## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**YEAR I SEMESTER I EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE**

**SMA 2104: MATHEMATICS FOR SCIENCE/ BUSINESS**

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

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND**

**ANY OTHER TWO QUESTIONS.**

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**QUESTION ONE (30 MARKS)**

(a) Determine the nature of the roots of the equations below:

i) 376x + 248 = -198x2 (2 marks)

ii) 8x2 + 15x + 3 = 0 (2 marks)

iii) 6x2 – 12x = -6 (2 marks)

(b) In how many ways can six blue beads, five green beads, 4 red beads and two white beads be arranged in a row if beads of the same colour are indistinguishable. (4 marks)

(c) Solve the equation 3x. 72x+1 = 37 (4 marks)

(d) Simplify without using tables and calculators.

 (4 marks)

(e) Find using first principles the sum of the first 8 terms, S8 of the G. P with first term 3 and common ratio ½. (8 marks)

(f) Find the interquartile range for the data.

10, 14, 7, 13, 17, 25, 5 (4 marks)

**QUESTION TWO (20 MARKS)**

(a) Solve the equation log2 (x + 2) + log2 (x – 2) = 5 for x > 0 (4 marks)

(b) Find the term containing y5 in the expansion of (and simplify your answer. (6 marks)

(c) Find the sum of the A.P series using first principles.

17 + 22 + 27 + 32 + ------112 (10 marks)

**QUESTION THREE (20 MARKS)**

(a) Calculate the mean and the standard deviation of the distribution given below using the variance formula.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mass in kg | 53-57 | 58-62 | 63-67 | 68-72 | 73-77 | 78-82 | 83-87 | 88-92 |
| Length | 2 | 12 | 11 | 23 | 27 | 10 | 9 | 6 |

(10 marks)

(b) A polynormial F(x) has remainder 9 when divided by x – 3 and remainder -5 when divided by 2x + 1. Find the remainder when F(x) is divided by

(x – 3) (2x + 1) (10 marks)

**QUESTION FOUR (20 MARKS)**

(a) Simplify leaving the answer in the form a + bwhere a, b, c are integers. (5 marks)

(b) Show that  (5 marks)

Hence solve the equation for x > 0  (5 marks)

(c) Determine the first four terms and the tenth term of the series.

 (5 marks)