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NAME	INDEX NO
121/2 MATHEMATICS ALT A PAPER 2 JULY/AUGUST, 2014 TIME: 2 ¹ / ₂ HOURS	Erceekcsepastpage DATE
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CENTRAL KENYA NATIONAL SCHOOLS JOINT EXAM - 2014

Kenva Certificate of Secondary Education MATHEMATICS ALT A PAPER 2 TIME; 2²/₂ HOURS

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INSTRUCTION TO CANDIDATE'S:

- (a)Write your name, index number and school in the spaces provided at the top of this page.
- (b) Sign and write the date of examination in spaces provided above.
- (c) This paper consists of **TWO** sections: Section I and Section II.
- (d) Answer ALL the questions in Section I and any five questions from Section II.
- (e) Show all the steps in your calculation, giving your answer at each stage in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong. (f)
- (g) Non-programmable silent electronic calculators and KNEC Mathematical tables may be used, except where stated otherwise.
- (h) This paper consists of 16 printed pages.
- (i) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (*j*) Candidates should answer the questions in English.

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

17	18	19	20	21	22	23	24	TOTAL	Grand
									10181

SECTION I: (50 MARKS) Answer all the questions in this section in the spaces provided.

(3mks)

Use reciprocal and square tables to evaluate, to 4 significant figures.

(3mks)

Make K the subject of the formula and simplify. 3.

$$t = \frac{2y+1}{\sqrt{2Ky+K}}$$
(3mks)

- .com Expand $\left(5 - \frac{t}{2}\right)^6$ up to term in χ^3 uses your expansion to estimate the value of $\left(4\frac{1}{2}\right)^6$ correct 4. For More Pree Con Past Papers Visit WMM. Freekcaep (2mks)
 - Find the number of terms in the series. $a + 3a + 9a + \dots$ 243a.

(3mks)

The number χ is chosen at random from the set (0, 3, 6, 9) and the number y is chosen at random 6. from the set (0, 2, 4, 6, 8). Calculate the probability of each of the following separate evens. (a) $\chi > 6.$ (1mk)

(b) $\chi + y = 11.$ (2mks)

- Given that $4y = 3 \operatorname{Sin} \frac{2}{5}$, for $O \le \theta \le 360^{\circ}_{O}$ determine. (a) Amplitude of the curve. 7. For wore Free 109 Papers Visit wow Freekcaek

(1mk)

(2mks)

Find the radius and centre of the circle whose equation is: 8.

$$\frac{t^2}{2} - 2t + \frac{y^2}{2} - 5y + 2 = 0$$
(3mks)

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Given that $5^{\chi} = 7^{y}$ find the ratio χ : y. 11.

(3mks)

(3mks)

con Find the equation of the normal to a curve $\chi_{2}^{2} \neq 4y + 1$ at the point (2, 0.75). 12.

(4mks)

Calculate the standard deviation of 42, 45, 46, 50, 52, 56, 59.

(3mks)

(3mks)

OA = 3i + 4j - 6K and OB = 2i + 3j + K. P divide line AB in the ratio 3: -2. 14. Write the coordinate of P.

15. Two variables y and χ are such that y varies partly as χ and partly as the square of χ . Determine the relationship between y and χ given when $\chi = 2$, y = 28, $\chi = 3$, y = 48. (3mks)

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Draw the net of the solid below and calculate surface area of its surfaces VA = VB = VC = VD = 10cm. (3mks)



SECTION II: (50 MARKS)

Answer only **five** questions from this section in the spaces provided:

- The first, fourth and thirteenth terms of an Arithmetic Progression (AP) correspond to the first 17. three consecutive terms of an increasing Geometric Progression (G.P). Given the first term of the AP is \mathbf{a} and the common difference is \mathbf{d} .
 - Write down the first three terms of the G.P in terms of **a** and **d**. (1mk) (a)

For More Free Legis Past papers The sum of the third and the eleventh terms of the A.P is 30.

the common difference of the A.P. (5mks)

(ii) the first term of the A.P. (1mk)

(iii) the common ratio of the G.P. (1mk)

sum of the first 10 terms of the G.P. (2mks) (iv)



con Income tax for all the income earned is charged at the rate shown in the table below. 19.

