Name: .... **Adm No**: ....**Class**: ....

Candidate's Signature:..

121/1
MATHEMATICS ALT A
Paper 1
July 2014
2½ hours

KAKAMEGA COUNTY JOINT EVALUATION TEST-2014
Kenya Certificate of Secondary Education (K.C.S.E.)
MATHEMATICS ALT A
Paper 1
2½ hours

Instructions to candidates

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

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	
Total	

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Kenya Certificate of Secondary Education, 2014
Mathematics Alt A
Paper 1

SECTION I (50 marks)

*Answer **all** the questions in this section in the spaces provided.*

1. Use tables of reciprocal only to evaluate $\dfrac{1}{0.325}$, hence evaluate ;

   $$\frac{\sqrt[3]{0.000125}}{0.325}$$

   (3 marks)

2. Solve the equation $3x^2 + 4x = 2$ giving the roots correct to two decimal places. (4 marks)

3. The straight line through the points D (6, 3) and E (3, -2) meets the y-axis at the point F. Determine the coordinates of F. (3 marks)

4. Using the grid provided below, draw and shade the unwanted regions to show the region satisfied by R given the following inequalities; $y + x < 5$, $y - x \leq 1$ and $x + 5y > 5$ (3 marks)

5. Given that $a = -2$, $b = -1$ and $c = 3$, evaluate $\dfrac{2(a+c)^2 - (a-b)(b-c) - 2c}{3(a+b) - 2(b-c)}$ (3 marks)

6. A key cutting factory starts cutting keys at the rate of 500 per hour. The rate of production reduces by 10% every 2 hours. Calculate the numbers of keys cut in the first 6 hours.   (2 marks)

7. Two boys and a girl shared some money .The elder boy got $\frac{4}{9}$ of it, the younger boy got $\frac{2}{5}$ of the reminder and the girl got the rest. Find the percentage share of the younger boy to the girl's share.

          (3 marks)

8. Annette has some money in two denominations only. Fifty shilling notes and twenty shilling coins. She has three times as many fifty shilling notes as twenty shilling coins. If altogether she has sh. 3400, find the number of fifty shilling notes and 20 shilling coins.   (3 marks)

9. The figure below shows a rhombus PQRS with PQ = 9cm and $\angle$ SPQ=60^0. SXQ is a circular arc; centre P.
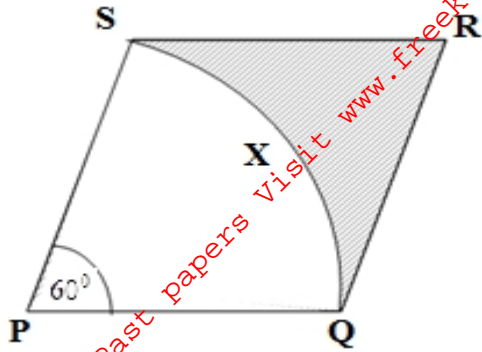
Calculate the area of the shaded region correct to two decimal places. (Take $f = \frac{22}{7}$)   (4 marks)

10. A particle accelerates uniformly from rest and attains a maximum velocity of 30m/s after 16 seconds. It travels at this constant velocity for the next 20 seconds before decelerating to rest after another 8 seconds. Calculate the total distance covered by the car.   (3 marks)

11. The figure below shows a right angled triangle with AB = 12cm. ED is parallel to BA, CE = 6.3cm and ED = 8cm.
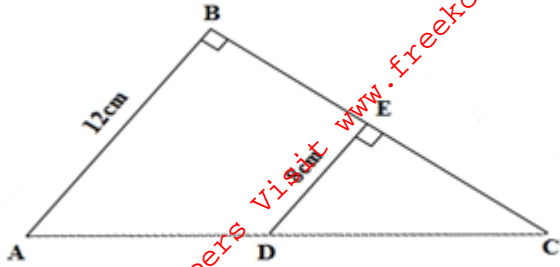
Given that the area of EBAD = 31.5cm^2, find the length of BC (4 marks)

12. Find the value of x in the equation $5^{\frac{x}{4}} = \dfrac{1}{25}$ (3 marks)

13. Given that $\tan x = 2.4$, evaluate without use of tables and calculators, $\sin x - \cos x$ in the form of $\dfrac{a}{b}$ where a and b are integers. (4 marks)

14. The difference between the interior and exterior angles at each vertex of a regular polygon is 162^0. Find the number of sides of the polygon. (2 marks)

15. A number n is such that when it is divided by 27 and 30 or 45, the remainder is always 3. Find the smallest value of n. (2 marks)

16. The figure below shows a regular tetrahedron PQRS of edges 4cm.
    Draw its net and measure the length of the straight path of PS through the midpoint T over the edge
    QR.   (3 marks)
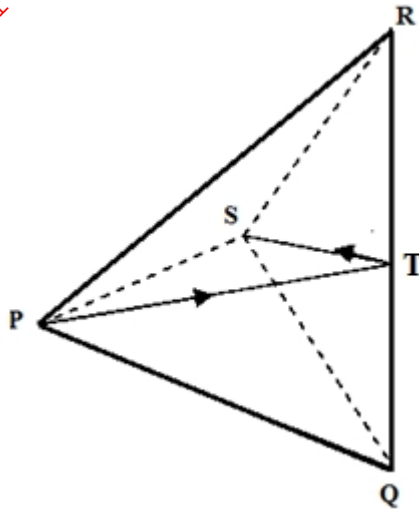
SECTION II (50marks)

Answer only five questions in this section in the spaces provided.

