NAME:……INDEX ……..…..DATE……..…

SCHOOL:……SIGNATURE……

121/1
MATHEMATICS
PAPER 1
JULY / AUGUST, 2010
2½ HOURS

JOINT INTER-SCHOOLS EVALUATION TEST (JISET)
Kenya Certificate of Secondary Education 2010

121/1
MATHEMATICS
PAPER 1
JULY / AUGUST 2010

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

17	18	19	20	21	22	23	24	Total

Grand Total

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

SECTION I *(Answer **all** questions in this section) (50 marks)*

1. Without using mathematical tables or calculators, evaluate: (3 mks)

$$\frac{0.0168 \times 2.46 \times 7}{5.74 \times 0.112}$$

2. A two-digit number is such that the sum of the ones digit and the tens digit is 10. If the digits are reversed, the number formed exceeds the original number by 54. Find the number (3 mks)

3. Simplify $\frac{125^{\frac{2}{3}} \div 3^4}{243^{-\frac{3}{5}}}$ (3 mks)

4. Metal cube of side 4.4cm was melted and the molten material used to make a sphere. Find to 3 significant figures the radius of the sphere $\left(take \prod = \frac{22}{7}\right)$ (3 mks)

5. Use reciprocal, square and square root tables to evaluate, to 4 significant figures, the expression. $\sqrt{\frac{1}{24.56} + 4.346^2}$ (3 mks)

6. The position vectors of points x and y are $x = 2i + j - 3k$ and $y = 3i + 2j - 2k$ respectively. Find x y as a column vector (2 mks)

7. Given that A' (3, -3) is the image of A (-1, -5) under a reflection. Find the equation of the mirror line in the form of $ax + by + c = 0$ (4 mks)

8. The table below represents the marks scored by form 4 students in an end term exam

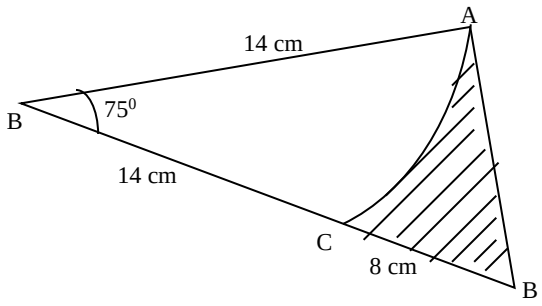
Marks	6 - 10	11 - 20	21 - 35	36 – 55	56 - 65
Frequency	8	14	18	24	10

Calculate the median mark (3 mks)

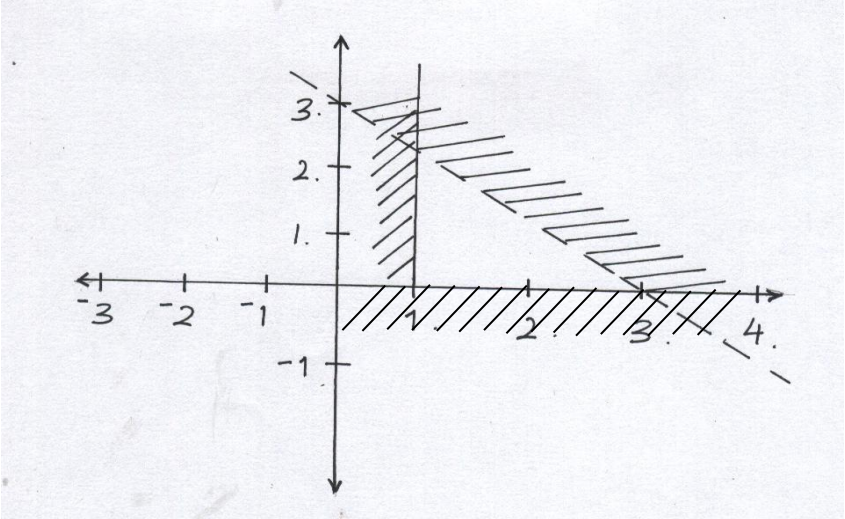
9. The sum of angles of a triangle is given by the expression $(2a+b)^0$ while that of a quadrilateral is given by $(13a-b)^0$. Calculate the values of a and b (4 mks)

10. A particle moves in a straight line from a fixed point. Its velocity Vm/s after t seconds is given by $V = 9t^2 - 6t + 2$ calculate the distance traveled by the particle during the 2nd second. (4 mks)

11. Calculate the area of the shaded region below, given that AC is an arc of a circle centre B. AB=BC=14cm CD=8cm and angle ABD = 75^0 (4 mks)



12. Determine the inequalities that represent and satisfies the unshaded region (3 mks)



13. Three mountains Mikai, Kembo and Chaka in a village are situated in such a way that Kembo is 900m on a bearing of 120^0 from Mikai. Mt. Chaka is 1200m on a bearing of 030^0 from Kembo.

