# KABARAK UNIVERSITY

## EXAMINATIONS

## 2008/2009 ACADEMIC YEAR

## FOR THE CERTIFICATE OF PRE - UNIVERSITY MATHEMATICS

**COURSE CODE:** **PMATH 011**

**COURSE TITLE:** **BASIC ALGEBRA**

**STREAM:** **SEMESTER ONE**

**DAY:** **WENESDAY**

**TIME:** **9.00 – 11.00 A.M.**

**DATE:** **25/03/2009**

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**INSTRUCTIONS:**

Attempt **QUESTION ONE** and **ANY OTHER TWO** questions.

**PLEASE TURN OVER**

**QUESTION ONE (30 MARKS)**

(a) Given a quadratic equation $\quad + \quad + \quad = 0$, derive the quadratic formula then solve

$2 \quad + 5 \quad + 3 = 0$ (8 mks)

(b) (i) State the three laws of logarithms. (3 mks)

(ii) Use laws of logarithms to rewrite $\sqrt{\sin}$ (2 mks)

(c) Solve for

(i) $4 \quad - 1 = 63$

(ii) $— — \ 1 = 242$

(iii) $— \times 12(4\ ) = 48$

(iv) $5 \quad + 5 \ = 208$ (12 mks)

(d) Find the equation of a line that is perpendicular to the line $y - 3 \quad + 1 = 0$ and passes through the point (0, 2) (2 mks)

(e) Simplify $\quad + \quad ( \quad + 2 = \quad 3$ (3 mks)

**QUESTION TWO (20 MARKS)**

(a) In a geometrical progression the sum of the second and third terms is 6 and the sum of the third and fourth term is -12. Find the first term and common ratio. (6 mks)

(b) Given a sequence; a, a + d, a + 2d,--------, L

Derive the sum of n terms given that the sequence is A.P. (8 mks)

(c) A ball is dropped from a certain height, first bounce takes one second and subsequent bounce Take $\frac{2}{3}$ of the time of the previous bounce. Find;

(i) Total time for the first 4 bounces (3 mks)

(ii) Total time until bouncing stops (3 mks)

**QUESTION THREE (20 MARKS)**

(a) Define the following terminologies

(i) Permutation (1 mks)

(ii) Combination (1 mks)

(b) In how many ways can 3 – Letter Word be made from 26 letters of alphabet. (3 mks)

(c) There are 3 boys and 4 girls at birthday party. In how many ways can a team of 5 pupils be formed so as to include at least one boy? (5 mks)

(d) Use Binomial theorem to approximate values of

(i) $(1.005)$ (ii) $(0.98)$ (4 mks)

(e) Use the concept of series to write the following decimals into fractions;

(i) $0.\dot{3}$ (3 mks)

(ii) $0.4\ddot{5}$ (3 mks)

**QUESTION FOUR (20 MARKS)**

(a) Given a linear equation $2 + 4 - 10 = 0$ and passes through a point (4, 2), Find an equation parallel to that line. (3 mks)

(b) Given $\begin{matrix} 3 & 5 \\ -1 & 4 \end{matrix} + \begin{matrix} 2 & -3 \\ -6 & -3 \end{matrix} = \begin{matrix} 7 & 2 \\ -7 & 2 \end{matrix}$

Find and . (4 mks)

(c) Using the Inverse technique solve the following system of linear equations.

$2 - 3 = -7$

$3 + = -5$ (6 mks)

(d) What do you understand by the following terminologies

(i) Singular matrix

(ii) Zero matrix

(iii) Matrix (3 mks)

(e) Find the determinant $\begin{matrix} 4 & 2 & 6 \\ 2 & 8 & 1 \\ 7 & 2 & 4 \end{matrix}$ (4 mks)

**QUESTION FOUR (20 MARKS)**

(a) Without using the calculator evaluate the following;

(i) $(100)$ (1 mk)

(ii) $64$ (1 mk)

(iii) — (1 mk)

(b) Solve for

(i) $3 \quad = 1$ (3 mks)

(ii) $5 \quad + 5 \quad = 208$ (3 mks)

(c) Evaluate

(i) $16 + \quad 2 - \quad 8$ (3 mks)

(ii) $0.001$ (2 mks)

(d) Evaluate

(i) $\frac{(\quad)!}{(\quad)!}$ (3 mks)

(ii) — (3 mks)