks)

QUESTION THREE (16mrks)

- a. The third term of a geometric progression is $\frac{1}{2}$ and the fifth term is $\frac{1}{32}$.
Find the sum of the first 6 terms (5mrks)
- b. In an arithmetic progression, the thirteenth term is 27 and the seventh term is three times the second term. Find the first term, the common difference and the sum of the first ten terms. (7mrks)
- C. Differentiate between;
1. Arithmetic sequence and arithmetic series
 2. Geometric sequence and geometric series (4mrks).

QUESTION FOUR (16mrks)

- a. Use Cramer's rule to solve the values of the unknown
$$\begin{aligned} 2x + y + z &= 1 \\ x - y + 4z &= 0 \\ x + 2y - 2z &= 3 \end{aligned}$$
 (10mrks)
- b. Define a Matrix (2mrks)
- c. Use matrix method to find the value of x and y

$$3x + y = 10$$

$$2x + 4y = 0$$

(4mrk)

QUESTION FIVE (16mrks)

- a. Show the region represented by $2x + y > 3$, $x - y \geq 4$ and $y \leq 3$ (9mrks)
- b. Solve the following pairs of simultaneous inequalities and illustrate the solution on a number line (3mrks)

$$3x - 1 > -4$$

$$2x + 1 < 7$$

- c. Use expansion $(x - 0.2)^4$ to find the exact value of $(9.8)^4$ (4mrks)