Index No:.....

Candidate's Signature

121/2**MATHEMATICS** PAPER 2 JULY/AUGUST-2014 TIME: 2¹/₂ HOURS

Name.....

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Kenya Certificate of Secondary Education (K.C.S.E.)

121/2**Mathematics** Paper 2 2¹/₂ Hours

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **index number** in the spaces provided at the top of the . page.
- The paper contains two sections; section I and II. •
- Answer *all* the questions in section I and any five questions from section II.
- All answers and working Must be written on the question paper in the spaces • provided below each question.
- Non- programmable silent electronic calculators and KNEC mathematical • tables may be used except where stated otherwise.
- Mark may be given for correct working even if the answer is wrong. .

For Examiners Use Only

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

Section II

Question	17	18	19	20	21	22	23	24	Total

GRAND 1	TOTAL
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1			

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

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

1. Use logarithms in all steps to evaluate.

$$\frac{2.53^2 \times 83.45}{\sqrt{0.4562}} \text{ free}^{\text{e}}$$

 x_{0}^{0} v x_{0}^{0} 2. By using completing square method, solve for x in $4x^{2} - 3x - 6 = 0$

3. Make p the subject in T =
$$\sqrt[3]{\frac{p^2 + n}{m^2}} + R$$

(3mks)

(4mks)

(3mks)

- 4. If $\frac{\sqrt{14}}{\sqrt{7} \sqrt{2}} \frac{\sqrt{14}}{\sqrt{7} + \sqrt{2}} = a\sqrt{7} + b \frac{\sqrt{9}}{\sqrt{9}}e^{be}$ Find the value of a and b where a and b are rational numbers. (3mks) $f = be e^{be} e^{be}$ 5. e^{ab} Find the first three terms in ascending powers of x of $(2 - x)^5$ (1mk) For work the first three terms in ascending powers of x of $(2 - x)^5$ (1mk)
 - (b) Hence find the value of the constant K, for which the coefficient of x in the expansion of (k + x)(2- x)⁵ is -8 (2mks)

6. OA = 3i + 4j - 6k and OP = I + 15k. P divides AB in the ratio 3 – 2. Write down the coordinates of B. (3mks)

7. Solve the following equation giving answer in degrees for 0° x 360° $5-4 \cos 2 x = 4 \sin x$ 10° $5-4 \cos 2 x = 4 \sin x$ 10° $10^{$.s. com

(4mks)

(3mks)

9. Three people A, B and C can do a piece of work in 45 hours, 40 hours and 30 hours respectively. How long can B take to complete the work when he starts after A and C have worked for 13 hours each. (3mks) 10. Two line x + 2y = -1 and 2x + 3y = 3 intersect at point T. Find the equation of circle T and radius 5 units giving your answer in the form $x^2 + ye^2 + g + fy + c = 0$ where g, f, and c are constants. (3mks)

con

11. The figure below shows a square based pyramid ABCD. AV = BV = DV = 18cm. AB = 10cm. calculate the angle between the planes BVC and AVD (3mks)

12. Find the equation of the normal to the curve $y = x^3 - 2x^2 + 3x - 1$ at part (2,5) (3mks)

13. The figure below shows a circle with centre O and diameter AB is parallel to CD. Given that AB = 8cm and Chord CD is 6cm. Calculate the distance of the chord from O to a significant figure. (2mks)

Diagram

14. A quantity P varies partly as the cube of Q and partly varies inversely as the square of Q. when Q = 2, P = 108 and when Q = 3, P = 25q. thad the value of P when Q = 6. (3mks)
(3mks) **Constraints of Constraints of Constraints**

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15. Solve for y in the following equation below: $\log_4 y + \log_y 4 = 2$ For More Free

(4mks)

16. The data below shows marks scored by 8 form four students in Rachuonyo district mathematics contest. 44,32,71,52,28,39,46,64. Calculate the mean absolute deviation (3mks)

SECTION II (50 MARKS)

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Answer any five questions in this sections in the spaces provided.

