JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF HEALTH

UNIVERSITY EXAMINATION FOR THE CERTIFICATE IN COMMUNITY HEALTH AND DEVELOPMENT

1ST YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR

CENTRE: MAIN

COURSE CODE: SMA 1111

COURSE TITLE: MATHEMATICS 1

EXAM VENUE: LR 7 **STREAM: Cert. (Community Health & Dev)**

DATE: 10/12/2013 **EXAM SESSION: 11.30 – 1.00 PM**

TIME: 1 ½ HOURS

Instructions:

1. **Answer question 1 (Compulsory) and ANY other 2 questions.**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION 1

a. A set A is defined as $A =$ {a,b,c}. determine the power set of A. (3 marks)

b. A line passes through a point *P(2,6)* and cuts the *x-axis* at *x=4*, determine its equation in the form *y=mx+c* (3 marks)

c. Solve the quadratic equation below.
$2x^2+13x+6=0$ (3 marks)

d. Write down the surd $\sqrt{42525000}$ in its simplest form. (3 marks)

e. Simplify $\dfrac{\left(x^4y^3z^{-2}\right)^3\left(x^6y^4z^2\right)^{\frac{1}{2}}}{x^2yz^{-3}}$ (3 marks)

f. Evaluate $\dfrac{\log 243+\log 27-\log 81}{\log 9}$ (3 marks)

g. Expand $(x+y)^5$ (3 marks)

h. determine the mean, mode and median of the following data (5 marks)
12, 11, 14, 17, 24, 19, 21, 10, 26, 24

i. Evaluate the following logarithms (4 marks)
$\log_4 64+\log_{11}121$

QUESTION 2 (15 MARKS)

a. Three sets are defined as
A={2,4,5,7,9,11,13,15,16,19,20} B={2,4,6,8,10,12,14,16,18} and
C={1,2,3,5,7,11,13,17,19,23}
Determine
$A\cup B$
$(B\cap C)\cup(A\cap C)$
$(A\cup C)\cap(B\cup C)$

b. A universal set U is defined as a set of all numbers from 1 to 10. Two other sets P and Q are defined in such away that P is the set of all even numbers that lie between 1 and 10 while Q is the set of all odd numbers that lie between 1 and 10.
Determine i. $P^C\cup Q^C$
ii. $P^C\cap Q^C$

QUESTION 3 (15 MARKS)

a. A line L1 passes through P(3,7) and Q(6,16)
i) Determine its equation in the form *y=mx+c* hence state the coordinates of its y-intercept (3 marks)
ii) Determine the equation of a line L2 that is parallel to the line L1 above and passes through the origin (3 marks)
iii) Determine equation of another line L3 that is perpendicular to L1 and passes through (4,6) (3 marks)

b. Determine the meeting point of the two lines whose equations are given as $2y+3x=23$ and $5y-2x=10$ (4 marks)

c. Determine the acute angle that lies between the line *2y=x-6* and *x-axis*

QUESTION 4 (15 MARKS)

a. Solve the following quadratic equations using the stated method

i) Factorization method

$3x^2+11x+10=0$ (3 marks)

ii) Completing square method

$2x^2+14x+24=0$ (4 marks)

iii) Quadratic formula method

$3x^2-11x-4=0$ (3 marks

b. The length of a rectangle is 9cm longer than its width. Given that its area is $22cm^2$. Determine its perimeter and the length of its diagonal (5 marks)

QUESTION 5 (15 MARKS)

a. Simplify the following surds $\left(3\sqrt{5}+4\sqrt{2}\right)\left(6\sqrt{5}-11\sqrt{2}\right)$ (3marks)

b. Evaluate $\dfrac{6\sqrt{3}+3\sqrt{5}}{7\sqrt{3}-2\sqrt{5}}$ in the form $a+b\sqrt{c}$ hence state the values of *a*, *b* and *c*

c. Evaluate the logarithms below (4 marks)

$$\frac{\log 625+\log 125+\log 5^7}{\log 25}$$ (3 marks)

d. Expand $(2x+3y)^6$ (5 marks)