KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2010/2011 ACADEMIC YEAR

FOR THE BACHELOR OF THEOLOGY DEGREE

MATHEMATICS

COURSE CODE: MATH 001

COURSE TITLE: INTRODUCTORY MATHEMATICS

STREAM: Y2 S2

DAY: WEDNESDAY

TIME: 2.00 – 4.00 P.M.

DATE: 08/12/2009

INSTRUCTIONS:

Attempt questions **ONE** and any other **TWO** questions

PLEASE TURN OVER

QUESTION ONE (30 MARKS)

a) Starting with a general format of a quadratic equation
$ax^2 + bx + c = 0$. Deduce the quadratic formula and hence solve $2x^2 + 5x = -3$ (8 marks)

b) Given the coordinates $(2, 4)\ and\ (4, 8)$deduce the equation of the line. (3 marks)

c) Consider the sequence $\{Xn\} = 2, 5, 8, 11, \ldots\ldots\ldots\ldots\ldots\ldots\ldots$ find

(i) The number of terms in a sequence given the nth term is 92 (3 marks)

(ii) The sum of the first 20 terms (3 marks)

d) Consider the following systems of equations

$2y + x = 4$

$5y + 3x = 11$

Solve the simultaneous equations (4 marks)

e) Find the number of ways in which letters of the word TERRITORY can be arranged (3 marks)

f) Solve the following equations

(i) $2x + \frac{1}{x} = 3$ (3 marks)

(ii) $27^{\left(\frac{3}{4} - x\right)} = 81^{\left(x - \frac{1}{4}\right)}$ (4 marks)

QUESTION TWO (20 MARKS)

a) Deduce the formula of the sum of G. P. and hence find the sum of the first 5 terms in a sequence$\{Xn\} = \{64, 32, 16, 8 \ldots\ldots\ldots\ldots\ldots\ldots.\}$ (10 marks)

b) Find the approximate value of a G. P
$\{Xn\} = 0.45$ in fraction form. (5 marks)

c) Solve the following equations

(i) $2x^2 + 4x + 4 = 0$ (2 marks)

(ii) $x^2 + 6x = 15$ (3 marks)

QUESTION THREE (20 MARKS)

a) Solve for x

(i) $5^{x+2} = 5^{3x-6}$ (2 marks)

(ii) $3^{2x-6} = 1$ (2 marks)

(iii)$4^x - 2^{x+1} = 8$ (2 marks)

(iv)$\log(x + 3) + \log(x + 2) = \log 6$ (3 marks)

b) Evaluate $5_{P_3} - 5_{C_3}$ (2 marks)

c) Use Binomial to expand $(1 - 2x)^6$ up to the term involving x^3

d) In how many ways can a committee of four be formed from five boys and six girls if the committee must have at least one girl. (4 marks)

QUESTION FOUR (20 MARKS)

a) Define the terms
   (i) Permutation (2 marks)
   (ii) Combination (2 marks)

b) Given the word LOGARITHMS
   (i) In how many ways can the word be written without repetition? (2 marks)
   (ii) If the repetition is allowed (2 marks)
   (iii)How many four letter word can be made. (4 marks)

c) In how many ways can six people sit at around table. (3 marks)

d) Given the line $10y + 4x = 12$ find a line parallel to it but passes through a point $(1, 2)$ (5 marks)

QUESTION FIVE (20 MARKS)

a) Simplify
   (i) $\left[\frac{x^5y^6}{x^9y^4}\right]^{1/2}$ (2 marks)
   (ii) $\sqrt{\frac{640x^8y^5}{10x^4y^9}}$ (2 marks)

b) Without using a calculator simplify
   (i) $\log_2 32$ (1 mark)
   (ii) $\frac{\log_3 81 - \log_3 27}{\log_3 9}$ (2 marks)

c) Without using the calculator evaluate
   (i) $\log_{10}(100)^{-3}$ (2 marks)
   (ii) $\log_4\left(\frac{1}{16}\right)^{-1}$ (2 mark)

d) Evaluate $\frac{{}^8C_5}{{}^5C_3}$ (1 mark)

e) Given $\begin{bmatrix} 3x & 5 \\ -1 & 4x \end{bmatrix} + \begin{bmatrix} 2y-3 \\ -6-y \end{bmatrix} = \begin{bmatrix} 7 & 2 \\ -7 & 2 \end{bmatrix}$
   Find x & y (4 marks)

f) Using the inverse method

Solve the following system of linear equations.

$2x - 3y = -7$

$3x + y = -5$ (4 marks)