**JOMO KENTATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATION 2017/2018**

**YEAR 1 SEMESTER 1 EXAMINATION FOR THE DEGREE OF BACHELOR OF ACTUARIAL SCIENCE, FINANCIAL INGINEERING,OPERRATIONS RESEARCH,STATISTICS**

**SMA 2104/SMA 2103: MATHEMATICS FOR SCIENCE/ MATHEMATICS FOR BUSINESS**

**DATE: JANUARY 2018 TIME: 2 HOUR**

**INSRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS.**

**QUESTION ONE (30 MARKS)**

1. Solve the equation 2x2-x-4=0 by using the method of completing the square. (3 marks)
2. Solve the following equation and give your answer correct to 3 decimal places: 33x-5=12

 (2 marks)

1. Write down the first for terms of expansion of (x2+$\frac{1}{x}$)6. Find the value of the constant term of the expansion. (5 marks)
2. If $\sqrt{17}$ = 4.1231056 and $\sqrt{11 }$ = 3.316625 both correct to 6 decimal places. Find the value of

 1 without using table or calculator. (4 marks)

$ \sqrt{17}$- $\sqrt{11}$

1. Write down and evaluate in surd form an expression for:
2. Cos 135o
3. Sin 75o  (4 marks)
4. The third term of an arithmetic progression is 6 and the common difference is 4. Find the tenth term and the sum of the first 10 terms. (4 marks)
5. The following data represents the recommended loads in kilograms that can be carried by a certain category of Mazda pickups: 1005, 1001, 1010, 1012, 1014, 1007, 1006, 1009, 1010 and 1010. Find the mean, the mode and the median of the data. ( 4 marks)
6. A bag contains 6 red beads and 3 white beads. With the help of a tree diagram, find the probability of drawing two red beads in two draws if the beads drawn are not replaced after each draw. (4 marks)

**QUESTION TWO ( 20 MARKS)**

1. The second term of a geometric progression is -4 and the fifth term is 32.Determine the first term, the common ratio and the sum of the first six terns of the series. (5 marks)
2. Use Binomial Theorem to expand (2- 3x)7 up to and including the term in x3. Use your expansion to evaluate1.9977 giving your answer correct to 6 decimal places. (8 marks)
3. Calculate how many different six figure phone numbers can be made from the digits 0 to 9, such that the first digit must be 6, second 7 and the last digit must end with zero. Assume that repetition of the digits is allowed. (7 marks)

**QUESTION THREE (20 MARKS)**

1. i) state the Reminder Theorem $ $ (2 marks)
2. A function f(x) has the reminder of – 2.5 when divided by 2x-1 and a reminder of zero when divided by x-3. Find the reminder when the function is divided by (x-3)(2x-1). (6 marks)
3. Show that log 8 x =$\frac{1}{3}$ log 2 x. Hence or otherwise solve the equation, for x >0,

Log2(3x+1) + log8(x-1)3 =6 without using tables or calculator. (7 marks)

1. A person wants to invite 9 friends but there is only room for 5 of them. In how many ways can the five to be invited be chosen if two of nine are twins and must not be separated? (5 marks)

**QUESTION FOUR (20 MARKS)**

1. A number is chosen at random from the numbers 1,2,3,4,…25. Find the probability that it is
2. Divisible by both 3 and 4 (3 marks)

ii)Divisible by 4 given that its divisible by 3. (4 marks)

1. For the following frequency distribution :

|  |  |
| --- | --- |
|  **Length (cm)** | **frequency** |
|  225-229 | 5 |
| 230-234 | 12 |
| 253-239 | 26 |
| 240-244 | 10 |
| 245-249 | 7 |

1. State the modal class. (1 mark)
2. Calculate the median. (2 marks)
3. Calculate the semi- interquartile range. (3 marks)
4. Calculate the variance and standard deviation of the data. (7 marks)