



UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

Business and Humanities Certificate Examinations

MAY-JUNE SERIES

PROGRAMME

NCICT, NCCM, NCBM, CCE

PAPER NAME

BASIC MATHEMATICS

PAPER CODE

NCIT113/NCBM113/CBM1101

YEAR I, SEMESTER I

2½ HOURS

MONDAY, 17TH MAY, 2021

INSTRUCTIONS TO CANDIDATES

1. *This paper consists of **seven** questions.*
2. *Answer only **five** questions.*
3. *All questions carry equal marks.*
4. *All answers to each question should begin on a fresh page.*
5. ***Do not** write on the question paper.*
6. *All answers and rough work should be done in the official answer booklet provided.*
7. *A non-programmable electronic calculator may be used in this examination.*
8. *Read other instructions on the answer booklet.*

Question One

- (a) Solve the equation;
 $2\sqrt{2x+5} = \sqrt{2-x}$ (05 marks)
- (b) The volume of a cone is given by $v = \frac{1}{3}\pi r^2 h$, make r the subject of the formula and hence find r when $v = 302$ and $h = 8$. (04 marks)
- (c) Find the range of values of x which satisfy the inequality; $\frac{x}{3} > \frac{x}{4} + 2$. (04 marks)
- (d) Find the value of A, B , and C in the identity; $2x^2 - 7x + 5 = Ax(x-2) + B(x+5) + C$. (07 marks)

Question Two

- (a) Identify which sets are equal. (05 marks)
 $A = \{x/x \text{ is a letter in the word "follow"}\}$
 $B = \{\text{letters in the word "wolf"}\}$
 $C = \{x/x \text{ is a letter in the word "flow"}\}$
 $D = \{f, l, o, \text{ and } w\}$
- (b) Find the power set 2^s of the set $s = \{1, 2, 3\}$ (04 marks)
- (c) Given the function;
$$f(x) = \begin{cases} 3x - 1 & \text{if } x > 3 \\ x^2 - 2 & \text{if } -2 \leq x \leq 3 \\ 2x + 3 & \text{if } x < -2 \end{cases}$$

Find;
(i) $f(2)$. (02 marks)
(ii) $f(4)$. (02 marks)
(iii) $f(-3)$. (02 marks)
- (d) A function is defined by $f(x) = x^2 + 5$, find $f^{-1}(x)$. Hence find $f^{-1}(9)$. (05 marks)

Question Three

- (a) Copy and complete the table 1 for values of $y = 2^x$. (03 marks)

Table 1

x	-3	-2	-1	0	1	2
y						

- (b) Complete table 2 for values of $y = \log_2 x$. Give values of y correct to 2 decimal places. (04 marks)

Table 2

x	0.2	0.4	0.6	0.8	1	2	3	4
y								

- (c) Plot graphs of $y = 2^x$ and $y = \log_2 x$ on the same axes using a scale of 2cm to 1 unit on both axes. (09 marks)
- (d) Express $y = 2^x$ in $\log$ form, hence find $\log y$ when $x = \frac{1}{2}$. (04 marks)

Question Four

- (a) Simplify the following;
- (i) $(3 + \sqrt{2})(4 - 2\sqrt{2})$. (03 marks)
- (ii) $\frac{\sqrt{3}-1}{\sqrt{3}+1}$. (05 marks)
- (b) Evaluate; $\log_2 128$. (04 marks)
- (c) Solve for x given $\log_2 x - \log_2 8 = -2$. (04 marks)
- (d) Verify $2 \log_{10} 10 + \log_{10} 5 - \log_{10} 50 = 1$. (04 marks)

Question Five

- (a) Find the gradient and the intercept on the y-axis for the equation;
- $$\frac{x+5}{2} = \frac{y-3}{4}$$
- (05 marks)
- (b) Plot graphs of the equations below on the same axes.
- $$2y = -3x - 3$$
- $$3y = 2x + 1$$
- $$3y = 2x + 8$$
- $$2y = -3x + 6$$
- Show that they form a square and find its area. (15 marks)

Question Six

- (a) Given the functions $f(x) = 2x - 1$, $g(x) = \frac{1}{x}$ and $h(x) = 1 - x$, find;
- (i) The value of x for which $g(x)$ is undefined. (04 marks)
- (ii) $fg(2)$. (03 marks)
- (iii) $gh(-1)$. (03 marks)

- (b) The function is defined by $f(x) = x^2 - 7x + 9$ and $g(x) = 7 - 4x$, find;
- (i) $f(2)$.
 - (ii) the value of x for which $f(x) = g(x)$. (07 marks)
 - (iii) $g(-4)$. (03 marks)

Question Seven

- (a) Two quantities are connected by the equation; $y = mx + c$. Given that $y = 4$ when $x = 3$ and $y = 2$, when $x = -2$. Find m and c . (06 marks)
- (b) The height s of a mass thrown vertically upwards at time t seconds is given by $s = 40t - 13t^2$. Calculate the time the mass will take after being thrown to reach a height of 25 meters when moving;
- (i) Upwards. (03 marks)
 - (ii) Downwards. (03 marks)
- (c) Solve the simultaneous equations;
- $$x + y = 1$$
- $$x^2 - xy + y^2 = 7$$
- (08 marks)

END