Name: ………………………………………………………… Index no …….….................................

School: ………………………………………………....… Candidate's sign ……………………....

Date: …………………………………………………………

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST 2011
TIME: 2 ½ HOURS

BUSIA DISTRICT JOINT EVALUATION TEST

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

Mathematics
Paper 2

INSTRUCTIONS TO CANDIDATES:

* *Write your **name**, **index number** , **Signature** and write **date** of examination in the spaces provided*
* *The paper contains **two** sections. Section I and Section II.*
* *Answer **ALL** the questions in section I and any **five** questions in section II.*
* *Answers and working **must** be written on the question paper in the spaces provided below each question.*
* *Show all steps in your calculations below each question.*
* *Marks may be given for correct working even if the answer is wrong.*
* *Non programmable silent electronic calculators and KNEC mathematical table may be used, except where stated otherwise.*

FOR EXAMINERS USE ONLY

SECTION 1

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	**TOTAL**
Marks																	

SECTION II

Question	17	18	19	20	21	22	23	24	**TOTAL**
Marks									

Grand Total

This paper consists of 15 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are missing

1.   Use logarithms table to evaluate   (4mks)

$$(3.712)^2 \, X \, \sqrt{0.006217}$$

2.   Solve the equation below by completing the square method $3x^2 - 7x + 2 = 0$ (3mks)

3.   Evaluate the following leaving your answer in surd form.   (3mks)

$$\frac{11}{\sqrt{7}-\sqrt{3}} \, - \, \frac{5}{\sqrt{7}+\sqrt{3}}$$

4. Make A the subject of the formula   (3mks)

$$t = \frac{2m}{n} \sqrt{\frac{L - A}{3k}}$$

5. Find without using mathematical tables or calculator, the value of x which satisfy the equation. (3mks)
$$\log_2 (x^2 - 9) = 3 \log_2 2 + 1$$

6. (i) Expand $(2 + x)^6$ upto the fourth term   (1mk)

Using the expansion solve $(1.98)^6$ correct to 4 d.p   (3mks)

7. Given that matrix $A = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}$ find matrix **B** such that $A^2 = A + B$ (3mks)

8. a) Construct a parallelogram PQRS such that PQ = 8cm PS = 4.5cm and angle QPS = 60° (3mks)

   b) Locate locus of a point x such that x is equidistant from P and R. (1mk)

9. Find the radius and centre of a circle whose equation is: (3mks)
   $4x^2 + 4y^2 + 56x - 104y - 152 = 0$

10. An investor deposited 40,000 in a bank compounded at the rate of R p.a semi-annually for 2 years and realized Ksh. 50,499. Find the rate of compound interest. Give your answer correctly to 4 significant figures. (3mks)

11. In the circle below chords PQ and RS intersect internally at X. Given that RX = 8cm,XS = 3cm and PQ=10cm. Calculate PX (3mks)
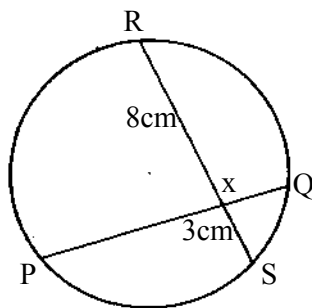
12. ABCD is a trapezium in which angle B = $\angle$ C=90°
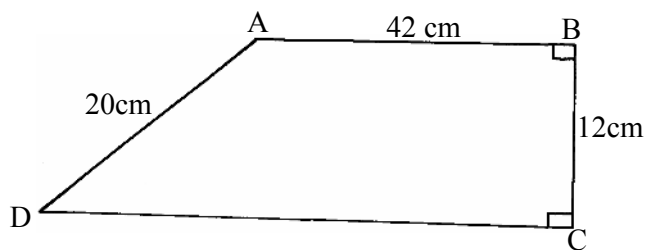
Calculate the length DC hence the area of the trapezium. (3mks)

13. If P varies directly as r and inversely as the square root of q. Find the percentage change in P if r increase by 40% and q decrease by 36% (4mks)

14. Wafula was asked to round off to $\frac{2}{3}$ decimal places but he truncated it to 3 decimal places.

Determine the percentage error as a result of misunderstanding of the question (3mks)

15. The nth term of an AP is given by $2n+3$. Find the first three terms hence show that the sum of the first n terms is given by $S_n = n^2 + 4n$ (3mks

