

456/1  
Mathematics  
Paper 1  
July/August 2018  
2 ½ hours

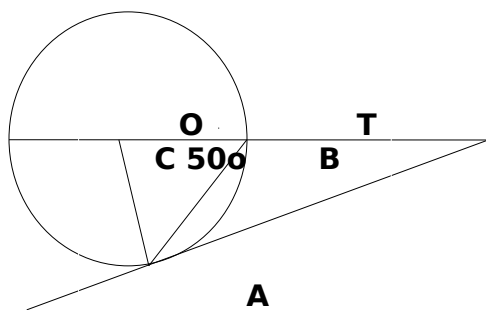
**UGANDA CERTIFICATE OF EDUCATION**  
**MATHEMATICS**  
**PAPER 1**  
**2 HOURS 30 MINUTES**

**INSTRUCTIONS TO CANDIDATES**

- Answer **all** questions in **Section A** and any **five** from **Section B**
- Any additional question(s) will not be marked
- All necessary calculations must be done on the same page as the rest of the answer .Therefore no paper should be provided for rough work.
- Graph papers will be provided.
- Silent, non programmable scientific calculators may be used.

### SECTION A: (40 MARKS)

1. Without using tables or calculators, evaluate  $21.5 \times 48.6 + 51.4 \times 21.5$  (3 marks)
2. Given that  $x * y = x^2 + y$  determine;
  - (i) The value of  $-3 * 5$
  - (ii) The value of  $y$  when  $2 * y = 7$  (4 marks)
3. Solve the equation:  $\frac{y+2}{3} - \frac{y-1}{4} = \frac{y+3}{2}$  (4 marks)
4. Given  $P^{-1} = \begin{pmatrix} 5 & -2 \\ -7 & 3 \end{pmatrix}$  determine the matrix  $P$ . (4 marks)
5. Given that  $\tan \theta = \frac{-3}{4}$  and that  $0^\circ < \theta < 180^\circ$ , without using a calculator, evaluate  $\sin \theta - \cos \theta$  (5 marks)
6. Solve the equation  $x^2 - 2x = 15$ . (3 marks)
7. Given the numbers 0, 6, 7, 3, 6 and 5 determine their;
  - (i) Mean
  - (ii) Median (5 marks)
8. Below is a circle with centre  $O$ .  $AB$  is a tangent at  $A$  and angle  $OTA = 50^\circ$



Determine value of angles;

- (i)  $\angle TAB$
- (ii)  $\angle ABT$
9. Point  $A(2,2)$  is rotated through  $90^\circ$  using centre  $(1,0)$ . Determine the coordinates of  $A'$ , the image of  $A$  after the rotation (4 marks)

10. A box has balls of the same size in colours of yellow, green and blue. The probability of picking a yellow ball is  $\frac{1}{4}$  and that of a green one is  $\frac{2}{3}$ . What is the probability of picking a blue one. (4 marks)

**SECTION B: (60 MARKS)**

11. The table shows marks scored in a Mathematics test and their respective cumulative frequency.

| MARKS   | CF |
|---------|----|
| 20 – 29 | 2  |
| 30 – 39 | 7  |
| 40 – 49 | 15 |
| 50 – 59 | 27 |
| 60 – 69 | 33 |
| 70 – 79 | 38 |
| 80 – 89 | 40 |

- (a) State ;
- the modal frequency
  - class interval
- (b) Calculate the mean mark
- (c) Draw a histogram and use it to estimate the modal mark. (12 marks)
12. Triangle **ABC** with vertices **A(2,2)**, **B(5,2)** and **C(1,5)** is given a translation  $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$  to triangle **A<sup>1</sup>B<sup>1</sup>C<sup>1</sup>**. Then **A<sup>1</sup>B<sup>1</sup>C<sup>1</sup>** is reflected in line  $y = -1$  to triangle **A<sup>11</sup>B<sup>11</sup>C<sup>11</sup>**.
- (a) Using a graph paper and on the same axes draw the triangles **ABC**, **A<sup>1</sup>B<sup>1</sup>C<sup>1</sup>** and **A<sup>11</sup>B<sup>11</sup>C<sup>11</sup>** (12 marks)
- (b) State the coordinates of;
- A<sup>1</sup>**, **B<sup>1</sup>** and **C<sup>1</sup>**
  - A<sup>11</sup>**, **B<sup>11</sup>** and **C<sup>11</sup>** (12 marks)

13. (a) Using a pencil, ruler and a pair of compasses, construct triangle **ABC** in which **AB = 8cm**, angle **A = 60°** and angle **C = 45°**. Measure length **AC**.

(b) Construct a circle passing through A, B and C. State its radius.

(c) Calculate the area of triangle **ABC** (12 marks)

14. (a) Given the matrices  $A = \begin{pmatrix} 3 & 4 \\ 4 & -1 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 2 \\ -3 & 1 \end{pmatrix}$ . Determine

(i)  $A^2 + B$

(ii)  $2B - A$  (6 marks)

(b) Use matrices to solve  $\begin{matrix} 2x+3y=1 \\ x-y=3 \end{matrix}$  (6 marks)

15. (a) Solve the inequality  $2x+1 < 7-x$  hence state the greatest integral value of

$$2x+1 < 7-x$$

(b) By shading the unwanted region, show the inequalities

$$y \leq x+1$$

$$y > 1$$

$$2y+x \leq 8$$

16. (a) Draw a graph of  $y = 2x^2 + x - 6$  for  $-3 \leq x \leq 3$

(b) state the minimum value of  $2x^2 + x - 6$

(c) Use the graph to solve the equation:

(i)  $2x^2 + x - 6 = 0$

(ii)  $x^2 - x - 2 = 0$

(12 marks)

17. (a) Given that  $x^2 - y^2 = 65 \wedge x - y = 5$  determine the value of x and y

(b) The length of a rectangle is 3cm less than twice its width, and the area is  $35\text{cm}^2$ .

Calculate the;

(i) width

(ii) perimeter of the rectangle (12 marks)

**END**