CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF DIPLOMA IN TOURISM AND HOTEL MANAGEMENT

MATH 0121: INTRODUCTORY MATHEMATICS

STREAMS: DIP (DTHM) **TIME: 2 HOURS**

DAY/DATE: THURSDAY 09/08/2018 **8.30 AM – 10.30 AM**

INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE

a) State the properties of real numbers in the equations below

i) $2 = 2 \times 1$

ii) $8(3+2y) = 24 + 16y$

iii) $(2+3) + 8 = 2 + (3+8)$

iv) $2(12) = 2(12)$ [4 marks]

b) Given U = $\{2,4,6,8,10,12,14,16,18,20\}$

A= $\{6,10,14\}$

B = $\{8,14,18,20\}$

Find

i) A^c

ii) B^c

iii) $(A \cap B)^c$ [4 marks]

c) Given $f(x)=4x+3$

$g(x)=-7x$ $-x^2+5$

$h(x) = 3x^3 - 6x^2 + 7$

Find

i) $f(x)+g(x)$

ii) $2g(x)-h(x)$

iii) $g(x)\,x\,h(x)$

[4marks]

d) A committee of 5 men and 4 women is to be chosen from 8 men and 6 women. In how many ways can this be done [4 marks]

e) Simplify $\frac{6+4i}{2-i}$ [3 marks]

f) Show that $\frac{\tan\theta}{sin\theta}$ = $sec\,\theta$ [3 marks]

g) Classify the following numbers

i) -2.2222

ii) 3

iii) $\sqrt{5}$

iv) $\frac{22}{7}$ [4 marks]

h) Find the quotient and the remainder when $x^3 - x^2 - x + 1$ is divided by $x-1$ [4 marks]

QUESTION TWO

a) Expand and simplify the binomial expansion:$(2 \;\frac{-1}{2}y \;)^5$ [5 marks]

b) How many arrangements are there for the letters of the word PREUNIVERSITY [4 marks]

c) Solve for n in ${}^{n}C_2 = 28$ [5 marks]

d) Write out the following series and evaluate them

i) $\sum_{i=1}^{6} i^2$

ii) $\sum_{i=1}^{6} \frac{1}{i(1+i)}$ [6 marks]

QUESTION THREE

a) (i) Complete the table below [4 marks]

θ	0	30	60	90	120	150	180	210	240	270	300	330	360
tan $\frac{1}{2}x$									-1.73				
2cosx									-1.00				

i) Using the grid provided draw the graph of y=tan $\frac{1}{2}x$ and y = 2cosx [6marks]

ii) Use your graph to solve

tan $\frac{1}{2}x = 2\,cosx$ [2 marks]

2cosx-1.5=0

b) In how many ways can 4 boys and 2 girls be seated in 9 rows such that

i) The boys and girls can sit anywhere
ii) The two girls must sit together

iii) The two girls must be separated [6 marks]

c) Define a fallacy and a tautology [2 marks]

QUESTION FOUR

a) Given that $f(x) = 4x^2 - 5$ and $g(x) = x + 3$, find

i) $\overset{3}{fog}$¿)

ii) $gof(3)$

iii) $gog(x)$

iv) $fof(x)$ [6marks]

b) Show that $(PVQ) = \; P\Lambda \;\; Q$ [4marks]

c) In an AP of 25 terms, the 4th term is 4, 22nd term is 5. Find the sum of the AP

[5marks)

d) In a class of 40 students 30 of them passed in physics and 28 passed English. How many students passed both subjects? Illustrate your answer on a Venn diagram. [5marks]

QUESTION FIVE

a) Prove analytically that $(A \cup B) U C = A \cup (B \cup C)$ [5 marks]

b) 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 [5marks]

c) 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 [6 marks]

d) Let $g(x)=2x^3+3x^2-2x+1$,

Find

$g(1)$

$g(x^2)$

$g(2) + g(-1)$ [4 marks]