16. A curve passes through the origin and its gradient function is $3x^2 + 6x - 2$ (3mks)
   Find its equation

SECTION B (50MARKS)
Answer <u>any</u> five questions from this section

17.   The figure below shows a right pyramid on a square base ABCD of sides 4cm VA =VB = VC=VD = 8cm
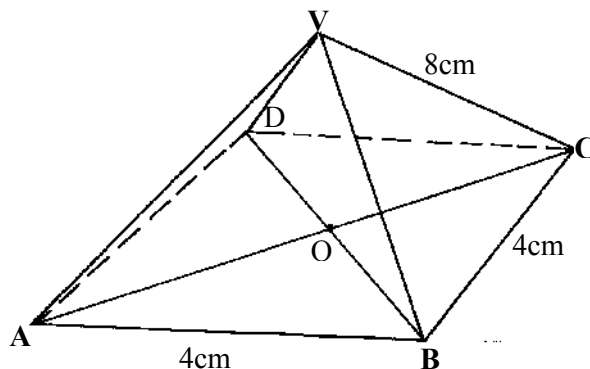
a) Find the height VO of the pyramid.   (3mks)

b) The angle between slant edge and the base ABCD   (3mks)

c) The angle between the planes VBC and ABCD   (2mks)

d) Find volume of the pyramid in litres.   (2mks)

18. a) Using the same axes, a horizontal scale of 1cm to represent 30° and vertical scale of 4cm represents 1 unit

   (i) Fill in the table (2mks)

X	0	30	60	90	120	150	180	210	240	270	300	330	360
Sin (x-15)	-0.259		0.707					-0.259		-0.966			
2 cos x				0.000		-1.732						1.732	2.00

   (ii) Draw the graphs of y = sin (x-15) and y = 2 Cos x on the graph paper provided (5mks)
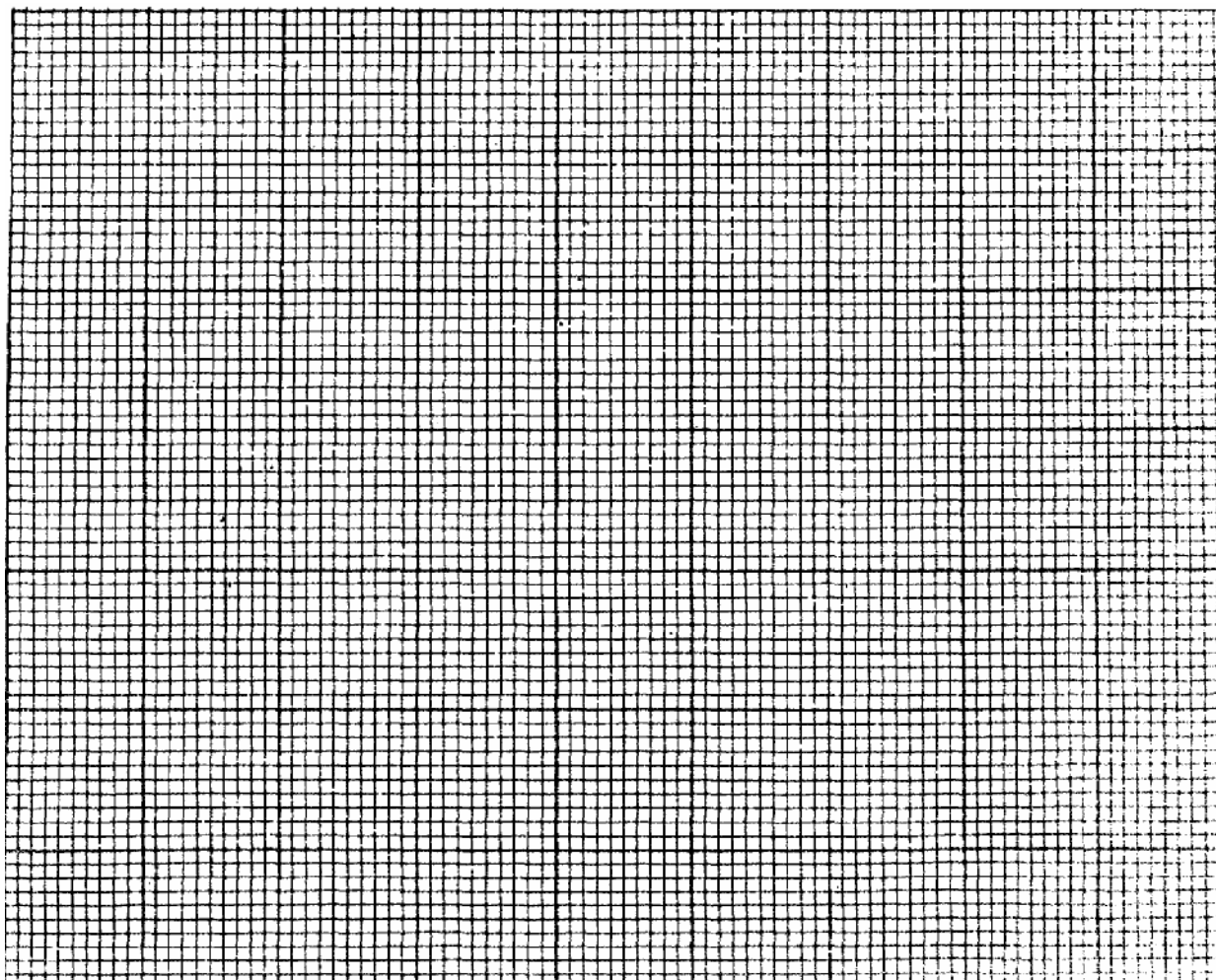
b) Using your graphs, solve the equations

