**425/1**

**Principal**

**Mathematic**

**3 Hours**

**July/August 2022**

**3hours**

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**Community**

UNNASE MOCK EXAMINATIONS 2O22

**Uganda Advanced Certificate of Education**

**PRINCIPAL MATHEMATICS**

**PAPER 1**

**3HOURS**

**INSTRUCTIONS**

*Attempt* ***ALL*** *questions in Section A and any* ***FIVE*** *from Section B only.*

*State the levels of Accuracy in case of calculator (cal) and tables (tab).*

*Show the working clearly and begin each number on a fresh page.*

**SECTION A (60 MARKS)**

1. Given log3x = p and log18x = q. Show that log63 = *(05 marks)*

2. Solve the equation 2(32x) – 5(3x) + 2 = 0. *(05 marks)*

3. Express the following in partial fractions: *(05 marks)*

4. Express: in modulus – argument form. *(05 marks)*

5. Given that y = . Show that x + + xy = 0 *(05 marks)*

6. Expand by maclaurin’s theorem up to the first three terms. *(05 marks)*

7. Use substitution t = tan to evaluate *(05 marks)*

8. Solve the following set of simultaneous equations given by:

2x + y + 3z = 10

x – 3y + 5z = 12

-6x + 5y + z = -10 *(05 marks)*

**SECTION B (60 MARKS)**

9. The curve is given by: y = , be systematic and sketch it. *(12 marks)*

10i) Determine the point of intersection and an acute angle between

line = = and plane 3x – y + 2z = 8. *(08 marks)*

(ii) Form the equation of the line through a point A(2,0,1) and perpendicular to the

plane 3x – y + 2z = 8 in vector form. *(04 marks)*

11a) Solve a differential equation + ytanx = 2cosx for y = 3 *(05 marks)*

b) A liquid is being heated in an oven maintained at constant temperature of 180oc.

The rate of increase of liquid temperature is assumed to be proportional to (180-)

where is the temperature of the liquid at any time t in minutes.

The liquid temperature raises from 0oc to 120oc in 5 minutes,

i) Form a deferential equation and solve it.

ii) Temperature of liquid after further 5 minutes. *(07 marks)*

12a) Show that dx = In 2 + *(07 marks)*

b) Use integration by parts to evaluate the following 2x dx. *(5mrks)*

13a) Show that 5y = 4x + 25 is a tangent to the ellipse.

9x2 + 25y2 = 225

b) Form the equation of the normal at the point of contact.

c) Determine the eccentricity of the ellipse. *(12 marks)*

14a) If x is small enough such that terms x3 and higher powers may be ignored

Show that the binomial expansion of = 1 - x + x3. *(06 marks)*

b) The sum of the first two terms of the geometric progression is 9 and sum to

infinity is 25. Determine its first term and its positive common ratio.

*(06 marks)*

15a) Given that t = tan, show that Sin = and deduce the

expression for tan hence or otherwise find in the range 0 to 2

if 3 Sin + cos = 2. *(08 marks)*

b) Prove that = 2Sin x.

**END**