NAME： $\qquad$
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## SCHOOL：

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MATHEMAN̈TIEN
PAPERZ系 ${ }^{2}$
JULYY STUGUST 2007
2媘 准OURS

# BUNGOMA DISTRICT MOCK EXAMINATION Kenya Certificate Of Secondary Education 2007 

$121 / 1$
MATHEMATICS
PAPER 1
JULY／AUGUST 2007

## 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 I and Section II．
3．Answer all questions in section I and any five questions from 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，except where stated otherwise．

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

| $\mathbf{1 7}$ | $\mathbf{1 8}$ | $\mathbf{1 9}$ | $\mathbf{2 0}$ | $\mathbf{2 1}$ | $\mathbf{2 2}$ | $\mathbf{2 3}$ | $\mathbf{2 4}$ | Total |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
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## SECTION I ( 50 Marks)

## Answer All the question in this section.

1. Without using mathematical tables or calculator, evaluate $\frac{0.08 \times 0.54 \times \sqrt{182.25}}{0.01 \times 0.012} \quad$ (3marks)
2. A solid metal cone has a diameter of 14 cm and a height of 24 cm .
(a) What is the volume of the cone
(b) If the cone is melted and recast into a cylinder of the same diameter, what is the height of the cylinder.
3. Express the number 1478 and 7056 , each as product of its prime factor. Hence evaluate $\frac{1470^{2}}{\sqrt{7056}}$, leaving the ${ }^{e^{5^{5}}}$ answer in numerical form
4. Simplify $\left\{\frac{33 y^{4} \times 9 y^{5}}{11 y^{12}}\right\}^{\frac{1}{3}}$
5. In the figure below, PQ is parallel to RS and the lines PS and RQ meet at T . Given that $\mathrm{PT}: \mathrm{TS}=2: 3$ and $\mathrm{RQ}=10 \mathrm{~cm}$

(i) Show that triangle PTQ and STR are similar
(ii) Hence find the length of RT
6. One of the sides of a rightangled triangle is 14 cm longer than the shortest side but 4 cm shorter than the longest sides $\boldsymbol{c}_{\text {Find }}$ the area of the triangle
7. (a) Water and Alcohol are mixed in the ratio of $3: 8$. Find the density of the mixture if the density of water is $2.0 \mathrm{~g} / \mathrm{cm}^{3}$ and that of alcohol is $0.96 \mathrm{~g} / \mathrm{cm}^{3}$.
(1mark)
(b) Find the surface area of a glass cuboid block whose volume is $1504 \mathrm{~cm}^{3}$ if its length and breadth are 36 cm and 24 cm respectively.
(2 marks)
8. $\quad \mathrm{X}(4,-3)$ and $\mathrm{Y}(-3,-2)$ afe points on a straight line. Find the equation of the perpendicular of XY, giving your anastwer in the form $\frac{X}{a}+\frac{y}{b}=1$

Hence state the x and y intercepts
(1mark)
9. The graph below shows the motion of a bus for 10 minutes


The bus moves from V to X. Calculate the distance (total distance) moved by the bus from V to X and hence its average speed.
10. In the figure below, O is 8 the center of the circle ABCD and AOD is a straight line. If $\overline{A B}=\overline{B C}$ and angle DAC $=40^{065}$, Calculate angle BAC.
11. Using a ruler and a pair of compasses only,
(a) Construct triangle ABC in which $\mathrm{BC}=8 \mathrm{~cm}$, angle $\mathrm{ABC}=112 \frac{1}{1 / 2}$ and $\angle \mathrm{BAC}=45^{\circ}$
(2marks)
(b) Drop a perpendicular from A to meet CB produced at P , hence find the area of triangle ABC.
12. $A$ is a square whose sides are $5 \mathrm{~cm} . \mathrm{A}_{1}$ is the image of A under an enlargement scale factor ${ }^{+} 4$. $\mathrm{A}_{2}$ is the image of $\mathrm{A}_{2} \mathrm{x}_{\mathrm{u}}$ nder enlargement scale factor ${ }^{+} 3 . \mathrm{A}_{3}$ is the image of $\mathrm{A}_{2}$ under an enlargement scale factor +2. Calculate:

(ii) The ratio of the area $\mathrm{A}_{2}$ to the area $\mathrm{A}_{3}$
13. Solve the equation $\frac{x+1}{2}=1-\frac{1-3 x}{5}$
14. A tailor brought two pair of trousers at sh 1600 . He marked the price such that after allowing his discount of $15 \%$, he would still make a profit of $30 \%$ on the cost price. Determine the price at which a pair of trouser was marked.
(3marks)
15. Without using mathematieal tables and calculator, evaluate: $3 \log _{10} 5+\log _{10} 64-\log _{10} 8$

16. A two digit number is made by combining any 2 of the digits $1,3,5,7,9$ at random
(a) Make an array of possible combinations
(2marks)
(b) Find the probability that the number is a prime number.