   (i) Sin (x-15) ^{o} = 0.5 (1mk)

   (ii) 2 Cos - 0.5 = 1 (2mks)

19.   Triangle $\overrightarrow{OPQ}$ is such that $\overrightarrow{OP}$ = **p** and $\overrightarrow{OQ}$ = **q** point R divides OP in the ratio 1:3 and a point S divided PQ in the ratio 5:2 $\overrightarrow{OS}$ and $\overrightarrow{RQ}$ meet at T.

a) Express $\overrightarrow{OS}$ and $\overrightarrow{QR}$ in term of **p** an **q.**   (2mks)

b) Given that $\overrightarrow{OT}$ = K$\overrightarrow{OS}$. Express $\overrightarrow{OT}$ in terms of K, p and q (1mk)

c) (i) Given also that $\overrightarrow{RT}$ = h $\overrightarrow{RQ}$, express $\overrightarrow{OT}$ interms of h , p and q (3mks)

(ii) find the value of h and k   (2mks)

d) State the ratio in which Q divided RT.   (2mks)

20   Two places P and Q are on parallel latitude 26° N. The points lie on 10^oW and 30° E longitudes
respectively.
a) Find the distance between P and Q along parallel latitudes
(i) in km   (2mks)

(ii) In nm   (1mk)

b) Find the distance between P and Q along longitude lines in nm   (3mks)

c) Two planes A and B left for Q at speed of 15000knots and 600 knots respectively. If A flew
along the great circle and B along parallel latitude, which one arrived earlier and by how long to
the nearest minute (take R = 6370km, $\pi = \underline{22}$)   (4mks)
7

21   The velocity of a particle moving in a straight line is given by the equation $\frac{ds}{dt} = -4t + 2$ where s is a

displacement from the origin in meters and **t** is time of motion.

a) Find when the particle is instantaneously at rest.   (2mks)

b) Given that S = 2 when t = o find a in terms of t   (4mks)

