

KABARAK UNIVERSITY

(ELAND COLLEGE)

UNIVERSITY EXAMINATIONS

BRIDGING CERTIFICATE COURSE IN MATHEMATICS

AUGUST 2008 EXAMINATIONS

COURSE CODE: BMATH 002

COURSE TITLE: BASIC ALGEBRA

STREAM: BRIDGING

DAY:

DATE:

TIME:

INSTRUCTIONS TO CANDIDATES

1. Answer all questions in section A and any four questions in section B.
2. Show your working clearly and neatly.

SECTION A (30MKS)

Answer all questions

1. a) Solve the equation

$$9^{(2x-1/4)} \times 27^{(x-1/2)} = 81^{1/2(3x+1)} \quad (3\text{mks})$$

b) Simplify $\log_{10} 120 + \frac{1}{3}\log_{10} 27 - 2\log_{10} 6$. (3mks)

2. a) Factorize completely

$$18x^2 - 50y^2 \quad (2\text{mks})$$

b) Factorize $m^2 - n^2$ hence use it to evaluate:

i) $998^2 - 2^2$

ii) $8.87^2 - 1.13^2$ (4mks)

3. a) Determine the range of values of x that satisfy the inequality:

$$\frac{14}{3} < \frac{5x}{6} + \frac{1}{2} \geq x - \frac{5}{3} \quad (3\text{mks})$$

b) Evaluate $\frac{13!}{9!5!} + \frac{13!}{10!4!}$ (2mks)

4. a) Expand $(1 + \frac{1}{5}x)^6$ and hence use your expansion to evaluate $(1.02)^6$

to 4d.p (4mks)

b) Find the sum of the following G.P

$$1 + \frac{1}{2} + \frac{1}{4} + \dots, 6 \text{ terms.} \quad (3\text{mks})$$

5. a) Given that $x = \begin{pmatrix} 1 & 0 \\ 3 & 2 \end{pmatrix}$ and $y = \begin{pmatrix} 2 & -1 \\ -1 & 0 \end{pmatrix}$. Find $xy + x$ (3mks)

b) Express in the simplest possible form

$$\frac{4+x}{3-x} + \frac{2+x}{3+x} \quad (3\text{mks})$$

SECTION B (40MKS)

Answer any four questions

6. a) Simplify completely

$$\frac{A^{3y+1}}{A^{2y+2} \sqrt[3]{A} A^{3y-3}} \quad (3\text{mks})$$

b) Given that $\log_{10}m = x + y$ and $\log_{10}n = x - y$, express, in terms of x and y , the value of $\log_{10}(m^2n)$ (3mks)

c) Express the following in an algebraic sum of logarithms:

i) $\log \left(\frac{a^3b^2}{c^5} \right)$ (2mks)

ii) $\log \left(\frac{\sqrt{b}}{c} \right)$ (2mks)

7. a) Solve the equation $2x^2 + 5x - 1 = 0$, giving your answer correct to 2 decimal places. (3mks)

b) Factorize completely $5x^2 - 2x - 3$. Hence or otherwise solve the equation $5x^2 - 2x - 3 = 0$. (3mks)

c) If a and b are the roots of the equation $x^2 + 2x - 3 = 0$, find the equation whose roots are $\frac{1}{a^2}$ and $\frac{1}{b^2}$. (4mks)

8. a) Use matrix method to solve simultaneous equations.

$$3x + y = 7$$

$$2x - 3y = 1 \quad (4\text{mks})$$

b) Let $A = \begin{pmatrix} x & 1-x \\ x+2 & -x \end{pmatrix}$ and $B = \begin{pmatrix} x & x-2 \\ \frac{x}{2} & 2x \end{pmatrix}$

i) Determine the value of x given that A is a singular matrix. (3mks)

ii) If $C = A + B$, find the inverse of the matrix C . (3mks)

9. a) Simplify $\frac{(n+1)!}{n!} + \frac{n!}{(n-1)!}$ (3mks)

b) In how many ways can a committee of three girls and four boys be formed from a youth group of six girls and seven boys? (3mks)

c) How many arrangements can be made from the letters of the words?

i) EXPRESSIONS (2mks)

ii) SIMPLIFICATION (2mks)

10. a) The first three terms of an arithmetic progression are: $x + 2y$,

- $4x$ and $7x - 2y$. Find the sum of the first ten terms. (4mks)
b) Write down the term independent of x in the expansion of

$$\left(4x + 1 \frac{\quad}{2x} \right)^8$$

(3mks)

- c) Solve the inequalities:

i) $\frac{1}{3}x + 2 \leq 5$ (1mk)

ii) $2x + 3 > 5x - 3 > -8$ (2mks)