



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCIENCES
UNIVERSITY EXAMINATION FOR CERTIFICATE IN COMMUNITY HEALTH AND
DEVELOPMENT
1ST YEAR 1ST SEMESTER 2013/2014 ACADEMIC YEAR
CENTRE: MAIN

COURSE CODE: SMA 1111

COURSE TITLE: MATHEMATICS I

EXAM VENUE: LAB I

STREAM: Certificate in Comm. Health & Development

DATE: 10/12/2013

EXAM SESSION: 11.30 – 1.30 PM

TIME: 1 ½ HOURS

Instructions:

- 1. Answer question 1 (compulsory) and ANY Two 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 ONE

- a) $X = \{1, 5, 4, 6, 7, 11, 12\}$ $Y = \{0, 1, 4, 6, 8, 11\}$ and $Z = \{2, 3, 6, 9, 10\}$
Determine $X \cap (Y \cup Z)$ (3 marks)
- b) A line L passes through 3,4 and is parallel to another line N whose equation is $3y + 7x = 10$. Determine the equation of line L. (3 marks)
- c) Find the meeting point of the two lines P and Q whose equations are given as
P: $y = 3x + 9$ Q: $3y = -6x + 27$ (3 marks)
- d) Use completing square method to solve $4x^2 = 12x + 28$ (3 marks)
- e) Express $\frac{2\sqrt{3} + 4\sqrt{2}}{4\sqrt{3} - 3\sqrt{2}}$ in the form $a + b\sqrt{c}$ hence state the values of a, b and c
- f) Simplify $\log_5[(x-1)(x-2)] - \log_5(x-2)$ (3 marks)
- g) The second term of an A.P is 11 and the fifth term is 26. Determine the sum of the first 10 terms of the series. (3 Marks)
- h) Expand $(2x + y)^6$ (3 marks)
- i) In a Mathematics Diploma class, the duration in minutes, taken by 10 students to recall the mathematical concepts they learnt in the secondary school syllabus were measured and recorded as shown.
4, 7, 9, 12, 14, 17, 20, 22, 24, 25, 30
Determine the variance of these 'thinking' durations (3 marks)

QUESTION TWO (15 MARKS)

(1 mark)

a. Three sets P Q and R are defined as

$$P = \{1,4,6,7,9,10,13,15,20\} \quad Q = \{2,4,6,8,12,16,18,20\} \quad \text{and} \quad R = \{3,6,9,12,15,18,21,24\}$$

Evaluate

i. $P \cup R$

ii. $(P \cap R) \cup (P \cap Q)$

iii. $(\emptyset \cap R) \cap (Q \cap R)$

(9 marks)

b) A universal set U is defined as a set containing all alphabets. A set V is the set containing all vowels while the set C is the set containing of all consonants. With reference to the universal set U determine

i. $V^c \cup C^c$

ii. $V^c \cap C^c$

(6 marks)

QUESTION THREE (15 MARKS)

a. Use the appropriate method to solve for x in the equation $x^2 + 19x + 60 = 0$ (3 marks)

b. Use the laws of logarithms to rewrite

$$\log \frac{abc^2}{d^3}$$

(3 marks)

c. A line L_1 passes through two points P(2,6) and (-3, 19) and is perpendicular to another line L_2 . Given that L_2 passes through the origin determine

Equation of L_2 (3 marks)

The point of intersection of the two lines (3 marks)

The angle between the line L_1 and the x-axis (3 marks)

QUESTION FOUR (15 MARKS)

- a. The twentieth term of an arithmetic progression is 66 while the fifty ninth term is 222. Determine the sum of the first 60 terms of the A.P. (4 marks)

- b. An infectitious disease spreads in a village in such a way that it attacks 5 more people daily. If it attacks 3 people in the first day determine the total number of people infected in two months. (6 marks)

- c. In a geometric sequence, the 4th term is 6 while the 5th term is 12. Determine the sum of the first ten terms (5 marks)

QUESTION FIVE (15 MARKS)

In a class of 50 students, a survey was conducted on the number of times each student had visited VCT centre for HIV testing and counseling since they attained the age of 18. The following were the responses obtained from each student.

22 ; 46 ; 35 ; 68 ; 67 ; 49 ; 55 ; 44 ; 23
44 ; 29 ; 35 ; 34 ; 42 ; 37 ; 40 ; 42 ; 46
41 ; 30 ; 59 ; 62 ; 26 ; 47 ; 45 ; 37 ; 38
23 ; 29 ; 56 ; 51 ; 38 ; 35 ; 43 ; 47 ; 43
46 ; 45 ; 61 ; 53 ; 52 ; 55 ; 48 ; 45 ; 52

- i. Using classes of 20-29, 30-39,..... up to 60-69. Construct a frequency distribution table. (5 marks)

- ii. From the frequency distribution table made in a. (i) above, determine the mean, the median variance and the standard deviation of the frequency of the visits. (10 marks)