NAME: $\qquad$
SCHOOL: $\qquad$
INDEX NO:
DATE: $\qquad$

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST - 2012
TIME: $21 / 2$ HOURS

## MANGA DISTRICT JOINT EVALUATION EXAM- 2012 <br> Kenya National Examination Council (K.C.S.E)

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST - 2012
TIME: $21 / 2$ HOURS

## INSTRUCTIONS TO CANDIDATES

1. Write your name and Index number in the spaces provided above.
2. The paper contains two sections. Section I and II.
3. Answer all the questions in section I and only any FIVE questions from section II.
4. All answers and working must be shown on the question paper in the spaces below each question.
5. Show all steps in your calculations, giving answers at each stage.
6. Marks may be given for each correct working even if the answer is wrong.
7. 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 | 14 | 15 | 16 | TOTAL |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

SECTION II
GRAND TOTAL

| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | TOTAL |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |  |  |  |  |

$\square$

This paper consists of 16 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

1. When asked to find $\frac{7}{18}$ of a certain numiber, Juma found by mistake $\frac{7}{8}$ of it. Hence the answer was too large by 105 .Find the nuruber.
2. 

$$
6 \log _{2} 3 \sqrt{64}+10 \log _{3} 5 \sqrt{243}
$$

3. Solve for x , for $0^{0} \leq x \leq 360^{\circ}$
4. Momanyi deposited sh. 24,000 in a fixed account for a period of 24 months .The bank pays compound interest on quarterly basis. At the end of this period, Momanyi's account had ksh. 64,200 .Determine the rate at which interest is paid per annum.
5. Simplify the following surd in the form $a \sqrt{2} 4^{c^{\circ}} b \sqrt{5}$ where a and b are constants. $\frac{5}{2 \sqrt{2}-\sqrt{5}}-\frac{2}{2 \sqrt{2}+\sqrt{5}}$
6. The figure beld ${ }^{5}$ is a circle of radius 8 cm . Point $\mathrm{A}, \mathrm{B}$ and C are vertices of the triangle ABC , in which,$\angle A B E=80^{\circ}$ and $\angle A C B=60^{\circ}$ which is in the circle.


Calculate the area of the triangle ABC
7. Expand completely $(x-0.2)^{5}$.

Hence use your expansion to find the exact value of $(9.8)^{5}$
8. Make $b$ the subject of the formula
9. The eleventh term of an A.P is four times the second term. If the sum of the first seven terms of the A.P is 1
10. An object whose area is $80 \mathrm{~cm}^{2}$ is mapped onto an image where area is $40 \mathrm{~cm}^{2}$ after a transformation represented by the matrix $\left(\begin{array}{ll}k & 2 \\ 3 & 4\end{array}\right)$ Find the value of k .
11. The gradient of a curve at any point is given by the function $2-x^{2}$.If the curve passes through the point ( $-1,3$ ). Find its equation
12. The velocity of water flowing through a pipe is inversely proportional to the square of the radius of the pipe. If the velocity of the water is $30 \mathrm{~cm} / \mathrm{s}$ when the radius of the pipe is 2 cm .Find the velocity of the water when the radius of the pipe is 4 cm .
13. The sum of two numbers is 15 .The differencerbetween five times the first number and three times the second number is 19 .
Find the two numbers
14. Find the distance along a parallel of a latitude between the points $\mathrm{A}\left(75^{\circ} \mathrm{N}, 38^{0} \mathrm{E}\right)$ and $\mathrm{B}\left(75{ }^{6} \mathrm{~N}, 42^{0} \mathrm{~W}\right)$ in
(a) Kis) Kilometers
(b) nautical miles
15. Nyambane missed two types of coffee, type A and type B in the ration 1:3 by mass. The coffee type A and type B cost sh. 180 per kg and ksh. 120 per kg respectively.
Calculate the percentage profit when the mixture is sold at ksh. 162 per kg .
16. A nail is known to have a diameter of 5 mm . it is measured with a micrometer screw gauge and the diameter is recorded as 4.986 mm .
Calculate the percentage error in this measurement.
17. Use the taxation rates in the table below ${ }^{\circ}$ to answer the questions that follow:


