

## UNIVERSITY EXAMINATIONS <br> RESIT/SPECIAL EXAMINATIONS

## EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

## MATH /COSC 0170: MATHEMATICS FOR COMPUTING I

STREAMS:
TIME: 2 HOURS
DAY/DATE: TUESDAY 24/07/2018
2.30 P.M - 4.30 P.M

INSTRUCTION:
ANSWER ALL QUESTIONS

## QUESTION ONE

a) In a 6- question marking test how many different answer sheets are possible if no answer sheet can be used twice and there are
(i) 6 answer sheets available
(ii) 7 answer sheets are available
(iii) 10 answer sheets are available 6marks]
b) How many terms of the sequence $1,4,7,10 \ldots$ are needed to give a sum of 590 from the first term of the sequence [5marks]
c) Find the quotient and the remainder when $x^{3}-4 x^{2}+x+2$ is divided by $\left(x^{2}-3\right)$ [ 5marks]
d) Prove analytically that $(A \cup B) U C=A \cup(B \cup C)$ [4marks]

## QUESTION TWO

a) A school committee of nine members is to be formed 8 parents and 6 teachers and the principal. In how many ways can the committee be formed in order to include
i) The principal
ii) The principal and 5 parents
[ 10marks]
b) Given $U=(1,2,3,4,5,6,7,8,9,10\}$

$$
\begin{aligned}
& A=\{2,3,4\} \\
& B=\{4,5,6\}
\end{aligned}
$$

Find i) $\mathrm{A}^{\mathrm{c}}$
iv) $(\mathrm{A} \cap B \quad)^{c}$
ii) $\left.B^{c}\right) A^{c} \cap B^{c}$
iii) $A \cap B$
(v) $A^{c} \cap B^{c}$
[6marks]
c) How many ways are there to select a first prize winner, second prize winner and a third prize winner from 50 different people who have entered a content [4marks]

## QUESTION THREE

a) The second term of a GP is 2 and the fourth term is 8 . Find the possible values of the common ratio and the corresponding first terms [ 6marks]
b) Solve the following equation for $0^{\circ} \leq \theta \leq 360^{\circ}$
[6marks]

$$
2 \sin ^{2} \theta=\sin \theta
$$

c) Given that $f(x)=2 x-1$ and $g(x)=x+3$, find

i) $\quad$ fog $i$ )
ii) $\quad g o f(3)$
iii) $\operatorname{gog}(x)$
iv) $f \circ f(x)$
[ 8 marks]

## QUESTION FOUR

a) Simplify $\frac{6-3 i}{4-i}$

> [2marks]
b) Find the value of $K$ such that the sequence is an $A P$ [4marks]

$$
K-1, K+3,3 K-1
$$

c) A family of 4 brothers and 3 sisters is to be arranged for a photograph in one row. In how many ways can they be seated if
i) All the sisters seat together
ii) No two sisters seat together
[ 4marks ]

