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**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE**

**UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE**

**1ST YEAR 1ST SEMESTER 2016/2017 ACADEMIC YEAR**

**MAIN CAMPUS**

**COURSE CODE: SMA 3111**

**COURSE TITLE: MATHEMATICS I**

**EXAM VENUE: STREAM: HEALTHSCI, AGRI, ENGINEERING Y1S1**

DATE: EXAM SESSION:

TIME: 2.00 HOURS

**Instructions:**

1. **Answer question one (compulsory) and any other two questions.**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**QUESTION ONE (30 MARKS)**

1. Given that and . Show that . (4marks)
2. Find the power set of (4marks)
3. Convert
4. to radians. Express your answer as a multiple of (2marks)
5. radians to degrees (2marks)
6. Solve the equation (4marks)
7. Find the real solution, if any of the equation using quadratic formula

 (4marks)

1. Find the coefficient of in (3marks)
2. Let and be the functions from the set of integers to the set of integers defined byand . Find

i ) (2marks)

ii) (2marks)

1. Karen invested $1000 in an account that paid 3.5% interest compounded quarterly. Find the total amount of money that Karen had at the end of 5 years. (3marks)

**QUESTION TWO (20 MARKS)**

1. Describe the following sets using list method and give the set cardinality.

 (3marks)

1. If , and Find

i) (4marks)

ii) (4marks)

1. Draw the Venn diagram and shade the regions corresponding to the combinations to the set (3marks)
2. Prove the following law of set operation

 (6marks)

**QUESTION THREE (20 MARKS)**

1. The data below represents the masses of some containers sampled from a warehouse.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mass | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 |
| Frequency | 1 | 2 | 4 | 5 | 10 | 8 | 5 | 2 | 1 |

Use the data to calculate

i)themean (2marks)

ii) the median (3marks)

iii)the variance (3marks)

iv)the standard deviation (2marks)

1. Out of consonants and vowels, how many words of consonants and vowels that can be formed. (4marks)
2. If  and  are factors of , determine the values of

and(6marks)

**QUESTION FOUR (20 MARKS)**

1. Solve for (6marks)
2. Verify the identity

 (6marks)

1. A triangle has sides and . Determine its angles and its area. (8marks)

**QUESTION FIVE (20 MARKS)**

1. The fifth term of a geometric progression is and the ninth term. All the terms are positive.

i) Find the common ratio (3marks)

ii) Find the first term (2marks)

iii) Find the sum of the first terms (3marks)

1. A man wishes to save money by setting aside  shilling the first day,  shillings the

second day,  shillings the third day, and so on:

i) If he continues to double the amount set aside each day, how much must

 he set aside on the fifteenth day? (3 marks)

 ii) Assuming he does not run out of money, what is the total amount saved at

 the end of the  days? (3 marks)

1. If it rains on a given day, the probability that it rains the next day is 1/3. If it does not rain on a given day, the probability that it rains the next day is 1/6. The probability that it will rain tomorrow is 1/5. Using a tree diagram find the probability that it will rain the day after tomorrow. (6marks)