Mr Okweba is manager of a certain company who is entitled to a monthly personal relief of sh. 3000 and ${ }^{\text {is }}$ tax (P.A.Y.E) is sh. 9000 per month and cooperative shares of sh. 1200 per month is contributed.
Calcifate
(as) Mr. Okweba's total deductions per month from his earnings,
(b) Total tax per month without relief.
(c) Mr. Okweba's monthly basic salary in his monthly allowances amounted to sh. 12,000
18. In the figure below $\mathrm{AB}=a \mathrm{AD}=b$ AX: $\mathrm{XC}=2.9^{5}$ and $\mathrm{DX}: \mathrm{XB}=4: 5$

(b) Express $D C$ in terms of $a$ and $b$ in the simplest form
(c) If $B \underset{\sim}{C}=\mathrm{n} \underset{\sim}{a}+\mathrm{m} \underset{\sim}{b}$, find the values of n and m .
19. The marks scored by 50 students in a maths dest were as follows:

| Marks | $10-19$ | $20-29$ | $30-39$ | $50-50$ | $60-69$ | $70-79$ | $80-89$ | $90-99$ |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Frequency | 1 | 2 | 5 | 50 | 13 | 10 | 6 | 3 | 2 |

(a) State the modal class
(b) On the grid provided draw an ogive

(c) From the graph in (b) above determinee ${ }^{s}$
(i) The mediun mark
(iii) The pass mark is $44 \%$ of the students passed the test.
20. Given that $x+y=8$ and $x^{2}+y^{2}=34$. Find the value of
(a) $x^{2}+2 x y+y^{2}$
(2mks)
(b) $2 x y$
(c) $x^{2}-2 x y+y^{2}$
(d) $x-y$
(e) $x$ and $y$
21. A particle moves suchkthat $t$ seconds after passing a given point $O$, its distance $S$ metres from $O$ is given as $S=t(t-2)\left(t-s=P^{3}\right)$
(a) Find its belocity when $\mathrm{t}=2$ seconds
(b) Find its minimum velocity
(c) Find the time when the particles is momentarily at rest.
(d) Find its acceleration when $t=3$ seconds
22. (a) On the grid provided, draw triangle $A B C$, $\mathrm{AC}(-2,2), \mathrm{BC}(-5,2)$ and $\mathrm{C}(-5,6)$ and its image $A^{\prime} B^{\prime} C^{\prime}$ under negative quarter turpabout origin.
(b) Draw the image $A^{\prime} B^{\prime} C^{\prime}{ }^{\prime}$ of $A^{`} B^{`} C^{`}$ under a reflection in the line $y+x=0$
(c) Draw the image $A^{\prime \prime}{ }^{\prime} B^{\prime \prime} C^{\prime}$ " of $A$ " $B^{\prime \prime} C^{\prime \prime}$ under a reflection in the line $x=0$
(d) Describe a single transformation that maps $A^{\prime}{ }^{\prime} B^{\prime}{ }^{\prime} C^{\prime}{ }^{\prime}$ onto $A B C$.

23. The triangle below shows a triangular prism. $\mathrm{AB}=20 \mathrm{~m}, \mathrm{BC}=10 \mathrm{~m}$.
$\mathrm{AE}=\mathrm{ED}=\mathrm{BF}=\mathrm{FC}=8 \mathrm{~cm}$.

(a) Find the length
(i) AC
(ii) AF
(b) (i) Calculate the angle between line AF and the base ABCD
(ii) Find the angle between plane ADF and the base ABCD
(c) Find the volume of the prism
24. The results of an experiment on the variation of $P$ and $Q$ are tabulated below. A relationship of the town $\mathrm{P}=\mathrm{aQ} \mathrm{Q}^{\mathrm{n}}$ is expected to hold between P and Q where a and n are constants.

| Q | $5 . \mathrm{e}^{\mathrm{e}^{4}}$ | 10 | 15 | 20 | 25 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| P | $q_{9}^{9} .67$ | 31.86 | 44.97 | 57.42 | 69.42 |

(a) あraw a suitable linear graph to verify that the assumed relation is approximately true (7mks)

(b) Hence determine the values of a and $\mathrm{b}_{\mathrm{f}} \mathrm{c}$ orrect to 2d.p

