JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE ACTUARIAL

1ST YEAR 1ST SEMESTER 2018/2019

KISUMU / KISII LEARNING CENTRE

COURSE CODE: SMA 1111

COURSE TITLE: MATHEMATICS I

EXAM VENUE: **STREAM: (Certificate in Community Health)**

DATE: 13/08/19 **EXAM SESSION: 9.00 – 10.30AM**

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 ONE (30MARKS)

a) Define the following
   i. Infinite set.
   ii. Proper subject.
   iii. Null set. (6mks)

b) Simplify by rationing the denominator.

$$\frac{2}{\sqrt{3} + \sqrt{2}}$$ (4mks)

c) Onyango buys 3 cows, 2 pigs and 4 hens from one who had 6 cows, 5 pigs and 8 hens. How many choices does Onyango have? (4mks)

d) Distinguish between the following terms.
   i. Primary and secondary data.
   ii. Population and sample. (4mks)

e) Prove that $sin^2\,\theta + cos^2\,\theta = 1$ (4mks)

f) Solve : $x^2 + 5x + 6 = 0$ (4mks)

g) The fifth term of an A.P is 18 and the twelfth term is 46. Determine the 17th term. (4mks)

QUESTION TWO (20MARKS)

a) From the data below

Class	4-8	9-13	14-18	19-23	24-28	29-33
Frequency	15	13	27	29	10	13

calculate the
   i. Mean
   ii. Median
   iii. Standard deviation
   iv. Variance

(12mks)

a) Wambilyanya starts a job with a salary of Ksh. 50 000 per annum. He enjoys an annual increment of Ksh.5000. Assuming a part from the increment Wambilyanga does not get any other increment and benefits. Find his salary in the 10th year. (4mks)

b) Solve the equation $3\,tan^2\,x - 4\tan x - 4 = 0$ (4mks)

QUESTION THREE (20MARKS)

a) The three sides of a triangle are given as $a = 10cm\ ,\ b = 8cm, c = 7cm.$ Find the angle C. (5 mks)

b) Find the simple interest that will earned when a welfare group lends to a member Ksh. 30,000 at the rate of 12% p.a for four years. (5mks)

c) Find the sum of the first 9 terms of the series 72.0, 57.6, 46.08,…… (5mks)

d) Solve for x in the equation
$32^{x-3} \times 8^{x+4} = 64 \div 2^x$ (5mks)

QUESTION FOUR (20MARKS)

a) Given that P,Q and R are subjects of the universal set U, each of the following is defined as fellows

U = $\{x : 2 \leq x < 12, x \text{ is an interger}\}$

P = $\{x : 3 < x < 6\}$

Q = $\{x : (2 < x \leq 5)\ U\ (9 < x < 12)\}$

R = $\{x : 4 \leq x \leq 8\}$

i. List the members of U, P, Q, and R.

ii. Find

- $(P \cup Q)\ UR$
- PU $Q \cap R$
- P$\cap$ $(Q \cup R)$ (12mks)

b) Evaluate $5C_3$ and$^8P_4$ (4mks)

c) Compute $(p+q)^5$ (4mks)

QUESTION FIVE (20MARKS)

a) Given $\cos\theta = \frac{1}{4}$ find without using tables.

i. $\sin\theta$

ii. $\tan\theta$

iii. $\sec^2\theta$ (7mks)

b) Simplify $\frac{x^3 + y^3 + xy^2}{xy}$ (4mks)

c) Solve for x in $2\log x^2 - 3\log 8x - \log 4x$ (4mks)

d) Covert 135^o and 330^0into radians. (4mks)

e) Convert $\frac{5\pi}{3}$ radians into degrees. (1mk)