17. Three business partners, Bela, Joan and Trinity contributed Kshs. 112, 000, Kshs. 128, 000 and Kshs. 210, 000 respectively to start a business. They agreed to share their profits as follows:

    30% to be shared equally

    30% to be shared in the ratio of their contributions

    40% to be retained for the running of the business.

   If at the end of the year, the business realised a profit of Kshs. 1. 35million

    Calculate:

    (a) the amount of money retained for running the business at the end of the year.   (1mark)

    (b) the difference between the amounts received by Trinity and Bela.   (6marks)

    (c) Express Joan's share as percentage of the total amount of money shared between the three partners.   (3 marks)

18. In the figure below, O_1 and O_2 are the centres of the circles whose radii are 4 cm and 7 cm respectively. The circles intersect at A and B and angle $AO_1O_2 = 60°$
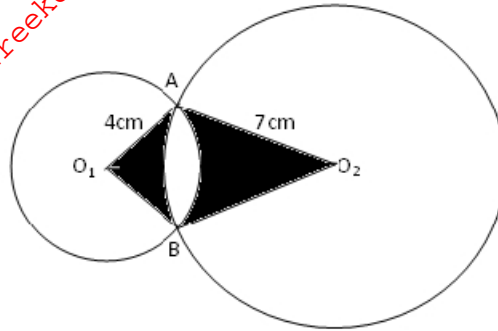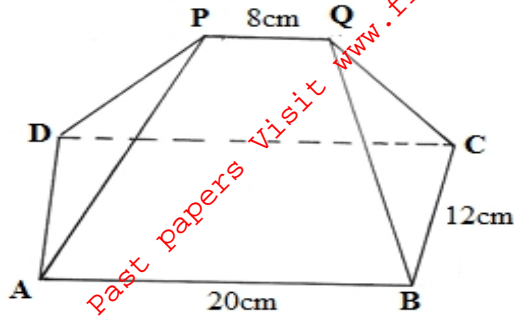

Find by calculation; take = 3.142

(a) The angle AO_2O_1 (1 marks

(b) The area of the quadrilateral AO_1BO_2 (4 marks)

(c) The shaded area (5 marks)

19. The figure below shows a plan of a roof with a rectangular base ABCD. AB = 20cm and BC = 12cm. the ridge PQ = 8cm and is centrally placed. The faces ADP and BCQ are equilateral triangles. N is the midpoint of AD

Calculate:

(a) The length of PN   (2 marks)

(b) The altitude of P above the base.   (3 marks)
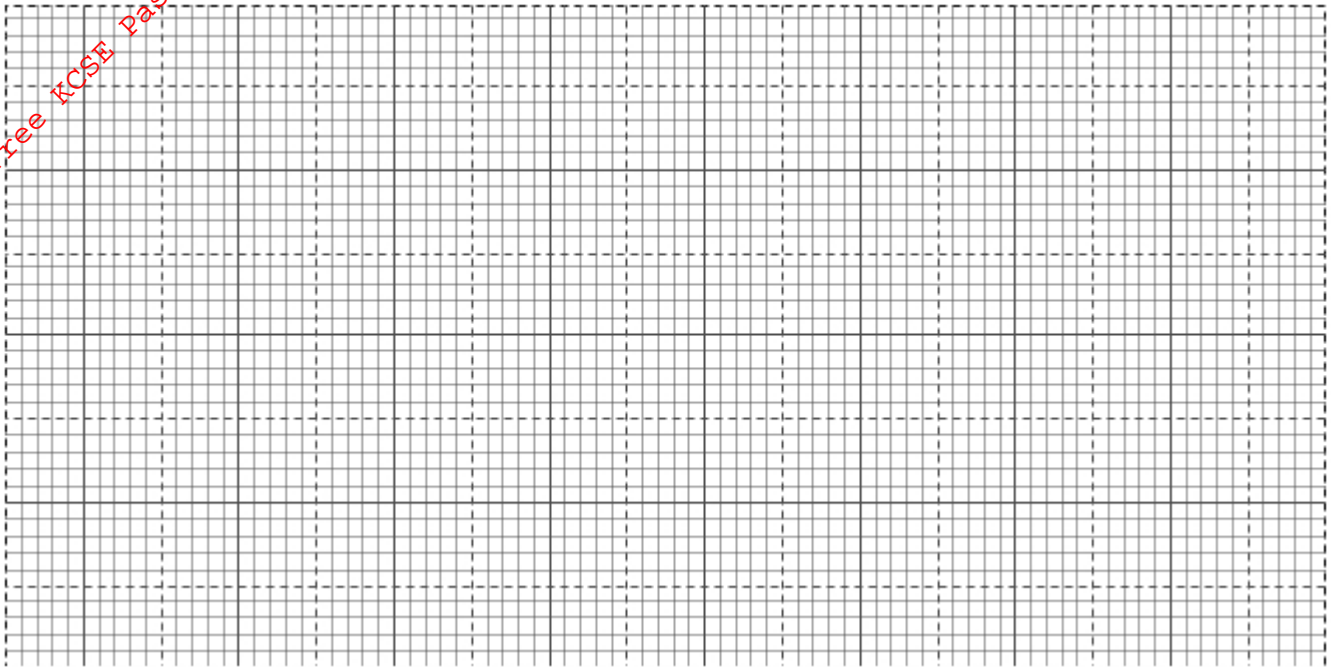
(c) The angle between the planes ABQP and ABCD.   (2 marks)

