**UGANDA CERTIFICATE OF EDUCATION**

**PRE REGISTRATION EXAMINATIONS 2016**

**MATHEMATICS**

**PAPER 2**

**2HOURS 30MINUTES**

**Instructions**

Attempt all questions in Section A and NOT more than FIVE from Section B.

Any additional question(s) answered will not be marked.

Only silent non-programmable scientific calculators and Mathematical tables with a list of formulae may be used.

**SECTION A (40MARKS)**

1. Without using tables or calculator, evaluate,

. (4marks)

1. Express, in the form . Hence state the values of a, b and c.

(4marks)

1. Given that varies inversely as the square of and that when

, find the value of;

1. when . (4marks)
2. Shs. 4,000,000 was invested at a 10% compound interest for 2 ½ years. Find the total amount of money the investor received at the end of the period. (4marks)
3. A straight line parallel to another line passes through a point . Find its equation. (4marks)
4. Given that and , find;
5. Vector
6. The magnitude of vector . (4marks)
7. In a class of 15 students, 7 like Luganda, 9 like French and 2 like neither Luganda nor French. Find the number of students who like both languages. (4marks)
8. The function If , find the value of .

(4marks)

1. Two similar cones have volumes 2000cm3 and 54000cm3. If the bigger cone has a height of 87cm, find the height of the smaller cone. (4marks)
2. Evaluate; . (4marks)

**SECTION B (60MARKS)**

1. a) Given that and that , draw an arrow diagram to represent the mapping. (5marks)

b) Given that and , find . (3marks)

c) If find the value of . (4marks)

12. A group of 80 science students in a certain school studied Physics (P), Biology (B), and Chemistry (C). Each studied atleast one of these three subjects. 16 took Physics only, 18 took Biology only, and 23 took chemistry only. 8 students took both Physics and Chemistry, 10 took Physics and Biology, and 9 took Biology and Chemistry. Using a suitable Venn diagram, find;

a) how many took all the three subjects

b) how many took Chemistry,

c) the probability that a student chosen at random took atleast two subjects.

(12marks)

13. The diagram below shows a right glass prism ABCDEF with the dimensions.

= 5cm, = = 3cm and = 12.5cm

**E**

**F**

***3cm***

***3cm***

**C**

**D**

***12.5cm***

***5cm***

**B**

**A**

Calculate to one decimal place;

1. The total surface area of the prism.
2. The volume of the prism
3. The angle between the planes BCEF and ABCD. (12marks)

14. a) Solve; .

b) Use logarithms tables to evaluate;

i) . ii) (12marks)

15. The figure below shows a trapezium, in which is parallel to . M is a point on such that and .

**O**

**P**

**R**

**Q**

**M**

***b***

***3a***

***a***

a) Given that and , express and in terms of and

b) Show that the points P, M and R are collinear. (12marks)

16. A quantity p is partly constant and partly varies as the square of when P = 2, n = 40 and when P = 3, n = 65.

a) Form an equation relating p and n (8marks)

b) Determine the values of p when n = 100. (4marks)

17. Every government employee is entitled to the following allowances.

- Medical Shs 720,000 per annum

- Electricity shs 40,000 per month

- Transport shs 2500 per day

- Housing 90% of the monthly medical allowance

The tax rates below apply to all government employees.

|  |  |
| --- | --- |
| **Taxable income (shs)** | **Rate (%)** |
| 0 - 80,000 | 2.0 |
| 80,001 – 190,000 | 5.0 |
| 190,001 – 280,000 | 7.5 |
| 280,001 – 380,000 | 12.0 |
| 380,001 – 490,000 | 15.0 |
| Above 490,000 | 20.0 |

If an employee paid a monthly income tax of shs.125,350 in June, 2015, calculate the;

1. Employee’s taxable income
2. Employee’s monthly gross income. (12marks)

***\*\*END \*\****