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PAPER 2

## KITUI WEST DISTRICT JOINT EVALUATION TEST - 2011

## Kenya Certificate of Secondary Education

121/2
MATHEMATICS
PAPER 2

## $21 / 2$ HOURS

## INSTRUCTIONS TO CANDIDATES

1. Write your name school and index number in the spaces provided at the top of this space
2. The paper consists of two sections section I and section II
3. Answer all the questions in section I and only five questions from section II
4. All answers and working must be written on the question paper in the spaces provided below each question
5. Marks may be given for correct working even if the answer is wrong.
6. Negligence and slovenly work will be penalized
7. Non- programmable silent electronic calculators or a mathematical table may be used except where stated otherwise.

## FOR EXAMINERS ONLY

SECTION 1

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | TOTAL |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
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SECTION II

| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | TOTAL |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
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| GRAND TOTAL |
| :---: |
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## SECTION 1 (50 MARKS)

Answer all questions in the spaces provided


1. Using logarithensevaluate;

2. Make $t$ the subject of formula.

$$
\mathrm{V}=
$$

3. Evaluate;

$$
\int \overline{(2+3)}
$$

4. Use matrix method to detgymine the co-ordinates of the point of intersection of the two lines.

$$
\begin{equation*}
3 \mathrm{x}-2 \mathrm{y}=13, \quad 2 \mathrm{y}+\mathrm{x}^{5} 1=0 \tag{3mks}
\end{equation*}
$$

5. P and Q are the points on the ends of the diameter of the circle below.

a) Write down in terms of $x$ and $y$ the equation of the circle in the form;
$a x^{2}+b y^{2}+x+y+c=0$
(2mks)
b) Find the equation of the tangent at $Q$ in the form $a x+b y+c=0$
6. Use binomial expansion to expand ( $1-)^{4}$ up to the $4^{\text {th }}$ term
(2mks)

7. Solve for $x$
$[\log ]+\log 8=\log$
(3mks)
8. An arc of a circle radius 3.5 cm is 9.1 cm long. Find the angle it substends at the centre of the circle
(3mks)
9. In the figure below ST andRU are parallel. Given that $\angle \mathrm{RUT}=<\mathrm{SRT}$. $\mathrm{RT}=12 \mathrm{~cm}, \mathrm{TS}=6 \mathrm{~cm}$ and RS $=4.5 \mathrm{~cm}$. calculatécthe length UT

10. In mr Mukala's shop, a radio has marked price of ksh10000. Mr mukala can allow a reduction of $15 \%$ on the marked price and still make a profit of $25 \%$ on the cost price of the radio. What was the cost price of the radio
11. A point $T$ divides a line $A B$ internally in the ratio 5:2. Given that $A$ is $(4,10)$ and $B(11,3)$. Find the coordinates of T
12. Grade x and grade y sugajeost sh60 and sh50 per kilogram respectively. In what proportion must the two grades be mixed 如 $^{\varsigma}$ produce a blend that cost $\operatorname{sh} 53$ per kilogram
13. Use the identity $\operatorname{Sin}^{2}+\operatorname{Cos}^{2}=1$ to find the values of $\sin$, Given that $\cos =-$
14. A two-digit number is made by combining any of the two digits $1,3,5,7$ and 9 at random.
a) Make an array of possible combinations

|  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
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b) Find the probability that the number formed is prime
15. Simplify completely

16. Mukai travels from $A$ to $B$ at $x k m / h$. The two towns are 40 km apart. She then travels to town $C$ at $(x+6) \mathrm{km} / \mathrm{h}$. Town B and C are 100 km apart. If the time she takes from B to C is the same time from $A$ to $B$, find the value of $x$