    (i) Draw a sketch showing the position of the three mountains (1 mk)

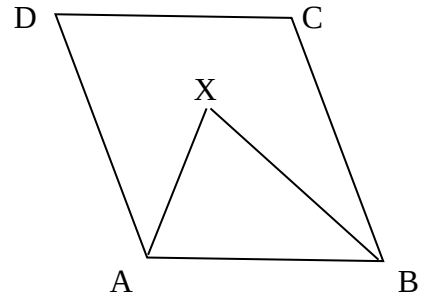
    (ii) Calculate the distance of Mt. Chaka from Mt. Mikai (2 mks)

14. A van travelled from Kitale to Kisumu a distance of 160km. The average speed of the van for the first 100km was 40km/h and the remaining part of the journey its average speed was 30km/h. Calculate the average speed for the whole journey. (3 mks)

15. Solve the simultaneous equation (3 mks)

$$2x - y = 3$$
$$x^2 - xy = -4$$

16. The figure below represents a quadrilateral ABCD. Triangle ABX is an equilateral triangle. If $\angle ADX = 50^0$, find $\angle AXD$ with $\angle BAD = 90^0$ (2 mks)



SECTION II *(Answer any five questions from this section) (50 marks)*

17. Jane is a sales executive earning a salary of Ksh. 20,000 and a commission of 8% for the sales in excess of Ksh 100,000. If in January 2010 she earned a total of Ksh.48, 000 in salaries and commissions.

(a) Determine the amount of sales she made in that month (4 mks)

(b) If the total sales in the month of February and March increased by 18% and then dropped by 25% respectively. Calculate

(i) Jane's commission in the month of February (3 mks)

(ii) Her total earning in the month of March (3 mks)

18. Two tanks are similar in shape. The capacity of the tanks are 1,000,000 litres and 512, 000 litres respectively.

(a) Find the height of the smallest tank if the larger is 300cm tall (4 mks)

(b) Calculate the surface area of the larger tank if the smaller tank has a surface area of $1200m^2$ (3 mks)

(c) Estimate the mass of the smaller tank if the mass of the larger one is 800kg (3 mks)

19. Wekhomba bought a laptop in Uganda for Ush.1, 050,000. He then paid 60 US dollars as transportation charges to Kenya. On arrival in Kenya he paid duty and sales tax amounting to 55% of the cost in Uganda. He then gave it to a friend in Tanzania tax free. If the exchange rates were I US dollar = Ush 1016, 1Ksh = Ush 24.83 and Tsh 1 = Ksh 0.0714

(a) Calculate the total expenses in Kenya shillings incurred by Wekhomba (3 mks)

(b) Find the expenditure on transportation and taxes as a percentage of the total expenditure (2 mks)

(c) What is the total value of the laptop in Tanzanian shillings (2 mks)

(d) Find the overall increase in value of the laptop as percentage of the buying price (3 mks)

20. Using a ruler and a pair of compasses only,

(a) Construct a triangle ABC in which AB = 9cm, AC = 6cm and angle BAC = $37\frac{1}{2}^0$

(b) Drop a perpendicular from C to meet AB at D. Measure CD and hence find the area of the triangle ABC

(c) Point E divides BC in the ratio 2:3. Using a ruler and Set Square only, determine point E. Measure AE.

21. A swimming pool water surface measures 10m long and 8m wide. A path of uniform width is made all round the swimming pool. The total area of the water surface and the path is $168m^2$

(a) Find the width of the path (4 mks)

(b) The path is to be covered with square concrete slabs. Each corner of the path is covered with a slab whose side is equal to the width of the path. The rest of the path is covered with slabs of side 50cm. The cost of making each corner slab is sh 600 while the cost of making each smaller slab is sh.50. Calculate

(i) The number of the smaller slabs used (4 mks)

(ii) The total cost of the slabs used to cover the whole path (2 mks)

22. Wanjiku is standing at a point P, 160m south of a hill H on a level ground. From point P she observes the angle of elevation of the top of the hill to be 67^0

(a) Calculate the height of the hill (3 mks)

(b) After walking 420m due east to the point Q, Wanjiku proceeds to point R due east of Q, where the angle of elevation of the top of the hill is 35^0. Calculate the angle of elevation of the top of the hill from Q (3 mks)

(c) Calculate the distance from P to R (4 mks)

23. Complete the table below for the function $y = 2x^3 + 5x^2 - x - 6$ (2 mks)

x	-4	-3	-2	-1	0	1	2
$2x^3$	-128	-54			0	2	16
$5x^2$	80	45	20	5	0	5	20
-x	4	3			0	-1	
-6	-6	-6	-6	-6	-6	-6	-6
y	-50				-6	0	

(b) On the grid provided draw the graph $y = 2x^3 + 5x^2 - x - 6$ for $-4 \le x \le 2$. Use 2cm to represent 1 unit on the x-axis and 1 cm to represent 5 units on the y – axis (4 mks)

(c) By drawing a suitable line, use the graph in (b) to solve the

i. equation $2x^3 + 5x^2 + x - 4 = 0$ (2 mks)

ii. equation $2x^3 + 5x^2 - x + 2 = 0$ (2 mks)

24. Given that $4p - 3q = \begin{pmatrix} 10 \\ 5 \end{pmatrix}$ and $p + 2q = \begin{pmatrix} -14 \\ 15 \end{pmatrix}$ find

(a) (i) $\underset{-}{p}$ *and* $\underset{-}{q}$ (3 mks)

(ii) $|p + 2q|$ (3 mks)

(b) Show that A (1, -1), B (3, 5) and C (5, 11) are collinear (4 mks)