**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

 **UNIVERSITY EXAMINATIONS 2016/2017**

**YEAR I SEMESTER I EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY**

**SMA 2014: MATHEMATICS FOR SCIENCE**

**DATE: APRIL 2017 TIME: 2 HOURS**

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

**QUESTION ONE**

1. Explain the following terms as used in probability;
2. Independent events [2 marks]
3. Compound events [2 marks]
4. Mutually exclusive events [2 marks]
5. Solve for x in the following function;

 Log4 (x) – Log4 (x – 1 ) = ½ [4 marks]

1. Use complete the square method to solve for x

 6x2 – 11x + 3 = 0 [5 marks]

1. Rationalize the function and leave your answer in its simplest form;

 $\frac{\sqrt[2]{5} - \sqrt{2}}{\sqrt{5}+ \sqrt[3]{2}}$ [4 marks]

1. Calculate the mean absolute deviation of the data;

 45, 60, 80, 75, 50 [5 marks]

1. If x – 1 is a factor of x3 – 6x2 + ax2 – 6, Find a and hence factorize the function.

 [6 marks]

**QUESTION TWO**

The following data was obtained from Juja Police Station on the number of blackouts (x) and number of times (y) occurring monthly for 8 months.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 90 | 44 | 53 | 20 | 70 | 80 | 32 | 21 |
| Y | 45 | 60 | 32 | 31 | 90 | 85 | 52 | 32 |

**Determine;**

1. The regression equation and estimate the number of crimes if there are 10 blackouts. [10 marks]
2. The Pearson Correlation Co-efficient and comment on your result. [10 marks]

**QUESTION THREE**

1. Expand the function (2- x)5 and hence solve (1.98)5 correct to three decimal places. [6 marks]
2. The 3rd term of a GP is 2 and the 5th term is 18. Find;
3. The first term and common ratio [4 marks]
4. The sum of the first 10 terms [4 marks]
5. Use an appropriate technique to differentiate;

 y = (2x + 3)2 (3x – 2) [6 marks]

**QUESTION FOUR**

1. A box contains 8 Red and 5 Blue balls. Three balls are picked at random without replacement. Find the probability that;
2. All three are blue [2 marks]
3. There are at least two blue balls [4 marks]
4. Use Crammer’s rule to solve for the unknowns in the functions;

 5x + 8y = 139

 3x + 6y = 93 [5 marks]

1. Proof that the solution of ax2 + bx + c = 0 is

 x = $\frac{-b \pm \sqrt{b^{2}-4ac}}{2a}$ [6 marks]

1. Differentiate y = (3x2 + 4)3 [3 marks]

**QUESTION FIVE**

1. Given the following data;

Score Frequency

30 – 39 6

40 – 49 12

50 – 59 17

60 – 69 14

70 – 79 11

**Calculate;**

1. Mean [4 marks]
2. Mode [4 marks]
3. Quartile deviation [4 marks]
4. Standard deviation [4 marks]
5. Find the value of m if 25x2 – 70x – 19 + m is a perfect square. [4 marks]