(d) The obtuse angle between the lines PQ and DB   (3 marks)

20. Complete the table below for the function $y = x^3 + 6x^2 + 8x$ for $-5 \leq x \leq 1$ (3 marks)

x	-5	-4	-3	-2	-1	0	1
x^3	-125	-64			-1	0	1
$6x^2$			54		6	0	
$8x$	-40		-24	-16		0	8
y		0	3			0	15

(a) Draw the graph of the function $y = x^3 + 6x^2 + 8x$ for $-5 \leq x \leq 1$ (3 marks)

(Use a scale of 1cm to represent 1 unit on the x axis. 1 cm to represent 5 units on the y-axis)

(b) Hence use your graph to estimate the roots of the equation

$x^3 + 5x^2 + 4x = -x^2 - 3x - 1$ (4 marks)

21. Three islands P, Q, R and S are on at ocean such that island Q is 400km on a bearing of 030^0 from island P. Island R is 520km and on a bearing of 120^0 from island Q. A port S is sighted 750km due south of island Q.

(a) Taking a scale of 1cm to represent 100km, give a scale drawing showing the relative positions of P, Q, R and S. (4 marks)

Use the scale drawing to

(b) Find the bearing of:

(i) Island R from island P (1 mark)

(ii) Port S from island R (1 mark)

(c) Find the distance between island P and R (2 marks)

(d) A warship T is such that it is equidistant from the islands P, S and R. By construction locate the position of T (2 marks)

22. Two vertical columns A and B of height h and $2h$ respectively stand on level ground and are 100m apart. Two points P and Q are d metres apart, the elevation of the top of A and B from point P are 35^0 and 28^0 respectively and the elevation of top of B from point Q is 75^0
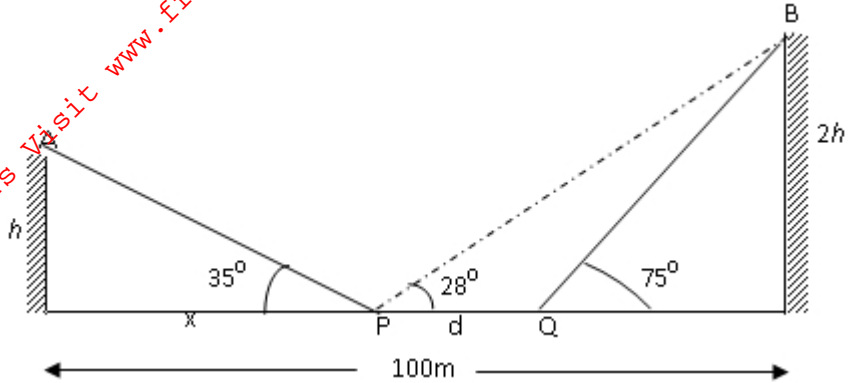
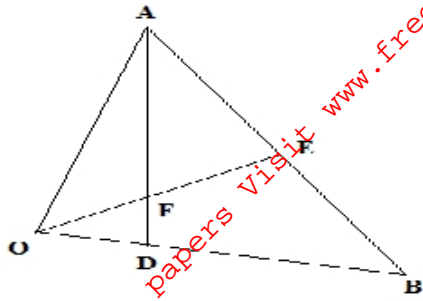Calculate

(a) The vertical heights of the two columns in metres   (7 marks)

(b) The distance PQ in metres   (3 marks)

23. In the figure below, E is the midpoint of AB, OD : DB = 2 : 3 and F is the point of intersection of OE and AD

Given that **OA** = **a** and **OB** = **b**,

(a) Express in terms of **a** and **b**

    (i) **AD**   (1 mark)

    (ii) **OE**   (2 marks)

(b) Given further that **AF** = s**AD** and **OF** = t**OE**, find the values of s and t (5 marks)

(c) Show that E, F and O are collinear   (2 marks)

24. A swimming pool is 20m by 12m and it slopes gently from a depth of 1m at the shallow end to a depth of 3m at the deep end.

   (a) Calculate the volume of water in the swimming pool (in m^3) when it is full. (3marks)

   (b) If the swimming pool is to be drained by a pump which removes water at the rate of 2.5m^3 per minute, how long will it take this pump to drain the swimming pool if it was full? (3marks)

   (c) If the sides of the swimming pool and its floor are to be covered with square tiles of side 20cm, find to the nearest 100 the number of tiles required. (4marks)