BUNYORE-MARANDA JOINT EXAMINATIONS

FORM FOUR 2011 ENROLMENT EXAMINATIONS

MATHEMATICS PAPER 2 (121/2)

Time 2 Hours

Name Adm.No Class

Instructions:

1. Write your name, class and Admission Number in the spaces provided above.

2. Answer all questions in Section I and ONLY Five questions in Section II.

3. All answers and working must be written on the question paper in the spaces provided below each question.

4. Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.

5. Non-Programmable silent calculators and KNEC Mathematical tables may be used except where stated otherwise.

6. Marks will be awarded for correct working even if the answer is wrong.

SECTION 1- (50 MARKS)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

SECTION 11 – (50MARKS)

17	18	19	20	21	22	23	24	TOTAL

SECTIONI (50 Marks)

Answer all questions in this Section

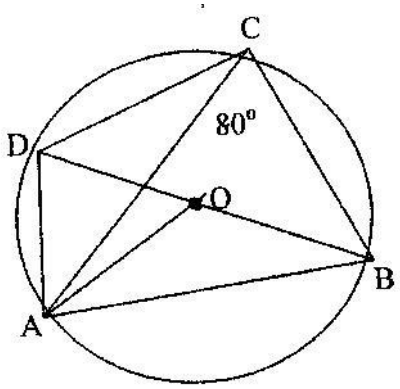
I. Use logarithm tables to evaluate

$$\left(\frac{0.6791 \times \sin 24^\circ}{\text{Log } 5} \right)$$ (4marks)

2. Simplify $\frac{3}{3-\sqrt{3}} + \frac{I}{3.+\sqrt{3}}$ in the form $a + b\sqrt{c}$, hence find the value of a, 1 and c. (3marks)

3. Find the equation of a line which passes through the point (6, 5) and makes an angle of 45° with the x-axis. (2marks)

4. In the figure below, 0 is the centre of the circle and line AC CB. Angle ACB = 80^0.



Giving reasons find the size of

(i) Angle ADC (2 marks)

(ii) Angle ACD

5. Make P the subject of the formula

6. Determine the value of k for which A is a singular matrix.

(2 Marks)

A= $\begin{pmatrix} (k+2 & 2 \\ 3 & 2k) \end{pmatrix}$ (2 marks

7. State the integral values of x which satisfy the inequalities (x - 2) (3x + I) <(x + 11). (3 marks)

8. The radius and height of a cylinder measured to the nearest millimeter are 2.5 cm and 7.5 cm respectively. Find, to 4 significant figures, the percentage error in the volume of the cylinder. (3 marks)

9. The angles of a triangle are in the ratio 3 : 4 : 2. If the shortest side is 5 cm, calculate, to 4 significant figures, the length of the largest side. (3 marks)

10 Line PQ drawn below is a side of a trapezium PQRS in which <PQR 105°, QR = 4cm, RS 6cm and RS is parallel to QP.

P Q

Using a ruler and a pair of compasses only;

(a)Complete the trapezium (2mks)

(b) Find (i)<SPQ (lmk)

11. Evaluate without using a calculator or mathematical tables leaving the answer as a decimal (4mks)

$\frac{24 \div 4 \text{ of } (-2) \times 2 \div 6}{-8 \div 6 \times 2}$

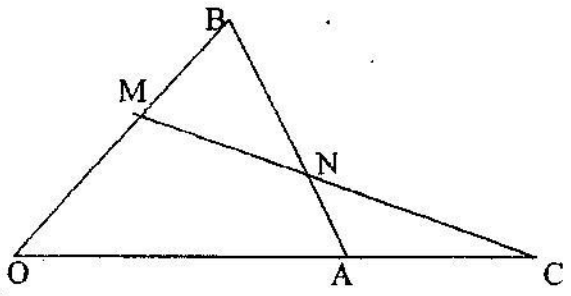
13. The vertices of triangle ABC are A(3,6),B(l, -2) and C(4, -1). The image of point B is B'(-2,2 under a certain translation. Determine the translation. Hence find the images of A and C (3mks)

14, A football tube in the form of a sphere is inflated so that its radius increases in the ratio of 32:18. Find the ratio in which the volume is increased (2mk)

SECTION 11(50 Marks)

