CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

**THIRD YEAR EXAMINATION FOR THE AWARD
OF BACHELOR OF SCIENCE IN LIBRARY SCIENCE**

MATH 100: GENERAL MATHEMATICS

STREAMS: BSC. LIBRARY   **TIME: 2 HOURS**

DAY/DATE: THURSDAY 01/04/2021   **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS
Instructions: Answer Question One and any other TWO Questions in Section B

SECTION A

QUESTION ONE (30 MARKS)

a) List all possible sets of real numbers in which all the following numbers belong
    i) $\sqrt{5}$ (1 mark)
    ii)   16 (1 mark)
    iii)   -16 (1 mark)
    iv)   0 (1 mark)
    v)   -3.333 (1 mark)

b) Find the values of x in the following functions
    i)   2logx=4log3 (2 marks)
    ii) $log_2(x-1) = 5$ (2 marks)
    iii) $log_3(x-2)^3 = \frac{1}{3} log_3(4x+7)$ (3 marks)

c) Find the mean, mode, median, range, and standard deviation of the following data
    30,50,30,70,20,50,30 (8 marks)

d) The function $f(x)=ax^2+x\text{-}7$ has a remainder of *3* when divided by *(x-2)*. Find the value of 'a' (2 marks)

e) Given f(x)=3x+2, g(x)=x+5, find fog(x) (2 marks)

f) Find $\frac{dy}{dx}$ for
    i) $y = 18x^6 + 9x^3 - \frac{1}{4x}$ (3 marks)

ii) $y = \sqrt[3]{x} + \frac{4}{x^3}$ (3 marks)

SECTION B

QUESTION TWO (20 MARKS)

Consider the following data representing the age of 100 people randomly selected in Chuka town.

Age	Frequency
0-9	5
10-19	8
20-29	7
30-39	12
40-49	28
50-59	20
60-69	10
70-79	10

Determine;

i)	Mean	(2 marks)
ii)	Mode	(3 marks)
iii)	Median	(3 marks)
iv)	75th percentile	(3 marks)
v)	7th decile	(3 marks)
vi)	Semi-interquartile range	(3 marks)
vii)	Standard deviation	(3 marks)

QUESTION THREE (20 MARKS)

a) Given $f(x) = 5x - 1$, $g(x) = x^2 + 4x$, $k(x) = \frac{1}{x-3}$. Find

i)	*(fog)(-2)*	(4 marks)
ii)	*(gof)(-2)*	(4 marks)
iii)	*(kof)(5)*	(4 marks)

b) Find the value of x in $ax^2 + bx + c = 0$ using completing square method (8 marks)

QUESTION FOUR (20 MARKS)

a) The expression $x^3 + kx^2 - 2x - 4$ is fully divisible by (x+1)

      i)   Find the value of k

      ii)   Use the long division method to confirm this result and hence solve the equation by using the value of k obtained in i) above   (8 marks)

b) Solve the following equations

      i) $2x^2 - 5x - 3 = 0$(factorization method)   (3 marks)

      ii) $2x^2 + 5x = 3$(completing square method)   (3 marks)

      iii) $9x^2 + 7x - 1 = 0$(quadratic formula method)   (3 marks)

QUESTION FIVE (20 MARKS)

a) Simplify $log\sqrt[3]{\dfrac{x^2 y}{z^4}}$ (3 marks)

b) Find the value of x in the following log functions

      i) $log_2(x - 3) + log_2(x - 1) = 3$ (3 marks)

      ii) $log_3(2x + 1) + log_3(x + 8) = 3$ (3 marks)

c) Find the derivatives of the following functions

      i) $p(x) = (x^2 + 2)(3x^2 - 5x)$ (3 marks)

      ii) $Q(x) = \dfrac{5x^2}{4x+3}$ (3 marks)

      iii) $h(t) = \left(\dfrac{2t+3}{6-t^2}\right)^3$ (5 marks)

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