

NAME:.....

INDEX NO:.....

SCHOOL:.....

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121/2
MATHEMATICS
PAPER 2
JULY/AUGUST - 2012
TIME: 2 1/2 HOURS

KISII SOUTH DISTRICT EVALUATION EXAM-2012
Kenya Certificate of Secondary Education (K.C.S.E)

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..

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

GRAND TOTAL

17	18	19	20	21	22	23	24	TOTAL

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

SECTION I (50 MARKS)

Answer all the questions in this section.

1. Use logarithms to evaluate. (4mks)

$$\frac{(0.07284)^2}{3\sqrt{0.06195}}$$

2. a) Work out the exact value of $T = \frac{1}{0.003146 - 0.003130}$ (1mk)

- b) An appropriate value of T may be obtained by first correcting each of the decimal in the denominator to 5 decimal places, Calculate;
- (i) The approximate value (2mks)

- (ii) The error introduced by the approximation. (1mk)

3. Kerubo bought three cups and four spoons for Kshs 324. Omae bought five cups and two spoons of the same type as those bought by Kerubo; Omae paid Kshs 228 more than Kerubo. Find the price of each cup and each spoon. (3mks)

4. A quantity y varies partly as x^2 and partly as x . When $y = 6$, $x = 1$ when $y = 30$, $x = 3$. Find y when $x = -3$. (3mks)

5. If
$$\frac{\sqrt{14}}{\sqrt{7}-\sqrt{2}} - \frac{\sqrt{14}}{\sqrt{7}+\sqrt{2}} = a\sqrt{7} + b\sqrt{2}$$

Find the value of a and b where a and b are rational numbers.

(4mks)

6. Expand and Simplify $(1 - 3x)^5$ up to the term in x^3 (2mks)

Hence use your expansion to estimate $(0.97)^5$ correct to 4 decimal places (2mks)

7. The second and fifth terms of a geometric progression are 16 and 2 respectively. Determine the common ratio and the first term. (3mks)

8. Point T is the midpoint of a straight line AB. Given the position vectors of A and T are $i - j + k$ and $2i + \frac{1}{2}k$ respectively, find the position vector of B in terms of i, j and k (3mks)

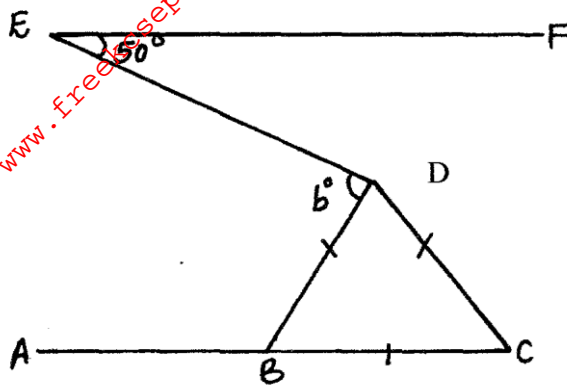
9. Three representatives are to be selected randomly from a group of 7 girls and 8 boys. Calculate the probability of selecting two girls and one boy (3mks)

10. The points with coordinates (5,5) and (-3,1) are the ends of a diameter of a circle Centre A
Determine:

(a) The coordinates of A (1mk)

(b) The equation of the circle, expressing it in form $x^2 + y^2 + ax + by + c = 0$ Where a, b, and c are constants (2mks)

11. Giving reasons, find the angle marked b , given that EF is parallel to AC (2mks)



12. Solve the equation $4 \sin (x + 30^\circ) = 2$ for $0 \leq x \leq 360^\circ$ (3mks)

13. Make y the subject of the formula $p = \frac{xy}{x - y}$ (3mks)

14. When the numerator of x/y is increased in the ratio 3:1 and the denominator decreased in the ratio 2:3 the resulting fraction is $27/28$. Find $x:y$ in its simplest form. (3mks)

15. A point $(-5,4)$ is mapped onto $(-1,-1)$ by a translation. Find the image of $(-4,5)$ under the same translation. (2mks)

16. Given that $\log 2 = 0.3010$ and $\log 3 = 0.4771$, evaluate $\log 15$ (3mks)

SECTION 11(50 MARKS)

Answer only FIVE questions from this section.

17. The table shows income tax rates.

Monthly taxable pay (Kenyan pounds)	Rate of tax in Ksh. per K£
1-435	2
436 – 870	3
971 – 1305	4
1306 – 1740	5
Excess Over 1740	6

A company employee earns a monthly basic salary of Kshs 30,000 and is also given

taxable allowances amounting to Kshs 10, 480.

(a) Calculate the total income tax

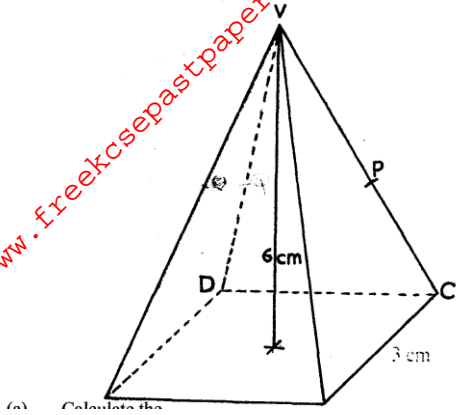
(6mks)

(b) The employee is entitled to a personal tax relief of Kshs 800 per month. Determine the net tax. (1 mk)

(c) If the employee received a 50% increase in his total income, calculate the corresponding percentage increase on the income tax. (3mks)

18. The diagram below shows a right pyramid VABCD with V as the vertex. The base of the pyramid is rectangle ABCD, with AB= 4 cm and BC= 3 cm. The height of the pyramid is 6 cm.

