NAME:………………………………………………………INDEX NO…...…………………………

SCHOOL………………………………………………………………………………………………

121 / 2
MATHEMATICS
PAPER 2
JULY / AUGUST 2010
2 ½ HOURS

KAKAMEGA NORTH DISTRICT JOINT EVALUATION TESTS

Kenya Certificate of Secondary Education (K.C.S.E) 2010

121 / 2
MATHEMATICS
PAPER 2
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, except where stated otherwise.*

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	

SECTION I 50 MARKS:-

Answer all questions in this section

1. Use logarithms to **evaluate**

$$\frac{16.49^2 \times \sqrt[3]{0.6329}}{438.2}$$

(4mks)

2. **Solve** the equation below.
   $7^{2x} - 8\times 7^{x} + 7 = 0$ (3mks)

3. The gradient of a curve at any point is given by 2x-1. Given that the curve passes through point (1,5). **Find** the equation of the curve. (3mks)

4. A car was valued at Ksh. 500,000 in January 2008. Each year, its value depreciates at 12% p.a. find after how long would the value depreciate to Ksh. 250,000 (3mks)

5. Given that $2 \leq A \leq 4$ and $0.1 \leq B \leq 0.2$. **Find** the minimum value of $\frac{AB}{A - B}$ (3mks)

6. A surveyor finds that she needs 28 beacons placed 40m apart when she surveys a length of the road. If she were to place the beacons 30m apart, **how many** would she need? (2mks)

7. The first and thirteenth terms of A.P are 7 and 1 respectively. **Calculate** the number of terms which have a sum of zero. (3mks)

8. The internal and external diameters of a circular ring are 8cm and 10cm respectively. **Find** the volume of the ring if its thickness is 3.5 millimeters. (3mks)

9. Given that $Cos\ x = \frac{2}{\sqrt{5}}$. Without using tables or calculators **evaluate** and **simplify** leaving your answer in the form of $a\ \sqrt{b}$

(a)Sin x (2mks)

(b)Tan(90 – x) (1mk)

10. A two digit number is formed from the first four prime numbers.

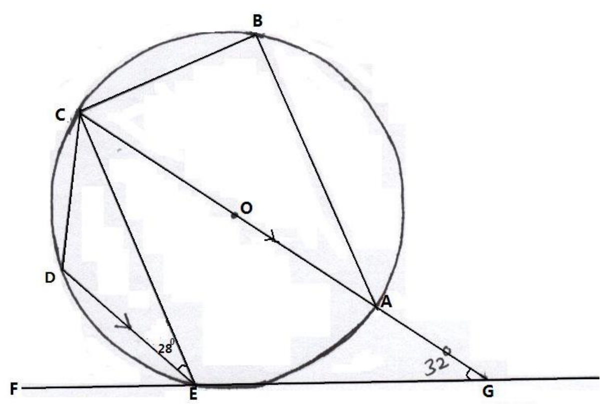
(a) **Draw** the table to show the possible outcomes. (1mk)

(b) **Calculate** the probability that a number chosen from the two digit numbers is an even number. (1mk)

11. (a) **Expand** $(a-b)^5$ (1mk)

(b) Use the first three terms of the expansion in (a) in ascending powers of b to **find** the approximate value of $(1.98)^5$ (2mks)

12. The diagram below shows a circle ABCDE. The line FEG is a tangent to the circle at point E. Line DE is parallel to CG, $\angle DEC = 28^0$ $\angle AEG = 32^0$



Calculate

(a) $\angle$ AEG (2mks)

(b) $\angle$ ABC (2mks)

13. The following distribution shows the masses to the nearest kilogram of 50 pupils in std 8.

Mass (kg)	26 – 30	31 – 35	36 – 40	41 – 45	46 - 50	51 – 55

Frequency	4	12	18	11	4	1

Calculate the standard deviation. (4mks)

14. Make x the subject of the formula. $h = \sqrt[3]{\frac{c - x^2}{b}}$ (3mks)

15. The resistance of an electrical conductor is partly constant and partly varies as the temperature(k). when the temperature is 27^0C, the resistance is 55 ohms, and when the temperature is 57^0C, the resistance is 58 ohms. **Find** the relation between the temperature and the resistance. (3mks)

16. A dam containing $4158m^3$ of water is to be drained. A pump is connected to a pipe of radius 3.5cm and the machine operates for 8 hours per day. Water flows through the pipe at the rate of 1.5m per seconds. **Find** the number of days it takes to drain the dam. (4mks)

SECTION 11 50 marks

Answer only five questions from this section

17. (a) A shear parallel to the x-axis (the invariant line) maps point (1,2) on to point (7,2). T is the transformation equivalent to this shear followed by the reflection in the line. Y = x. **find** the matrix which defines T. (5mks)

(b) A transformation P maps points (1,3) and (-2,-3) on to points (2,4) and (-3,-11) respectively. Find the matrix of the transformation. (5mks)

18. (a) **Draw** the graphs of y=2Cosx and $y = \frac{1}{Sin\ x}$ $for\ 0^0 \leq x \leq 360$