17. The table below show income tax rates

at CT							
Monthly taxable income	Rate of tax(Ksh/£)						
1-435 min.	2						
$436 - 870^{\circ}$	3						
871 - 3305	4						
1306-1740	5						
Excess over 1740	6						
a P							

(a) Calculate the gross income tax An employee exams a monthly basic salary of sh. 30,000 and is entitled to taxable allowances

(4mks)

(b) The employee is entitle to a personal tax relief of Ksh. 800 per month. Determine the net tax. (2mks)

(c) If the employee received a 50% increase in his total income, calculate the parentage increase on the income tax. (4mks)

- 18. An aeroplane that moves at a constant speed of 600knots flies from town A (140N, 30oW) southwards to town B (XoS,30oW) taking 3 ½ hrs. it then changes direction and flies along latitude to town C (xoS,^0oE). Given f = 33142 and radius of the earth R = 6370km
- .f X Free Visit www.fre Papers Visit www.fre Papers Visit www.fre Ror More Free (ii) (3mks)

The distance between town B and town C along the parallel of latitude in km. (2mks)

(b) D is an airport situated at (5oN, 120oW), calculate (i) The time the aeroplane would take to fly from C to D following a great circle through the South pole. (3mks)

(ii) The local time at D when the local time A is 12.20 p.m

9

Mathematics 2

19. Three darts players Jane, Kelly and Brony are playing in a completion the probability that Jane, Kelly and Brony hit the bull's eyes is ¹/₅,⁹²/₅ and ³/₁₀ respectively.
(a) Draw a probability tree diagram to show all the possible outcomes for the players. (4ml freekce to be an exact paper of the treekce to be an exact p

(4mks)

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For Note Free (b) Calculate the probability that : (i)

> (ii) All the three fail to hit the bull's eye.

Only two fails to hit the bull's eye. (iii)

(2mks)

(2mks)

Jane or Brony hit the bull's eye.

20. The voltage V and the resistance R in certain conductor are correction by the equation RV+a + bv where a and b are constant. The values of \mathbb{R} and V are given is the table below.

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200 ²									
V	0.25	0.13	0.08	0.06	0.05	0.04			
R	1	2 6	<mark>?</mark> 3	4	5	6			

(a) Re write the above equation in the form y = mx + c

i

(1mk)

(b) Using the above table and equation obtained in (a) above, draw a straight line graph using scale of 1 cm 5 mits (5mks)

- (c) Use your graph to estimate
 - (i) The value of a

(2mks)

(ii) The value of b

(1mk)

21. The fourth, seventh and sixteenth term of an arithmetic progression are in geometric progression. The sum of the first six terms of the arithmetic progression is 12.

con

(a) First term and the common difference of the arithmetic progression. Hor More Free KCSB Past Papers Visit MM. (6mks)

(b) Common ratio of the geometric progression.

(2mks)

(c) Sum of the first six terms of the geometric progression.

- 22. Use a ruler and compass only for all construction in this question.
 - a) (i) Construct a triangle ABC in which ABC = 8 cm BC = 7.5 and $\angle ABC = 112 \frac{1}{2^{\circ}}$ (3mks) b) By shading the unwanted regions show the locus of P within the triangle ABC such that

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- (i) AP BP
- (ii) AP 3cm mark the required as P.
- c) Construct a normal from C to meet AB produced at D.
- d) Locate the locus of R in the same diagram such that the area of triangle ARB is 34 the area of triangle ABC. (2mks)

(3mks)

(1mk)

23. Sarger makes two types of wedding cakes. Types A and B. type A requires 200g of flour and 80g of cooking oil. Type B requires 400g of flour and 50g of cooking oil. On a particular day, they had 16000g of flour and 400g of cooking.

com

(a) If they make x cakes of type A and Y cakes of type B, write down inequalities in x and y to represent the above conditions? (4mks)

(4mks)

(c) The profit on type A cake is sh. 30 and the profit n type B cake in sh. 40. Determine the number of cakes of each type he should make to maximize profits. (2mks)

24. A ball is thrown upward and its height after to econds is S metres , where $S = 30 t - 5t^2$

55

Find

a) The greatest height reached by the ball and the time when it is reached. (4mks)

con

In Hor wore Free b) b) The time it returns to the original level.

c) Its velocity after 4 seconds.

(2mks)

(2mks)

d) The acceleration when t = 1.8 seconds