P425/1

PURE

MATHEMATICS

Paper 1

Nov 2020

3hrs

**ST. MARYS’ KITENDE**

Uganda Advanced Certificate of Education

RESOURCEFUL MOCK EXAMINATIONS 2020

PURE MATHEMATICS

Paper 1

3 hours

INSTRUCTIONS TO CANDIDATES:

*Attempt* ***all*** *the* ***eight*** *questions in* ***Section A*** *and****Not*** *more than* ***five*** *from* ***Section B.***

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

*All working must be shown clearly.*

*Silent non-programmabe calculators and mathematical tables with a list of formulae may be used.*

*Graph papers are provided.*

**SECTION A: (40MARKS)**

*Answer* ***all*** *the* ***eight*** *questions in this Section.*

1. Solve the simultaneous equations;. (5marks)

2. Prove that; . (5marks)

3. Given the parabola ,

a) Express a point on the parabola in parametric form using as the parameter. (2marks)

b) If parameter gives point , show that the gradient of chord is .

(3marks)

4. Find . (5marks)

5. The line meets a plane perpendicularly at the point .

Find the vector equation of the plane. (5marks)

6. Solve . (5marks)

7. A roll of fencing material long is used to enclose a rectangular area using two existing perpendicular walls. Find the maximum area enclosed.

(5marks)

8. Solve the differential equation given that when

(5marks)

**SECTION B : (60MARKS)**

9. a) Prove that; . (6marks)

b) Two blue, three red and four black beads are to be arranged on a circular ring made of a wire so that the red are separated. Find the number of different arrangements. (6marks)

10. Given that;

a) Find Maclaurin’s expansion of upto the term in (8marks)

b) Hence, find the value of to four significant figures. (4marks)

11. a) Given that; find . (4marks)

b) A square prism is always three times the width in length. If the volume increases at a constant rate of 3-1, find the rate of change of the cross-sectional area when the width is . (8marks)

A

C

12.

P

***a***

B

O

Fig. 1

***b***

Figure 1 shows points A and B with position vectors and respectively. .

a) Express each of the following in terms of vectors and .

i) (2marks)

ii) (3marks)

b) Find the ration (7marks)

13. a) Prove that . (4marks)

b) i) Prove that for . (4marks)

14. The lines 1 and 2 are perpendicular and intersect at . Line 1 meets the x-axis in the first quadrant at such that units. If 2 meets the x-axis at , without graphical construction, find the area of the triangle .

(12marks)

15. Given that

a) Express in the form where and are real numbers. (6marks)

b) Find a polynomial of degree four where the roots of are 2 and 3. (6marks)

16. Evaluate; . (12marks)

**END**