JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

# **UNIVERSITY EXAMINATIONS 2014/2015**

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES AND BACHELOR OF SCIENCE IN PUBLIC HEALTH

**SMA 2104 : MATHEMATICS FOR SCIENCE**

**DATE: AUGUST 2015 TIME: 2 HOURS**

**INSTRUCTIONS:**

**ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

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**QUESTION ONE [30 MARKS][COMPULSORY]**

1. Use logarithms to evaluate

 [3 marks]

1. The fifth term of an arithmetic progression is 11 and the twenty fifth term is 51. Calculate the first term and the common difference of the progression. [3 marks]
2. Simplify the expression  leaving the answer in the form  where a, b and c are integers. [3 marks]
3. Find the first five terms of the expansion (2-x)8. Hence evaluate (198)8 correct to 4 significant figures. [4 marks]
4. Find the value of x that satisfies the equation

 [5 marks]

1. The population of a colon of bacteria increases at the rate of 10% per hour if the present population is 100 000 bacteria. Find the population of the bacteria after one day. [4 marks]

**QUESTION TWO [20 MARKS]**

1. Factorize the expression  [3 marks]
2. Solve the following quadratic expression by completely the square method

 [4 marks]

1. A group of young men decided to raise shs. 480 000 to start a business. Before the actual payment was made, four of the members pulled out and each of those remaining had to pay and additional shs. 20 000. Determine the original number of members. [5 marks]
2. The standard form of a quadratic expression is 
3. Write the following expression in standard form  [3 marks]
4. Use the standard form to determine the vertex of the graph and the general shape. [2 marks]
5. Use the discriminant  to determine the nature of the roots of the quadratic equation:  [3 marks]

**QUESTION THREE [20 MARKS]**

1. Given the series

43+74+105+………………..415, find

1. The number of terms in the series
2. The 10th term in the series
3. The sum of the series [10 marks]
4. Evaluate  [4 marks]
5. The fourth term of a geometric sequence is 192 of the first term of the sequence is 3. [6 marks]

Find

1. The common ratio
2. The number of terms that will give a sum of 255.

**QUESTION FOUR [20 MARKS]**

1. Use the remainder theorem to evaluate  at x =3. [4 marks]
2. Evaluate at x= -2. [3 marks]
3. Factorize 

Hence find the exact value of 25572-25472  [4 marks]

1. Simplify  [3 marks]
2. In how may ways can 3 men and their wives be seated [6 marks]
3. Alternately and
4. Anyhow, in a row of 6 chairs numbered 1 to 6, assuming a woman has to occupy seat 1.

**QUESTION FIVE [20 MARKS]**

1. Evaluate
2. 15P5 [2 marks]
3. 10C3 [2 marks]
4. In how many ways can a 3-digit number be formed from the digits 1, 3, 5, 7 and 9? [2 marks]
5. A child has 15 toy buildings and bricks of which 6 are red, 5 yellow and 4 green. In how many ways can he arrange his bricks in a line if he must have bricks of the same colour at either ends? [3 marks]
6. In how many ways can a candidate select 9 out of 16 subjects if
7. 6 subjects are compulsory and
8. If there are no compulsory subjects [6 marks]
9. Simplify - and leave your answer in surd form. [5 marks]