P425/1
Pure Mathematics
Paper 1
July/August 2022
3 Hours

KAYUNGA SECONDARY SCHOOLS EXAMINATION COMMITTEE

UGANDA ADVANCED CERTIFICATE OF EDUCATION

JOINT MOCK EXAMINATION 2022

MATHEMATICS

(PURE MATHEMATICS)

3 HOURS

INSTRUCTIONS TO CANDIDATES

- *All necessary working must be shown*
- *Attempt all the numbers in section A and only 5 in Section B.*
- *Extra Questions attempted will not be marked.*
- *Use silent non programmable calculator.*

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SECTION A

1. Solve the simultaneous equation **(5marks)**

$$\log_2 x^2 + \log_2 y^3 = 1$$
$$\log_2 x - \log_2 y^2 = 4$$

2. If $2x^2 + 3x + K = 0$ and $3x^2 + x - 2K = 0$ have a common root. **(5marks)**
Find the possible values of K.

3. Find the area enclosed by the curve $y = (x + 1)(x - 3)^2$, the x – axis line $x = 5$. **(5marks)**

4. Integrate $\frac{\sqrt{\tan x}}{Sin\, x\, Cos\, x}$ with respect x. **(5marks)**

5. Differentiate and simplify the function $\sqrt{\frac{(x+1)^3}{x+2}}$ **(5marks)**

6. Prove that $\frac{1+Sin\, x-Cos\, x}{1+Sin\, x+Cos\, x} = \tan\frac{1}{2}x$. **(5marks)**

7. Find the distance of a point A (1,2,0) from the plane $4x + 3y + 12Z = -16$. **(5marks)**

8. Show that $y^2 + 8y + 12 = 0$ represents a parabola. State the focus, direction and length of latus rectum. **(5marks)**

SECTION B

9. (a) By row reducing to edulon from solve the equations for x , y and z.

$$X + 3y - Z = 4$$
$$2x + 4y + Z = 8$$
$$3x + 6y + 2Z = 10$$

(6marks)

(b) Solve the equation $2(3^x) - 3^{2x+1} + 8 = 0$. **(6marks)**

10. (a) The sum of three numbers which are consecutive terms of an A.P is 21. If the second number is reduced by 1 and third number is increased by 1 we obtain three consecutive terms of a G.P. Find the numbers. **(6marks)**

(b) Expand $\sqrt{\frac{1-x}{1+2x}}$ in ascending powers of x upto including the term x^3. State the values of x for which the expansion is valid. **(6marks)**

11. (a) Find the volume generated when the area enclosed by the curve $y = x^2 - 6x + 18$ and $y = 10$ when rotated on the line $y = 10$. **(6marks)**

(b) Show that if $y = \frac{\cos 2x}{x}$ Then $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 4xy = 0$ **(6marks)**

12. Partialise function $f(x) = \frac{x^4-2x^3-x^2-4x+4}{(x-3(x^2+1)}$ Hence $\int_4^5 f(x)dx$ **(12 marks)**

13. (a) Differentiate with respect to x, $y = \frac{(x^2+1)^2(2x+1)^3}{(3x-1)^2}$ and simplify **(6marks)**

(b) $\int \frac{dx}{\sqrt{1+6x-3x^2}}$ **(6marks)**

14. (a) Prove that $\text{Cos}^2\text{A} - \text{Cos}^2\text{B} - \text{Cos}^2\text{C} = 2\text{ Cos A Sin B Sin C} - 1$. **(6marks)**

(b) By expressing $2\sqrt{2}\text{ Cos}(\theta + 45^0) + 7\text{ Sin }\theta$ as $\text{R (Sin }(\theta + \alpha)$. Find the maximum and minimum value of the function and corresponding angle from 0^0 to 360^0. **(6marks)**

15. (a) Find the point of intersection of the line $\frac{x-4}{1} = \frac{-3-y}{4} = \frac{z+1}{7}$ and $\frac{1-x}{2} = \frac{-1-y}{3} = \frac{z+10}{8}$ **(7marks)**

(b) Find the vector equation of a line joining planes $2x + 3y - 6Z = 3$ and $x - 2y + 2Z = 5$. **(5marks)**

16. (a) Given the curve $\frac{1}{x}\frac{dy}{dx} = \frac{Inx}{\sin y}$ **(5marks)**

(b) The rate at which a body loses temperature at any instant is proportional to the amount by which the temperature of body at the instant exceeds the temperature of its surroundings. A container of hot liquid is place in a room of the temperature 18^0C in 6 minutes the liquid cools from 82^0C to 50^0C. How long does it take to cool from 26^0C to 20^0C. **(7marks)**

END