c) Find acceleration of the particle   (1mk)
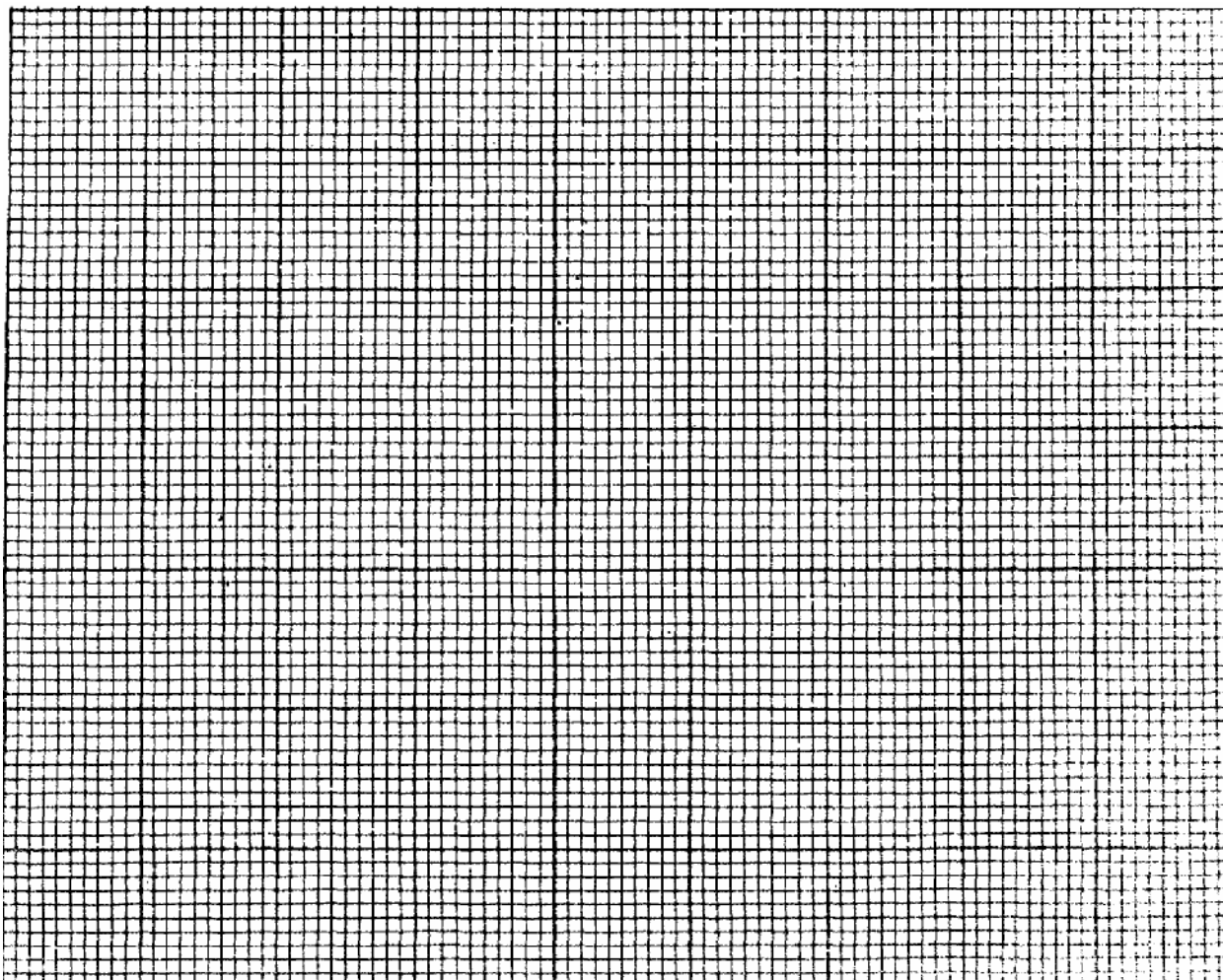
d) At what instant shall displacement of the particle be O?   (3mks)

22.   The table below gives corresponding values of y and x which obey the law of $y = ax^2 + bx$ where a
       and b are constants.

x	0.52	2.58	5.25	8.00	9.5
y	4.6	38.5	121.3	235.1	324.5

a) State linear equation connecting x and y   (2mks)

b)Draw a suitable linear graph and hence estimate the values of a and b   (7mks)

c) Hence state the law connecting x and y   (1mk)

23. The probability of Mary, Esther and Joan coming to school late on Friday are $\frac{1}{5}$, $\frac{2}{7}$ and $\frac{1}{4}$ respectively

a) Draw a tree diagram to represent the information   (2mks)

b) Calculate the probability that :-
   i) All the three students are late   (2mks)

   ii) All except Esther are late   (2mks)

   iii) At least one is late   (2mks)

   iv) At most two girls are late.   (2mks)

24. The table below shows distribution of mass of students in form 4 class.

Mass kg	35-39	40-44	45-49	50-54	55-59	60-64	65-69
No. of students	12	21	22	23	20	12	5

Using 52 as working mean, Calculate

a) The actual mean mass of the class.   (5mks)

b) The standard deviation of the masses.   (5mks)