**P425/1**

**PURE MATHEMATICS**

**KING’S COLLEGE – BUDDO**

**INTERNAL MOCK EXAMINATION 2020**

**Uganda Advanced Certificate of Education**

**PURE MATHEMATICS**

**P425/1**

**3 Hours**

**INSTRUCTIONS TO CANDIDATES**

Answer **all** the eight questions in section **A** and any **five** from section **B**

Any addition question(s) answered will **not** be marked

All necessary working **must** be clearly shown

Begin each answer on a fresh sheet of paper

Silent, non – programmable scientific calculators and mathematical tables with a list of formulae may be used.

**SECTION A (40 MARKS).**

**Attempt all the questions in this section**

1. If and are the roots of and thatand  are both positive, find an equation whose roots are and  ( 5marks)
2. A cylinder has radius and height . The sum of  and is 2. Find the maximum volume of the cylinder in terms of  (5marks)
3. Evaluate (5marks)
4. The first term of a geometric progression is  and the sum to infinity is .Find the common ratio and the sum of the first  terms. (5marks)
5. Find the area bounded by the curve  and the line  (5marks).
6. Determine the angle between the line and the plane 
7. Prove that  (5marks)
8. The line  is a tangent to the circle whose centre is the point .find the radius of the circle (5marks)

**SECTION B (60marks)**

**Attempt any 5 questions from this section. All questions carry equal marks.**

1. Given the lines and are and  intersect

a). Find the point of intersection of the lines (6marks)

b). Find a vector equation of the plane containing the line in (a) above (6marks)

10a).Solve the equation  for (7marks)

b). Prove that  (5marks)

11a). The complex number  satisfies the equation,whereis a complex Conjugate of . Find the possible values of  in the form  (6marks)

b) Use Demoivres theorem to find the four roots of the equation

(6marks)

12a). Given that , prove that . Hence solve the simultaneous equations  and  (7marks)

b). If  , where  is real , show that  cannot take any value between

and (5marks)

13 a). The surface area of a cube is increasing at a rate of. Find the rate of increase of the Volume of the cube when the edge is of length  (6 marks)

b). Prove that  (6marks)

14a).Use the substitution  to find the integral  (6marks)

b). Show that the integral 

(06 marks)

15a). Prove that the line  touches thecurve (5marks)

b). Show that the equation of the tangent to the curve  at the point with parametric equations is . This tangent meets theaxis at  and axis at. Find the area of the triangle  (7marks)

16 A hot body of temperature of is placed in a room of temperature, minutes later its temperature is 

1. Form a differential equation to represent the rate of change of temperature, of the body with time, (9marks).

ii) Determine the temperature of the body after  minutes (3 marks)

**END**