

**MATHEMATICS**

**21/10/2019**

**8h30 am -11h30am**

**SENIOR FIVE END OF YEAR EXAMINATIONS, 2019**

**SUBJECT: MATHEMATICS**

**COMBINATIONS:**

**PHYSICS-CHEMISTRY-MATHEMATICS (PCM)**

**MATHEMATICS-CHEMISTRY-BIOLOGY (MCB)**

**MATHEMATICS- PHYSICS- COMPUTER SCIENCE (MPC)**

**MATHEMATICS-COMPUTER SCIENCE –ECONOMICS (MCE)**

**MATHEMATICS –PHYSICS- GEOGRAPHY (MPG)**

**MATHEMATICS-ECONOMICS-GEOGRAPHY (MEG)**

|  |
| --- |
|  **/100** **Marks:** |

**DURATION: 3 HOURS**

**INSTRUCTIONS:**

1. Do not open this question paper until you are told to do so.
2. Answer all questions: **100 marks**
3. Use only a **blue** or **black** pen.

**S5 MATHEMATICS END OF YEAR EXAM, 2019**

**ANSWER ALL QUESTIONS (100MARKS)**

1) Simplify **( 3marks)**

2) If  and ; find the value of  without use of calculator **( 6marks)**

3)The angle of elevation of an airplane is 23 degrees, and its altitude is 2500 meters. How far away is it?

 (**4marks)**

4)solve the following equations

 **a) (3marks)**

**b) (4marks)**

**5.** If twice the age of son is added to age of father, the sum is 56. But if twice the age of the father is added to the age of son, the sum is 82. Find the ages of father and son**. (6marks)**

6) Use addition and subtraction formula to calculate **(4marks)**

7)A ray of light is incident through glass, with refractive index on an interface separating glass and water with refractive index.What is the angle of refraction if the angle of incidence of the ray in glass is ****

**(5marks)**

8) If the first and the tenth terms of an arithmetic sequence are 3 and 30 respectively. Find the fiftieth term of the sequence. **( 5marks)**

9)Solve the equation **( 6marks)**

10) Calculate the following limit **(6marks)**

11)At a certain school, 18% of all students play /Volleyball and basketball, and 32% of all students play football. What is the probability that a student who plays Volleyball also plays basketball?**( 5 marks)**

12.The table below shows the results of senior 4 students in Kinyarwanda and French Tests

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Kinya marks () | 3 | 5 | 6 | 8 | 9 | 11 |
| French marks() | 2 | 3 | 4 | 6 | 5 | 8 |

Answer to the following questions from the table above:

1. Complete the table below **(12marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | () |
|  |  |  |  |  |
| 5 | 3 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 11 | 8 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

 b)Find the covariance of  and (**3marks)**

13) Find the equation of a sphere which passes through the circle



and through the point(  (**5marks)**

14)For the matrix 

Find

a) **(2marks)**

b)Determinant of **(5marks)**

15)a)Find the derivative of the function **(4marks)**

b)Find the derivative of **(6marks)**

16)Determine the direction cosines of vectors with components (

**(6marks)**