**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM NO: \_\_\_\_\_\_\_\_\_\_\_\_CLASS:\_\_\_\_\_\_\_\_\_\_**

**DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

MARKS HERE

**MATHEMATICS**

**FORM 3**

**TERM 3, 2023**

**INSTRUCTIONS: ANSWER ALL QUESTIONS TIME: (1 HR 30 MINS)**

**1.** The sum of the first 3 terms of a geometric series is 26. If the common ratio is 3. Find the sum of the first 6 terms. (3 mks)

2. a. Use matrix method to solve the following simultaneous equation. (3 mks)

 x-2y=4

 2x+y=3

b. Given P= $\left[\begin{matrix}1&2\\0&4\end{matrix}\right] $Q=$[\begin{matrix} 2&0\\1&3\end{matrix}$ ] and R = $\left[\begin{matrix}3&0\\2&2\end{matrix}\right] $find:

 PQR. (3 mks)

½Q+P. (3 mks)

3. In the figure below the tangent AB and BC are 12 cm long, with O as the centre of the circle and the radius 5 cm find

 A

 12 cm

 B

a.OB C 12 cm

b. Angle ABC

4. The cash price of a phone is sh 9000. A customer bought the phone by paying 15 monthly installments of 950 each. Calculate the carrying charge and the rate of compound interest (4 mks).

5. Find the equation of a circle of centre (2,1) and radius $\sqrt{13}$. (2 mks)

6. Find the value of y. (3 mks)

2 + log 3 + log y = log 5 + 1

7. Find the values of x,y and z in the following triangles

(4 mks)

 X

 y

 5cm

Z 13.4cm Y

8. Two marbles are picked in turn with replacement from a pack containing three red marbles, six white marbles, 7 black marbles and 9 green marbles. Using a tree diagram, determine the probability of picking: (5 mks)

a. Two white marbles.

b. A black then a green marble.

c. No red marble.

9. The resistance to the motion of a bicycle is partly constant and partly varies as the square of the speed . The resistance is 265 N when the speed 20 km/h and 365 N when the speed is 30 km/h. Find the resistance when the speed is 35 km/h. (4 mks).

10. Using Pascal's triangle expand the following. (4 mks)

a.(P + Q)⁶

b.(2x + 3y)⁴

11. The length of an arc of a circle is 11.0 cm. Find the radius of this circle if the arc substends 90° at the centre of the circle. (3 mks)

12. Express in surd form and simplify $\frac{1+\cos( 30°)}{1-sin60°} ($3 mks)

13. The temperature of a body is measured and recorded as 29.5°c. Find the percentage error.(3 mks)