## SECTION II (50MARKS)

## Answer any FIVE questions from this section

17. Income tax sole on annual income at the rate shown below

| Taxable Ancome (K£) | Rate (sh per K£) |
| :---: | :---: |
| $1-2{ }^{4} 5000^{4}$ | 2 |
| $\hat{c}^{2} 50 \hat{c}^{2}-3000$ | 3 |
| -53001-4500 | 5 |
| 4501-6000 | 7 |
| 6001-7500 | 9 |
| 7501-9000 | 10 |
| 9001-12000 | 12 |
| Over 12000 | 13 |

a) A certain headmaster earns a monthly salary of Ksh 8570 . He is housed in the school and as aresult his taxable income is $15 \%$ more than his salary. He is entitled to a family tax relief of ksh150 per month. How much tax does he pay in a year
(6mks)
b) From the headmasterssalary the following deductions are also made every month

WC PS
NHIF

$2 \%$ of gross salary
ksh20
House rene, vyater and furniture charges ksh 246
Calcuiftexthe headmaster's net salary for each month
(4mks)
18. The figure below is a solid in which base ABCD is a rhombus. $\mathrm{AC}=16 \mathrm{~km}, \mathrm{BD}=12 \mathrm{~cm}$ and $\mathrm{CE}=$

a) EBD and ABCD
(4mks)
b) ECB and EBD
c) Length BC and BE
(3mks)
19. a)Fill the table below

| x | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 120 | 150 | 180 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $3 \operatorname{Sinx}-1$ | -1 |  | 0.5 |  | 1.6 |  | 2 |  |  |  |
| $\operatorname{Cos} \mathrm{x}$ | 1 |  | 0.87 | 0.71 | 0.5 |  | 0 | -0.5 | -0.87 | -1 |

b) Using the same axis draw on the graph paper provided, the graph of $y=3 \operatorname{Sin} x-1$ and $y=\operatorname{Cos} x$ for $0^{\circ} \leq \mathrm{x} \leq 180^{\circ}$
c) Use your graph to solve the equation
i) $3 \operatorname{Sin} x-\operatorname{Cos} x=1$
ii) $3 \operatorname{Sin} x=1$

20. A bag contains 3red, 4 white and 5 green balls. Three balls are selected without replacement. Find the probability that the 4 three balls chosen are
a) All Red
$e^{2}$
(2mks)
b) All green2 $\alpha^{5^{x}} 0^{\circ}$ (2mks)
c) One of each colour
21. A particle moving along asstraight line covers a distance 5 metres in time $t$ seconds from a fixed point O on the line where $\mathrm{s}=\mathrm{t}^{3}-6 \mathrm{t}^{2}+8^{\mathrm{t}}-4$
Find $e^{0,}$
a) The velgeityof the particle when $t=5$
b) The acceleration when $t=5$ seconds
c) The time when the velocity of the particle is constant
(4mks)
22. a) Using a rular and a paifaf compass only construct triangle ABC in which $\angle \mathrm{BAC}=120^{\circ} \mathrm{AB}=$ 6.4 cm and $\mathrm{AC}=7.0 \mathrm{cria}^{5}$

Measure i) $<$ ABC
(1mk)
ii) BC
b) Construct the circumscribed circle of triangle ABC withO as its centre. Describe the circumscribed circle as a locus
23. Two aircrafts A and B took off at the same time on Monday from Jomo Kenyatta International Airport $\left(1^{\circ} \mathrm{S}, 37^{\circ} \mathrm{E}\right)$ atty $\mathrm{c}^{\mathrm{s}} 1.00 \mathrm{Pm}$. AircraftA flew due East and Aircraft B flew due west. If they met again after 18 hoors at $\left(1^{\circ} \mathrm{S}, 117^{\circ} \mathrm{W}\right)$, calculate:- (take radius of Earth $=6370 \mathrm{~km}$ )
i) Theirfeesprective speeds in $\mathrm{km} / \mathrm{h}$ (to 2d.p)
24. The time they met again
(2mks)

Assuming that acceleration due to gravity is $10 \mathrm{~m} / \mathrm{s}^{2}$
Determine $\quad Q^{0,}$
a) An expressigx for its velocity $t$ seconds later
b) An expression for its height above the ground $t$ seconds later
c) The maximum height reached by the ball