## SECTION II (50 MARKS)

## Answer any FIVE Ouestions in this section

17. Last year Bungorma Teachers Sacco received a gross income of sh. 12.5 Million from 50,000 shares. After paying salaries and other expenses, the Sacco had a balance of sh. 6.5 Million.
Each year $\% 0 \%$ of a balance is paid to members as dividends which is calculated per share. This year the sacco's gross income increased by $15 \%$, the salaries and other expenses increased by $359 \%$ while members' share went up by 15000 shares calculate:
(a) ${ }^{\circ}$ The amount of dividends paid per share last year
(b) The amount of dividends paid per share this year.
(c) If Mr. Wamono had saved by $31^{\text {st }}$ December last year Shs 40,000 and a share is sh 225 , how much dividend did he receive this year?
(2 marks)
(d) Comment on the sacco's performance for the last two years
18. At 2225 hours, an aeroplain Q is reported to be 19700 km on a bearing of $060^{\circ}$ from town P and heading towards it att $5000 \mathrm{Km} / \mathrm{h}$. At the same time, another plane C leaves town P and heads steadily at $40000 \mathrm{R}_{\mathrm{e}}^{-\frac{0}{\mathrm{e}}} / \mathrm{h}$ on a bearing of $090^{\circ}$. At 0113 hours the two planes are closest together. Determine, $0_{0}^{\alpha} 0^{\infty}$
(a) The distance between the two planes at 0113 hours
(b) How far away from town P the plane C will be when plane Q lands at town P , Leaving you answer nearest to Km
(4 marks)
19. 



The diagłafus shows vertical telephone pole RS supported by wires SP and SQ pegged at points $P$ and Q respectively on a level ground. Points P and Q are on the same straight line from the base R of thaspole. The angles of elevation of S from P and Q are $33.9^{\circ}$ and $48.2^{\circ}$ respectively. Given that $\mathrm{PR}=$

(a) The distance QR
(b) The length of the wires SP and SQ
(c) If the cost of the pole and labour is sh. 1600 and the cost of 1 meter of the wire is sh. 233.

Find the total cost of the installation.
(2 marks)
20. A triangle $\Delta_{0}$ has vertices $(1,0), \mathrm{B}(1,2)$ and $\mathrm{C}(2,3)$. Its image $\Delta_{1}$ under an enlargement E has vertices $A^{1}(3,-2), B_{2}^{1}\left(8^{5}, 2\right)$ and $C^{1}(5,4)$. A triangle $\Delta_{2}$ whose vertices are $A^{11}(-3,-2), B^{11}(-3,2)$ and $C^{11}(-5,4)$ is, the image of $\Delta_{1}$ under reflection R .
(a) (i) Drayy the three triangles on the graph paper provided.
(b) Find the equation of the line of reflection.
(c) If $\Delta_{0}$ has an area of $y$ square units, state the area of $\Delta_{1}$ in terms of $y$.
21. Given a quadrilateral $A B C D$ is inscribed in a circle of center O and radius $6 \mathrm{~cm}, \angle \mathrm{CDE}=60^{\circ}$.
(i) $\angle A B C$
(ii) $\angle C A O$
(b) Find the
(i) Length of ON
(ii) Area of the sector subtended by the major arc ABC
22. Below is a diagram of a ranit cube OABCDEFG, in 3-dimensions.


Write down the co-ordinates of the vertices B, F and C.
(b) Determine column vectors

$$
\text { (i) } A B
$$

(ii) $A G$
(c) (i) A point P has co-ordinates $(-2,3,5)$. Write the position vector of P using the unit vectors $\mathbf{i}, \mathbf{j}$ and $\mathbf{k}$.
(1 mark)
(ii) Show that the points $p(-2,3,5), \mathrm{Q}(4,-6,-10)$ and $\mathrm{R}(0,0,0)$ are collinear. (2 marks)
23. A cylindrical storageftank of diameter 14 cm is initially two thirds full of water. The tank is filled by pipe of interral radius 5 cm through which water flows at the rate of 56 m per minute. Water starts flowing infor the tank at 10.15 a.m and the tank is full at $2.55 \mathrm{p} . \mathrm{m}$.
(a) Détermine the height of the tank.
(b) Starting with the full tank, school uses water from this tank at the rate of 11,550 liters per day. Find how long it takes to consume all the water assuming that no more water is added.
(c) How long does it take for the tap to fill the tank when empty.
24. United Millers imports wheat from U.S.A at initial cost of 350 dollar per tone. The shipping costs and customs duty are then charged as $25 \%$ and $15 \%$ respectively. When the wheat reached Mombasa, an $8 \%$ of the initial cost is incurred to transport it to Kisumu.
(a) Giventhat 1 US dollar $=$ Ksh82.40, calculate the total cost of importing 5 tonnes of wheat $\operatorname{ingsh}^{\circ}$
(b) The united millers intends to make a profit of $25 \%$. Giving your answer to the nearest ten cents, calculate the price at which a 2 kg packet of wheat should be sold.
(c) How much profit shall the company realize from the sell of 1 tonne of wheat?


[^0]:    This paper consists of16 printed pages．Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing．

