

KABARAK



UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

BRIDGING CERTIFICATE COURSE IN MATHEMATICS

COURSE CODE: BMATH 002

COURSE TITLE: BASIC ALGEBRA

STREAM: BRIDGING

DAY: MONDAY

TIME: 9.00 – 11.00 A.M.

DATE: 07/12/2009

INSTRUCTIONS TO CANDIDATES:

- 1. Answer ALL Questions**
- 2. Show your working clearly and neatly**

PLEASE TURN OVER

QUESTION ONE (30 MARKS)

1. a) Find x given that $2^{x+1} = \frac{1}{64}$ (2 mark)

b) Solve for x using the factor method in $2x^2+x-36=0$ (2 marks)

2. Find the range of x if $-5 < \frac{1}{2}(3x-1) \leq 7$ (3 marks)

3. Solve for x in the following:-

a) $a^{2x-7} = a^{x-3}$

b) $30^x = 900 \div 30$

c) $K^x = K^5 \div K^4$ (3 marks)

4. Given $\mathbf{P} = \begin{bmatrix} 1 & 2 \\ 0 & 4 \end{bmatrix}$, $\mathbf{Q} = \begin{bmatrix} 2 & 0 \\ 1 & 3 \end{bmatrix}$ and $\mathbf{R} = \begin{bmatrix} 3 & 0 \\ 2 & 2 \end{bmatrix}$

Find:

a) $3\mathbf{P} - 2(\mathbf{Q} + \mathbf{R})$

b) $\frac{1}{3}\mathbf{Q} + \mathbf{R}$ (6 marks)

5. a) Find y without using tables if $2 + \text{Log}_2 3 + \text{Log}_2 y = \text{Log}_2 5 + 1$ (4 marks)

b) Solve for the unknown in:-

(i) $n \text{Log}_{10} 30 = \text{Log}_{10} 900$ (2 marks)

(ii) $\text{Log}_{10} 60 = \text{Log}_{10} a + \text{Log}_{10} 12$ (4 marks)

6. A club has 9 members. In how many ways can a committee of three be chosen from the members in this club (4 marks)

QUESTION TWO (20 MARKS)

a. Define a Linear Inequality (1 mark)

b. Solve for the inequality $x^2 - 2x - 8 \leq 0$ (4 marks)

c. If the matrix below is a Singular matrix, find the value of x (4 marks)

$$\begin{pmatrix} x & 1-x \\ x+2 & -x \end{pmatrix}$$

d. Use matrix method to solve the following simultaneous equation

$$4x - 3y = 1$$

$$2x + 6y = 3$$

(3 marks)

e. Solve the following equation by using completing the squares method

$$9x^2 + 8x - 1$$

(3 marks)

f. Factorise completely $3x^2 - 12x + 6$, hence of otherwise solve the equation $3x^2 - 12x + 6 = 0$

(3 marks)

g. Find the sum of the first 11 terms of an arithmetic series with the first term 3 and the common difference 6

(2 marks)

h. Find the transpose of this matrix $\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix}$

(3 marks)

QUESTION THREE (20 MARKS)

a. The current value of a vehicle is Shs. 200,000. If this vehicle has been depreciating by $\frac{1}{5}$ th of its value every year, find the value of the vehicle four years ago. (5 marks)

b. Solve the equation $\frac{1}{5}x - \frac{1}{3} \leq x + \frac{1}{4}$ (3 marks)

c. Use binomial expansion to estimate the following to 4 decimal places:

(i) $(1.005)^4$

(ii) 1.01^3

(4 marks)

d. Given that $\text{Log}_{10} 5 = 0.6990$ & $\text{Log}_{10} 6 = 0.7782$. find the following logarithms

(i) $\text{Log}_{10} 30$

(ii) $\text{Log}_{10} 180$

(iii) $\text{Log}_{10} 1.2$

(3 marks)

e) Find the number of distinguishable permutations of the letters in the word

MISSISSIPPI

(2 marks)

f) From twenty raffle tickets in a hat, four tickets are to be selected in the order. The holder of the 1st ticket wins a car, the 2nd a motorcycle, the 3rd bicycle, the 4th a skateboard. How many different ways can the prizes be awarded. (3 marks)