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		\sim		
	Salary in Kf per month	Tax in Shseper f	Total tax per slab	
	The first 300	² 2 ²		
	Next 300	3 ² 3		
	Next 300	~~ ^e 5		
	Next 300	· 7		
	Excess χ 🖓	11		
	, G ¹			
	(a) Complete the table	by filling the value	for the total tax per	slab.
	a ta			
	(b) Empla claiming a t	ax relief of Ksh.600) discovered that a t	otal of Kshs.5710 is
	her earnings in form	n of income tax. He	ow much is her taxa	ble amount in Ksh.
	20.2			
	St			
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- (2mks)
- Emparclaiming a tax relief of Ksh.600 discovered that a total of Kshs.5710 is deducted from (6mks)

(c) Determine her net income if she earns a non-taxable entertainment allowance of Shs.3010 and that she pays a bank loan of Kshs.400. (2mks)

com In the figure below O is the centre of the circle TN is a tangent to the circle of m 20. a? $\angle PQM = 15^{\circ}$ \angle SMN = 33° D freek. Q 0 Pap For More Free KCSB Past P N M Giving reasons; find

- ∠POM. (i)
- (ii) ∠PMT
- (iii) ∠PRS.
- (iv) ∠OSM
- (v) ∠OPM

Draw the table for the equation $y = \chi^3 + 2\chi^2$. 21. (a)

a¥										
χ	-3	-2.5	-2	- k 30	-1	-0.5	0	0.5	1	1.5
2χ²	18	12.5	8	° 4.5	2		0		1	4.5
χ^3	-27		-8		1		0		1	
у	-9	<u>د ۲</u>	e ^e 0		3		0		2	

On the grid provided, draw the graph of $y = \chi^3 + 2\chi^2$ for $-3 \le x \le 1.5$. Take the scale 2cm for 1 unit on the X-axis and 1cm for 1 unit on the Y-axis. (3mks) (b)



(c)

Solve the equation $\chi^3 + 2\chi^2 = 0$. Solve the equation $\chi^3 + 2\chi^2 - \chi - 2 = 0$ using your graph and another line graph.(3mks) (ii)



Mathematics Paper 2

(2mks)

22. The figure below shows a right pyramid with a square base ABCD. VC = 20cm, AB = BC = 10.



X and Y are the mid-point of AB and BC respectively. Calculate (a) the vertical height VO to 2d.p.

(3mks)

(2mks)

(b) the angle between VD and ABCD.

(c) the angle which plane VXY makes with the base. (5mks)

FOT NOTE Free

- com P and Q are two points on the same parallel of latitude 66°25¹, whose longitudes differ by 120°. 23. of latin the tree to be past papers visit www.treetcoefferences to the tree to be past papers visit www.treetcoefferences to the tree to be papers visit www.treetcoefferences to the to the to be papers visit www.treetcoefferences to the tot Calculate
 - the radius of the parallel of latitude where P and Q lie R (6370km). (2mks)

the distance of P and Q measured along the parallel of latitude. (2mks)

(c) (i) the length of the straight line joining PQ. (2mks)

(ii) the distance PQ along the latitude in nautical mile. (2mks)

If an aircraft took 30min to fly P to Q. Calculate its speed in knots. (d) (2mks) 24. In a certain Mathematical relationship, the values of A and B are found to obey the relationship $B = CA + KA^2$ where C and K are constants. Below is a table of values of A and B.

А	1	2	4	6					
В	3.2	6.75	15.1	25.2					

(a) By drawing a suitable straight line graph, determine the values of C and K. (8mks)



(b) Hence write the relationship between \mathcal{R} and B.

(1mk)

(c) Determine the value of B when A = 7.