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(a) (i) Length of the projection of VA on the base (2mks)

(ii) Angle between the face VAB and the base (3mks)

(b) P is the mid- point of VC and Q is the mid — point of VD. Find the angle between the planes VAB and the plane ABPQ (5mks)

19. A bag containing blue, green and red pens of the same type in the ratio 8:2:5 respectively. A pen is picked at random without replacement and its colour noted.

a) Determine the probability that the first pen is picked is.

i) Blue

(2mk)

ii) Either green or red

(2mks)

b) Using a tree diagram, determine the probability that .

i) The first two pens picked are both green.

(3mks)

ii) Only one of the first two pens picked is red. (3mks)

20. Complete the table below by filling in the blank spaces (3mks)

X°	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$\cos x^{\circ}$	1.00		0.50			-0.87		-0.87					
$2 \cos \frac{1}{2} x^{\circ}$	2.00	1.93				0.52			-1.00				-2.00

Using the scale 1 cm to represent 300 on the horizontal axis and 4 cm to represent 1 unit on the vertical axis draw, on the grid provided, the graphs of $y = \cos x^{\circ}$ and $y = 2 \cos \frac{1}{2} x^{\circ}$ on the same axis. (5mks)

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a) Find the period and the amplitude of $y = 2 \cos \frac{1}{2} x^0$ on the same axis. (1mk)

b) Describe the transformation that maps the graph of $y = \cos x^0$ on the graph of $y = 2 \cos \frac{1}{2} x^0$ (1mk)

21. An aeroplane flies from point A ($1^{\circ} 15'S$, $27^{\circ} E$) to a point B directly North of A. the arc AB subtends an angle of 45° at the center of the earth. From B, the aeroplane flies due west to a point C on longitude $23^{\circ} W$.)

(Take the value of $\pi \frac{22}{7}$ as and radius of the earth as 6370km)

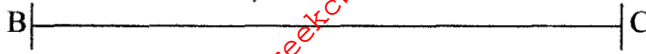
(a) (i) Find the latitude of B (3mks)

(ii) Find the distance traveled by the aeroplane between B and C in km and in nm. (4mks)

(b) The aeroplane left B on Wednesday at 1.00 a.m local time. When the aeroplane was leaving B, what was the local time at C? (3mks)

22. Use a ruler and a pair of compasses only for all constructions in this question.

- (a) On the line BC given below, construct triangle ABC such that $\angle ABC = 30^\circ$ and $BA = 12$ cm (3kms)

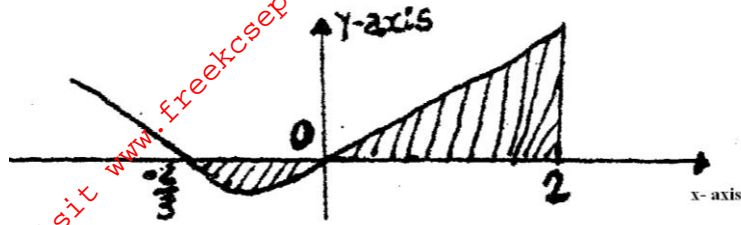


- (b) Construct a perpendicular from A to meet BC produced at D. Measure CD (3kms)

- (c) Construct triangle $A'BC$ such that the area of triangle $A'BC$ is the three quarters of the area of triangle ABC and on the same side of BC as triangle ABC. (3kms)

- d) Describe the locus of A' (1mk)

23. The curve of the equation $y = 2x + 3x^2$, has $x = -2/3$ and $x = 0$ as x intercepts. The area bounded by the axis $x = -2/3$ and $x = 2$ is shown by the sketch below.

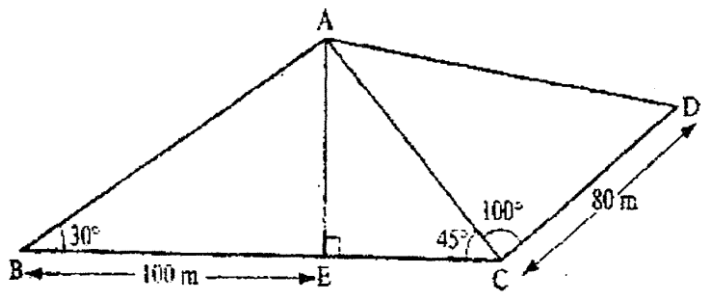


Find:

(a) $\int (2x + 3x^2) dx$ (3mks)

- (b) The area bounded by the curve x - axis, $x = -2/3$ and $x = 2$ (7mks)

24. The figure below represents a quadrilateral piece of land ABCD divided into three triangular plots. The lengths BE and CD are 100m and 80m respectively. Angle $\angle ABE = 30^\circ$ $\angle ACE = 45^\circ$ and $\angle ACD = 100^\circ$



- (a) Find to four significant figures:
 (i) The length of AE (3mks)

(ii) The length of AD (3mks)

(iii) The perimeter of the piece of land (4mks)

END