Answer only five questions from this section

17. In the triangle OAB below, OA a, OB b and OC 3/2 OA. M divides OB in the ratio 3:2



(a) Express in terms of a and b only, the vectors

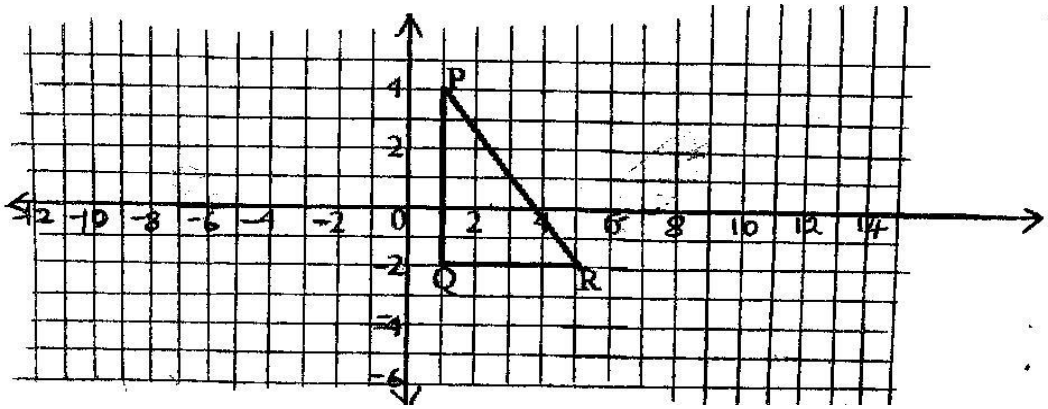
(i) AB

(ii) MC

(b) Given that MN h MC and RN = k BA, express vector MN in two different ways and hence find the value of h and k. (6 marks)

(c) Show that the points M, N and C are collinear.

18. Triangle PQR is shown on the Cartesian plane below.



(a) Given that Q(1, 2) is mapped onto Q(-5, -2) by a shear with x-axis invariant,

(1) draw triangle P1Q1R1 the image of triangle PQR, under the shear. (3 marks)

(ii) Determine the matrix representing the shear. (2 marks)

(b) Triangle $P_2Q_2R_2$ is the image of triangle P1Q1R1 under transformation defined by the matrix

(i) Draw triangle $P_2Q_2R_2$ (3 marks)

(ii) Find the area of triangle $P_1Q_1R_1$ (2 marks)

19. An experiment was conducted to establish the relationship between two variables X and Y. The results were tabulated as shown below.

X	1	2	3	4	5
Y	0.5	4	13.5	32	62.5

The law connecting X and Y is known to be of the form Y MX, where M and n are constants.

(i) Write the law in linear form

(ii) Copy and complete the table below

Log X	0		0.48		0.70
Log Y		0.60		1.51	

(iii) By drawing a suitable straight line, find the values of M and n and hence verify the law. (7 marks)

20. The table below gives marks obtained in mathematics test by *50* candidates.

(a) Draw a cumulative frequency curve to re resent the data. (3 marks)

Marks (%)	31-35	36-40	41-45	46-50	51-55	56-60	61-65
No. of candidates	4	6	12	15	8	3	2

(b) Use the graph to determine

1. The median score
2. The quartile 3 marks)
3. The pass mark if 80% of the candidates must pass
4. The probability that a candidate picked at random scored at least 48%

21. Onyango saved sh 2000 during the first year of employment. In each subsequent year he saved more than the preceding year until he retired.

(a) How much did he save in the second year? (2 marks)

(b) How much was saved in the first ten years. (3 marks)
(c) How many years dic1hê take to save sh. 58,000? (3 marks)
(d) How much did he save in the 20th year of his employment? (2 marks)

22. A man bought some sheep for sh 27000. Two of them died and he decided to sell the rest for sh 300 per head more than what he paid for each. On the whole, he gained 10% profit. Given that the original number of sheep bought were x;

(a) Write an expression in x for
(i) The cost of each sheep (1 mark)
(ii) The selling price of each sheep (1 mark)

(b) (i) Form an equation in x and simplify it to the lowest form (2 marks)
(ii) Solve the equation in (b) (i) above, hence find the number of sheep he bought (4 marks)

(c) Determine: (i) the cost price per sheep (1 mark)
(ii) The selling price per sheep

23. 200 students were admitted in form 1 in Buma High school for the year 2011. 40 students were enrolled for computer studies, 100 students for Business studies and 60 students for Agriculture. Past experience the school indicate that the probability of passing Computer studies, Business studies and Agriculture a

$^{2}/_{5}$ ¾ and ½ respectively.

A student in form I in that school in that year is picked at random. Find the probability that:

(a) (i) The student enrolled for Business studies and would fail. (2 marks)

(ii) The student enrolled for Computer studies and would pass. (2 marks)

(b) How many students

(i) Were enrolled for business studies and would probably fail. (2 marks).

(ii) Were enrolled for Agriculture and would probably pass. (2 marks)

(c) Find the total number of students who would probably pass the three elective subjects

24. The table below shows Income Tax Rates for the Year 2006.

Taxable Income in Sh. p.a.	Rate of Tax %
I …….120,000	10
120,001……. 240,000	15
240,001…… 360,000	25
360,001…….. 480,000	40
Over 480,000	50

Nfu1a is married and claims a Tax relief of sh 1120 per month. She stays in a company house for which she pays a nominal rent of sh 1200 per month. She found that her employer deducted sh, 4830 as Tax per month If she is entitled to a maximum insurance policy relief of sh 600 per month, calculate her monthly salary. (10 marks)