CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

RESIT/ SPECIAL EXAMINATIONS

EXAMINATION FOR THE AWARD OF BACHELOR OF SCIENCE

MATH 00101: MATHEMATICS FOR SCIENCE

STREAMS: BSC **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 11/8/2021 **8.30 A.M. – 10.30 A.M.**

INSTRUCTIONS: ANSWER QUESTION ONE AND TWO OTHERS

QUESTION ONE (30 MARKS)

a) Write out the following series in full. (2 marks)

$$\sum_{i=-2}^{3}(4i+2)$$

b) Solve the following polynomial using the remainder theorem $2x^3+x^2-6x+9$ divided by $x-2$. (4 marks)

c) In an AP of 25 terms, 4^{th} term is 4, 22^{nd} term is 5. Find the sum of AP. (6 marks)

d) From a group of 4 men and 6 women, 7 persons are to be selected to form a committee so that at least 3 men are there in the committee. In how many ways can this be done? (4 marks)

e) Evaluate without using calculators $log_3\left(\frac{1}{32}\right)$. (4 marks)

f) Solve the Quadratic equation by completing square method $-3x^2+6x-48=0$. (4 marks)

g) Differentiate between empirical probability and axiomatic probability. (2 marks)

h) Suppose, a bag has 3 red balls and 4 blue balls. What is the probability of choosing 2 blue balls at random? (4 marks)

QUESTION TWO (20 MARKS)

a) Find the expansion of $(7x - 2y)^3$. (5 marks)

b) The ages of the 112 people who live on a tropical island are grouped as follows.

Age	Number
0 – 9	20
10 – 19	21
20 – 29	23
30 – 39	16
40 – 49	11
50 – 59	10
60 – 69	7
70 – 79	3
80 – 89	1

Find mean, median and mode. (7 marks)

c) Differentiate between primary data and secondary data. (2 marks)

d) Given log 3=0.4771, evaluate

Log 300000. (3 marks)

e) A GP has first term 5 and common ratio 2. Find the sum of the first 10 terms. (3 marks)

QUESTION THREE (20 MARKS)

a) Solve the following equations using the stated method. (9 marks)

I. $5x^2 = 10x - 8$ (quadratic formula)

II. $3x^2 + 12x - 39 = 0$.(completing square method)

III. $x^2 - 5x + 6=0$ (factorization)

b) Simplify $\frac{cos^2\theta}{1+sin\theta} + \frac{cos^2\theta}{1-\sin\theta}$. (4 marks)

c) In how ways can 4 boys and 2 girls be seated in 9 rows where

a) The boys and girls can seat anywhere

ii) The two girls must seat together

iii) The two girls must be separated. (4 marks)

d) Ten horses run in a race, how many ways are there of predicting the first three places. (3 marks)

QUESTION FOUR (20 MARKS)

a) A bag contains 4 black balls and 5 white balls. John picks a ball at random from the bag and replaces it back in the bag. He mixes the balls in the bag and then picks another ball at random from the bag.

I. Construct a probability tree diagram of the problem.

II. Calculate the probability that John picks

i. Two black balls

ii. A black ball in his second draw. (10 marks)

b) State three the methods of collection of primary data. (3 marks)

c) Plot a graph of $y = sin\theta$ for $0° \leq \theta \leq 360°$ at an interval of $30°$. (5 marks)

d) Simplify the following expression $log\sqrt{xcosx}$. (2 marks)
