

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2015/2016**

FIRST YEAR, FIRST SEMESTER EXAMNATION FOR THE DEGREE OF BACHELOR OF SCIENCE MATHEMATICS AND COMPUTER SCIENCE, BACHELOR OF SCIENCE, BACHELOR OF EDUCATION SCIENCE, BACHELOR OF SCIENCE IN COMPUER SECURITY AND FORENSICS, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY, BACHELOR OF SCIENCE IN STATISTICS, BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE, BACHELOR OF COMPUTER SCIENCE, BACHELOR OF INFORMATION SCIENCE, BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

**SMB 3110: MATHEMATICS FOR SCIENCE**

**DATE: November, 2015 TIME: HOURS**

**INSTRUCTIONS:** *Answer questions* ***one Compulsory*** *and any other* ***two*** *questions*

**QUESTION ONE - (30 MARKS)**

1. Given that and express the following in terms of m,n, and p.

log (3 Marks)

1. Simplify by expressing with a rational denominator. (3 Marks)
2. Find the simplest form of the expression. (4 Marks)

1. Solve for y in the equation = log +log (2y +1)(3 Marks)
2. (i) Find the value of a such that when is divided x+2 the remainder is 6. (2 Marks)

(ii)Confirm your results using the long division. (2 Marks)

1. The mean weight of the distribution below is 117 kg.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Weight | 100 | 110 | 120 | x +25 | 40 |
| No. of people | 1 | 4 | 3 | 3 | 1 |

Find the value of x (3 Marks)

1. Determine the number of permutation of the letters of the word “MATHEMATICALLY” (2 Marks)
2. Solve the following equation on the domain (4 Marks)

 7 + 5cosx =

1. A batch of 40 bulbs contains 5 which are defective. A bulb is drawn from the batch and tested. One after the other without replacement. Find the probability that;
2. the two bulbs drawn are defective (2 Marks)
3. One is defective and the other is not. (2 Marks)

**QUESTION TWO (2O MARKS)**

1. forth term of an arithmetic progression is 13 while the seventh term is 22. Determine
2. the first term and the common difference (3 Marks)
3. the value of n if the nth form is 100 (2 Marks)
4. the values of m if the sum of the first m terms of the series is 175(3 Marks

 Prove the identity = 1 + sin 2 (4 Marks)

c) Find the term containing in the expansion (3 Marks)

d) An experimental culture has an initial population of 50 bactaria. The population increased by 80% every 20 minutes. Determine the time it will take to have a population of 1.2 million bactaria. (5 Marks)

**QUESTION THREE (20 MARKS)**

1. The following data relates to the marks obtained by learners in an examination;

|  |  |
| --- | --- |
| **Marks** | **No. o f learners** |
| 30-3435-3940-4445-4950-5455-5960-64 | 361215824 |

Calculate :

1. Mean (3 Marks)
2. Standard deviation (3 Marks)
3. The roots of the equation are and β. Find the value of;
4. + (3 Marks)
5. + (3 Marks)
6. (3 Marks)
7. In a triangle x y z, < x =, <y = and yz = 15.2 cm. Solve the triangle and hence find the area of the triangle. (5 Marks)

**QUESTION FOUR (20 MARKS)**

1. Given two events A and B, P(~A) = , P(B) = and P(AB) = . Find;
2. P(AB) (2 Marks)
3. P( ~A B) (2 Marks)
4. P(A ~B) (3 Marks)
5. Two dice are tossed and the number of each noted. Consider the following events;

A =

B=

1. Find P(A) and P(B) (4 Marks)
2. Determine whether A and B are independent (3 Marks)
3. A committee of 5 people is to be selected from 6 men and 4 women. Find
4. the number of different ways in which the committee can be selected. (2 Marks)
5. the number of these selections with more women than men. (3 Marks)
6. State one way in which statistical data can be collected. (1 Mark)

**QUESTION FIVE (20 MARKS)**

1. Find the value of m given that;

 (4 Marks)

1. Prove that = (3 Marks)
2. The table below gives the cumulative frequency distribution of heights of 400 children in a certain school.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Height  | 91-100 | 101-110 | 111-120 | 121-130 | 131-140 | 141-150 | 151-160 | 161-170 |
| Cummulative frequency | 3 | 27 | 85 | 215 | 320 | 370 | 395 | 400 |

 Determine;

1. Class width (1 Mark)
2. the range (1 Mark)
3. the mode height (3 Marks)
4. the median (3 Marks)
5. Inter Quartile Range (3 Marks)
6. 30th percentile (2 Marks)