## FORM 2 ENDTERM 3 EXAM

## MATHEMATICS

NAME
ADM $\qquad$ CLASS

## INSTRUCTIONS TO CANDIDATES

1.Write your name and index number in the spaces provided at the top of this page.
2.This paper consists of two sections: Section l and Section II
3.Answer all questions in section l and Section II.
4. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
5.Marks may be given for correct working even if the answer is wrong.
6.Non- programmable silent electronic calculators and KNEC Mathematical tables may be used.

## FOR EXAMINER'S USE ONLY

## SECTION I

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | TOTAL |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

## SECTION II

| 14 | 15 | 16 | TOTAL |
| :--- | :--- | :--- | :--- |
|  |  |  |  |

## SECTION I(40 MARKS)

## ANSWER ALL QUATIONS IN THIS SECTION

1. Find the equation of a line through point $(5,-1)$ and perpendicular to line $4 x+2 y-3=0$. (3mks)
2. Two spheres have surface areas of $36 \mathrm{~cm}^{2}$ and $49 \mathrm{~cm}^{2}$. If the volume of the smaller sphere is $20.2 \mathrm{~cm}^{3}$ calculate the volume of the larger one.
3. Find the integral values of x which satisfy the following inequality.

$$
\begin{equation*}
6-3 x \leq 2 x-4<x+1 \tag{3marks}
\end{equation*}
$$

4. Factorize the quadratic expression below: $x^{2}+6 x+9$
5. The interior angle of a regular polygon is $150^{\circ}$. Find the value of $n$.
6. Simplify the following expression
7. Calculate the area of the shaded region given that the radius is 27 cm .

8. Simplify: $\frac{\frac{1}{2} o f \frac{5}{7}+\left(\frac{3}{5}+2 / 5\right.}{3 \frac{1}{3}-1 \frac{4}{9}}$
9. Using a pair of compasses and a ruler only construct a triangle $A B C$ such that $A B=4 \mathrm{~cm}$, $\mathrm{BC}=6 \mathrm{~cm}$ and angle $\mathrm{ABC}=135^{\circ}$.
10. Solve for $\mathbf{x}$. If $3^{2 \mathrm{X}+3}+1=28$.
11. A straight line passing through $A(-2,1)$ and $B(2,-k)$. The line is perpendicular to a line $3 y+2 x=5$. Determine the value of $\mathbf{k}$ and hence the equation passing through $A$ and $B$.
12. Use substitution method to solve

$$
3 y+2 x=13
$$

$$
2 y-3 x=0
$$

(3mks)

## SECTION II (30 MARKS)

ANSWERALLQUATIONS IN THIS SECTION
14. A soda depot had 30816 sodas which were packed in crates. Each crate contained 24 sodas. The mass of an empty crate was 2 kg and that of a full crate is 12 kg .
a) How many crates were there?
(2mks)
b) What was the total mass of empty crates?
c) What was the total mass of sodas alone?
d) A lorry was hired to transport the crates at a cost of sh. 5 per crate of soda per trip. The lorry could only carry 107 crates per trip. How much money was spent on transporting all the crates? (3mks)
15. Triangle PQR has vertices $\mathrm{P}(3,2), \mathrm{Q}(-1,1)$ and $\mathrm{R}(-3,-1)$.
(a) Draw PQR on the grid provided.
(b) Under a rotation the vertices of $P^{1} Q^{1} R^{1}$ are $P^{1}(1,4), Q^{1}(2,0)$ and $R^{1}(4,-1)$. Find the centre and angle of rotation using points $P$ and $Q$.
(c) Triangle $P Q R$ is enlarged with scale factor 3 centre $O(0,0)$ to give triangle $P^{2} Q^{2} R^{2}$. Draw triangle $\mathrm{P}^{2} \mathrm{Q}^{2} \mathrm{R}^{2}$ and state its co-ordinates.
(2mks)
(d) Triangle $P^{1} Q^{1} R^{1}$ undergoes reflection in line $y=x$ to give triangle $P^{3} Q^{3} R^{3}$. Draw $P^{3} Q^{3} R^{3}$ and state its coordinates.
(3mks)

16. A country bus left Nairobi at 10.45 a.m and traveled towards Mombasa at an average speed of $60 \mathrm{~km} / \mathrm{h}$. A matatu left Nairobi at $1: 15 \mathrm{p} . \mathrm{m}$ on the same day and traveled along the same road at an average speed of $100 \mathrm{~km} / \mathrm{h}$. The distance between Nairobi and Mombasa is 500 km .
(a) Determine the time of the day when the matatu overtook the bus
(b) Both vehicles continued towards Mombasa at their original speeds. How long had the Matatu waited before the bus arrived?

