KABARAK   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: MATH 100

COURSE TITLE: GENERAL MATHEMATICS

STREAM: Y1S1

DAY: THURSDAY

TIME: 2.00 – 4.00 P.M.

DATE: 25/03/2010

INSTRUCTIONS:

1. Answer question **ONE** and any other **TWO** questions
2. Begin each question on a separate page
3. Show your workings clearly

PLEASE TURN OVER

QUESTION ONE (30 MARKS)

a) Solve the following equations for x

   i) $Ln(x - 3) + Ln(x - 2) = Ln(2x + 24)$ (5 marks)

   ii) $2^{2x+1} - 33(2^x) + 16 = 0$ (5 marks)

b) Given the lines x - 2y = 4, find the equation of the line that passes through (2,-3) and is

   i)   Parallel to the given line   (3 marks)

   ii)   Perpendicular to the given line   (3 marks)

c) Given the matrices $A = \begin{bmatrix} 0 & 9 \\ 2 & -3 \\ -1 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 8 & 1 \\ -7 & 0 \\ 4 & -1 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 3 \\ -2 & 5 \\ 10 & -6 \end{bmatrix}$

          Compute 3A + 2B – 1/2C   (5 marks)

d) The following data represents the population estimates in million for Kenya , Uganda , Tanzania , Zambia and Nigeria

Country	population estimates (1986)
Kenya	20.2
Uganda	14.7
Tanzania	21.7
Zambia	6.8
Nigeria	91.2

    Depict the data graphically using a pie chart   (6 marks)

e) Find the probability of drawing an ace or k in a deck of 52 cards   (3 marks)

QUESTION TWO (20 MARKS)

Mark	Frequency
1 – 10	4
11 – 20	5
21 – 30	32
31 – 40	89
41 – 50	102
51 – 60	78
61 – 70	63
71 – 80	21
81 – 90	3
91 – 100	3

From the data above calculate

i)	Mean	(4 marks)
ii)	Standard deviation	(4 marks)
iii)	Variance	(2 marks)
iv)	Mode	(4 marks)
v)	Median	(4 marks)
vi)	Coefficient of variation	(2 marks)

QUESTION THREE (20 MARKS)

a) Solve the following equations for x by completing the square
   i) $2x^2 + 6x + 7 = 0$ (3 marks)
   ii) $3x^2 - 2x - 1 = 0$ (3 marks)

b) Differentiate the following functions

   i) $\frac{dy}{dx} = (x^2 - 1)\left(\left(\sqrt{1+x}\right)\right)$ at x = 1   (5 marks)

   ii) $\frac{dy}{dx} = \frac{2x^2 - x^3}{\sqrt{(x^2 - 1)}}$ at x = 1   (5 marks)

c)   Intergrate $\int_{2}^{4} \sqrt[3]{x^2} + 4x^3 dx$ (4 marks)

QUESTION FOUR (20 MARKS)

a) Solve the following for x

   i) $X^4 + 4x^3 - 12x^2 \leq 0$ (4 marks)

   ii) $|2x-1| = |4x+9|$ (3 marks)

b) Consider an accounts receivable auditor examining customer accounts for a client. Past records indicate that the mean of ksh 5000 and a standard deviation ksh 1000.
   i)   What is the probability that an account selected at random will have a balance

   of more than ksh 5000   (2 marks)

   ii)   What is the probability that an account selected at random will have a balance

   between ksh 5000 and 6500   (3 marks)

iii) What is the probability that an account selected at random will have a balance of more than ksh 7000 (2 marks)

iv) What is the probability that an account selected at random will have a balance of less than ksh 4000 (3 marks)

c) Solve $7t^2 = 6 - 19t$ using formular method (3 marks)

QUESTION FIVE (20 MARKS)

a) Given $f(x) = 3x2 - x + 10$ and $g(x) = 1 - 20x$ find each of the following
   i) (f og)(5) (2 marks)
   ii) (fog)(x) (3 marks)
   iii) (gof)(x) (3 marks)
   iv) (gog)(x) (3 marks)

b) Differentiate the following by first principles
   i) $4x^2 + 2$ (4 marks)
   ii) $-2x^2 + 3x + 10$ (5 marks)