UGANDA CERTIFICATE OF EDUCATION
END OF TERM 2 S.3 EXAMINATIONS, 2019
MATHEMATICS PAPER 1
TIME: 2 ½ HOURS

INSTRUCTIONS

- *Answer **ALL** questions in Section A and any **FIVE** in section B*

SECTION A

1. Solve for x: $\frac{3x}{2} - \frac{2}{3}(1 - 2x) < 5$

2. Factorise: $xy - 12ab - 4bx + 3ay$

3. If $3\begin{pmatrix} 4 & 0 \\ 5 & 7 \end{pmatrix} + \begin{pmatrix} 4 & 1 \\ 3 & -2 \end{pmatrix}\begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, find the values of a, b, c, and d.

4. Given the matrices, $P = \begin{pmatrix} -2 & 1 \\ 0 & 3 \end{pmatrix}$ and $Q = \begin{pmatrix} 5 & 0 \\ -6 & 2 \end{pmatrix}$. Find the matrix $(P - Q)^2$. (04 marks)

5. What is the LCM of 20, 32 and 17? (04 marks)

6. If the operation $(a * b)$ denotes the arithmetic mean of the two given numbers, find the value of $15 * (7 * 3)$. (04 marks)

7. Solve the equation $\frac{x}{6} - \frac{2x-3}{5} = \frac{x-5}{3}$.

8. Solve the equation $\frac{x^2+5x+6}{cosx} = 0$

9. Make x the subject of the formula $\frac{a}{bx+c} = \frac{d}{ex-f}$

10. Find the equation of a line which passes through the points $(2, -11)$ and $(-4,\ 4)$

SECTION B (answer any five)

11. (a) Draw a graph of $y = x^2 - 3x + 2$ for the values of x from $^{-}2$ to $^{+}5$.(06 marks)
    (b) Use your graph to solve the equations:
    (i) $x^2 - 3x - 4 = 0$ (03 marks)
    (ii) $2x^2 + x - 3 = 0$ (03 marks)

12. A farmer supplied a restaurant with the following, during the first week of January, 2016: $8kg$ of tomatoes, $30kg$ of irish potatoes and $12kg$ of carrots. He charged shs. 3,000 per kg of tomatoes, shs. 2,500 per kg of irish potatoes and shs. 2,000 per kg of carrots.
    (a) Write down the prices of the food items in a column matrix and the quantities supplied, in a row matrix. Hence calculate the amount of money the farmer received from the restaurant in the first week. (05 marks)

(b) In the second, third and fourth weeks of the same month, he supplied the restaurant with the same food items at the same prices as follows (weights in kg in the order of;tomatoes, Irish potatoes, carrots): $(30, 60, 20), (10, 50, 24)$ and $(30, 40, 32)$ for the respective weeks.

13. a) Given that $f(x) = 4x - 3$, find;

(i) $f(2)$ ***(02marks)***

(ii) $f^{-1}(x)$ ***(02marks)***

(iii) $f^{-1}(-1)$ ***(02marks)***

b) Given that $g(x) = x^2 + 1$ and $h(x) = x - 3$.

c) Find the value of x for which $g\,h\,(x) = h\,g\,(x)$. (O6 marks)

14. a) For the set {2, 3, 7), draw a papygram for the relationship " is less than". (04 marks)

b) Given that f(x)=7x-p, find (i) the inverse of f(x) (02 marks)

(ii) p when f(1)= 3. (03 marks)

(iii) x when f(x)=8 (02 marks)

(iv) find q in $g(x)=q^2+3x$, if g(-4)=f(0) (04 marks)

15. (a) Solve the equations 2p+1=q and 2q-p=8 using matrix method (06 marks)

(b)Solve for x in $\frac{x^2}{2} = \frac{4}{x}$ (03 marks)

(c) An examination is marked out of 130 marks. If ritah obtained 60% in the examination, how many marks did she get out of 130 marks? (03 marks)

END