CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0170: MATHEMATICS FOR COMPUTING I

STREAMS: DIPLOMA IN COMPUTER SCIENCE **TIME: 2 HOURS**
DAY/DATE: THURSDAY 23/09/2021 **11.30 A.M – 1.30 P.M.**

INSTRUCTIONS:

- **Answer question one and any other two questions**
- **Do not write anything on the question paper**

QUESTION ONE

a) Define the following terms
   i) Universal set (2marks)
   ii) Disjoint set (2marks)
   iii) Finite set (2marks)

b) State the properties of real numbers in the following equations (6marks)
   i) $ax(b+c)=(axb)+(axc)$
   ii) $a+(b+c)=(a+b)+c$
   iii) $a+0=a$

c) Draw the truth table for conditional operator in Mathematical logic (4marks)

d) Use the Completing Square method to solve the quadratic equation (4marks)
   $3x^2=3-4x$

e) If $f(x)=2x^2+1$ and $g(x)=3x+4$, find (4marks)
   i) $f(x)+g(x)$
   ii) $fog¿(x)$

f) Differentiate the function $f(x)=\frac{x}{1+x^2}$ (3marks)

g) In how many ways can the letters of the word CORPORATION be arranged?

(3marks)

QUESTION TWO

a) Show that $A \cap (B \cup C)=(A\cap B)\cup(A\cap C)$ (5marks)

b) If U={ 1,2,3,4,5,6,7,8,9}, A=(1,2,3,4), B=(2,4,6,7) and C=(1,3,4,6,8,9) (12marks)
Find i) $A\cap(B\cup C)$ ii) $(A\cap B)^c$ iii¿$(A\cup B)^c - A$ iv) $(A\Delta B)\cup C$

c) Use the quadratic formula to solve $25x^2-40x+16=0$ (3marks)

QUESTION THREE

a) In how many ways a committee consisting of 5 men and 3 women can be chosen from 9 men and 12 women. (4marks)

b) Solve $-2<\frac{6-2x}{3}<4$ (3marks)

c) Show that $(A\cup B)^c = A^c \cap B^c$ (5marks)

d) Solve the inequality $x^2+5<5x+1$ (4marks)

h) Find the centre and radius of the circle ¿ (4marks)

QUESTION FOUR

a) In a survey of Chuka University students, 64 had taken Mathematics course, 94 had taken Chemistry course, 58 had taken Physics course, 28 had taken Mathematics and Physics, 26 had taken Mathematics and Chemistry, 22 had taken Chemistry and Physics, and 14 had taken all the three courses. (10marks)

i. Draw the Venn diagram
ii. Find the number of students that were surveyed
iii. Find the total number of students who had taken only one course

b) A (5,-4) and B (-1, 2) are points on a straight line. Find the equation of the perpendicular bisector AB; giving your answer in the form $y=mx+c$ (4marks)

c) Show that $(A-B)\cap(C-B)=(A\cap C)-B$ (6marks)

QUESTION FIVE

a) Find $\frac{dy}{dx}$ given that y=¿ ¿ (5marks)

b) An advertising agency has 170 clients. 115 use Television, 110 use Radio and 130 use Magazines. 85 use Television and Magazine, 75 use Television and Radio, 95 use Radio and Magazines, 70 use all the three. Draw Venn diagram to represent these data. Find

a) How many use only Radio
b) How many use only Television
c) How many use television and magazine but not Radio

(10marks)

c ¿ Differentiate between Conjunction operator and Disjunction operator using the truth table

(5marks)