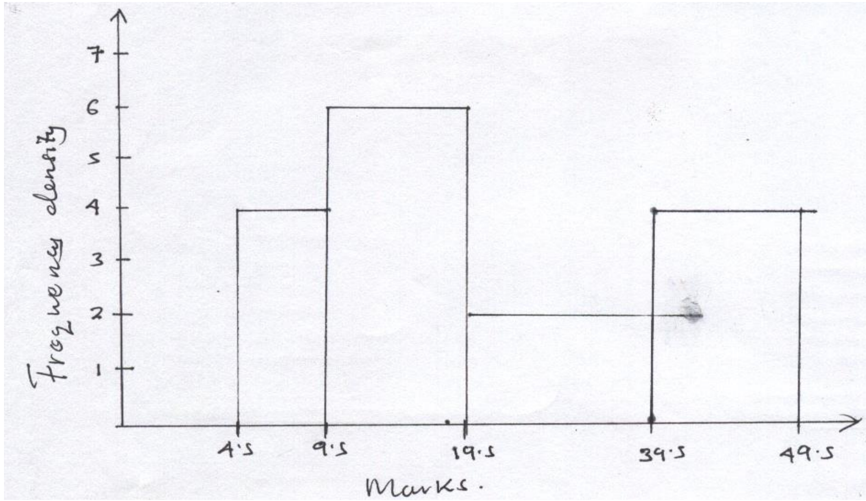
GRAPH PAPER

(b) use your graph to solve

(i) $2\text{Cos } x = \frac{1}{Sin\ x} - 1$

(ii) $\frac{1}{Sin\ x} > 1$ (10mks)

19. The diagram below shows a histogram representing marks obtained in a certain test.

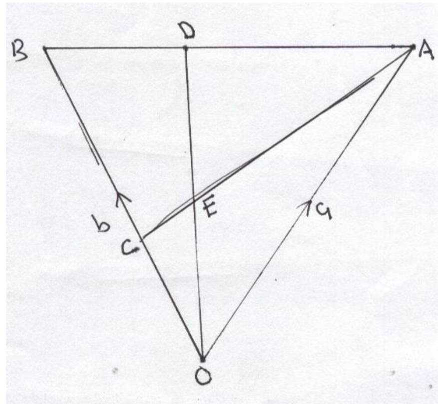


(a) Develop a frequency distribution table for the data if the first class 5 -9 has a frequency of 8. (3mks)

(b) **Estimate** the mean (3mks)

(c) **Calculate** interquartile range. (4mks)

20.



The figure above shows $\triangle OAB$ in which BD:DA = 1:2, OE: ED = 3:2 and c is the midpoint of OB.

(a) Given that OA = $\underset{\sim}{a}$ and OB = $\underset{\sim}{b}$ express the following vectors in terms of

(i) $\overrightarrow{AB}$ (1mk)

(ii) $\overrightarrow{OD}$ (2mks)

(iii) $\overrightarrow{AE}$ (2mks)

(b) Show that points A, E and C lie on a straight line. Hence determine the ratio of CE: EA (5mks)

21. (a) ABCD is a rectangle in which AB = 7.6 cm and AD = 5.2cm. Use a pair of compasses and a ruler only to construct rectangle ABCD, and construct the locus of a point P within the rectangle such that P is equidistant from CB and CD.

(b) Q is a variable point within the rectangle. ABCD drawn in (a) above such that $60^0 \leq$ AQB $\leq 90^0$. On the same diagram, construct and show the locus of point Q, by leaving unshaded, the region in which point Q lies. (10mks)

22. An auto spare dealer sells two types of lubricant A and B in his shop. While purchasing type A cost Sh. 40 per 100ml tin and type B cost Sh. 60 per 100 ml tin. He decided to buy at lease 30 tins altogether of type A and B with Sh. 1500 available. He decides that at least one third of the tins should be of type B. He buys x tins of type A and y tins of type B.

    (a) **Write down** three inequalities, which represent the above information. (3mks)

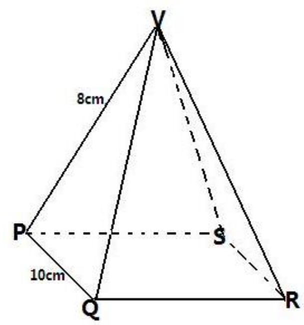
(b) On a graph paper, **draw** a graph to show the three inequalities (a) above. (3mks)

Graph paper

(c) **Determine** how many tins of each type that he should buy to maximize his profit if he makes a profit of sh. 10 of each type A tin and a profit of sh. 20 on each type B tin (2mks)

(d) **Calculate** his maximum possible profit. (2mks)

23. PQRSV is a right pyramid on a horizontal square base of side 10cm. the slant edges are all 8cm long. **Calculate**



(a) The height of the pyramid (2mks)

(b) The angle between

(i) Line VP and the base PQRS (2mks)

(ii) Line VP and line RS (2mks)

(iii)Planes VPQ and the base PQRS. (2mks)

(c) Volume of the pyramid. (2mks)

24. Two towns A and B lie on the same parallel of latitude 60^0N if the longitudes of A and B are 42^0W and 29^0E respectively.
(a) **Find** the distance between A and B in nautical miles along the parallel of latitude. (2mks)

(b) **Find** the local time at A if at B is 1.00pm. (2mks).

(c) **Find** the shortest distance between A and B along the earth's surface in km. (2mks)
(Take $\pi = \frac{22}{7}$ *and* $R = 6370$ km)

(d) If C is another town due south of A and 10010km away from A, **find** the coordinate C. (3mks)