**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2015/2016**

**EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE**

**SMA 2104: MATHEMATICS FOR SCIENCES**

**DATE: DECEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE**

1. Define the following terms:
2. Permutation [2 marks]
3. Combination [2 marks]
4. A function [2 marks]
5. Solve the equation 3x72x+1 = 37 [4 marks]
6. Solve the equation 2 sin = cos (300 - ) [4 marks]
7. Determine the mean and the semi-quartile for the data

7.5, 10, 5, 3, 2, 9, 8, 7, 14, 5, 8.5, 9.5 [4 marks]

(e) Expand (5x – y)5 [ 4 marks]

(f) The third term of a G.P is 1 ¼ and the sixth term is *5/32*. Determine the first term, the

 common ratio and the sum of the six terms of the series. [4 marks]

(g) A fair coin is tossed 8 times. Find the probability of obtaining;

 (i) Exactly 4 heads [2 marks]

 (ii) At least 1 head [2 marks]

**QUESTION TWO**

1. State and proof the sine rule [4 marks]
2. Prove that cos 3A = 4cos3A – 3cosA [4 marks]
3. A triangle has one side of length 5cm, perimeter 18cm and area 6. Determine the lengths of the other two sides. [6 marks]
4. Sketch the graph of y = cos  for -2 [6 marks]

**QUESTION THREE**

1. For two events A and B p and p(B) =  if p(A ^ B) = 

Find

(i) P (A [2 marks]

(ii) P (~A^B) [2 marks]

(iii) P (A [3 marks]

1. Calculate the mean, variance and the standard deviation of the distribution below:

|  |  |
| --- | --- |
| Length (cm) | Frequency |
| 25 – 29 | 5 |
| 30 – 34 | 12 |
| 35 – 39 | 25 |
| 40 – 44 | 11 |
| 115 – 49  | 7 |

1. A customer makes a single deposit of Sh.16,000 in an account which pays compound interest rate of 6% per annum.

(i) How much is the investment worth after 12 years. [3 marks]

(ii) After how many years will the investment be worth three times its initial value

 [4 marks]

**QUESTION FOUR**

1. State the remainder theorem and find the quotient and remainder of the polynomial

P(x) = x3-7x-6 when dividend by the factor x-4 [6 mark]

1. Determine the value of x without tables or electronic calculator if

  [6 marks]

1. Expand (10 + x)5 hence solve 10.045 [6 marks]
2. Give two application of studying the unit in real world events [2 marks]