Name .... Index No. ....

121/2 Candidate's signature ....

MATHEMATICS
Paper 2
july/August 2013
Time : 2½ Hours

Date ....

MERU COUNTY FORM 4 JOINT EVALUATION-2013

Kenya Certificate of Secondary Education

MATHEMATICS
Paper 2
July/August 2013
Time: 2½ Hours

INSTRUCTION TO ALL CANDIDATES

1. Write your name and admission number in the spaces provided.
2. This paper consists of two sections 1 and section II
3. Answer all the questions in section I and only five questions from section II.
4. All answers and working must be written on the question paper in the spaces provided below each question.
5. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. Non- programmable silent electronic calculators and KNEC mathematical table may be used except where stated otherwise.

FOR EXAMINERS USE ONLY

Section I	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

SECTION I (50 MARKS)

Answer all question in this section

1. Use logarithm tables to evaluate **(4mks)**

$$\sqrt[3]{\frac{3.782 \times 0.000288}{76.54}}$$

2. Make B the subject of the formular. **(3mks)**

$$K = \sqrt{\frac{A(B - A}{B - 1}}$$

3. Two blends of tea costing Ksh 140 and Ksh 160 per kg respectively are mixed in the ratio 2:3 by mass. The mixture is sold at sh. 240 per kg.

i) Find the percentage profit. **(2mks)**

ii) In what ratio should the two blends be mixed to get a mixture that costs sh 148 per kg? **(2mks)**

4. The dimensions of a rectangle are 10cm and 15cm. If there is an error of 5% in each measurement, find the percentage error in the area of the triangle. **(2mks)**

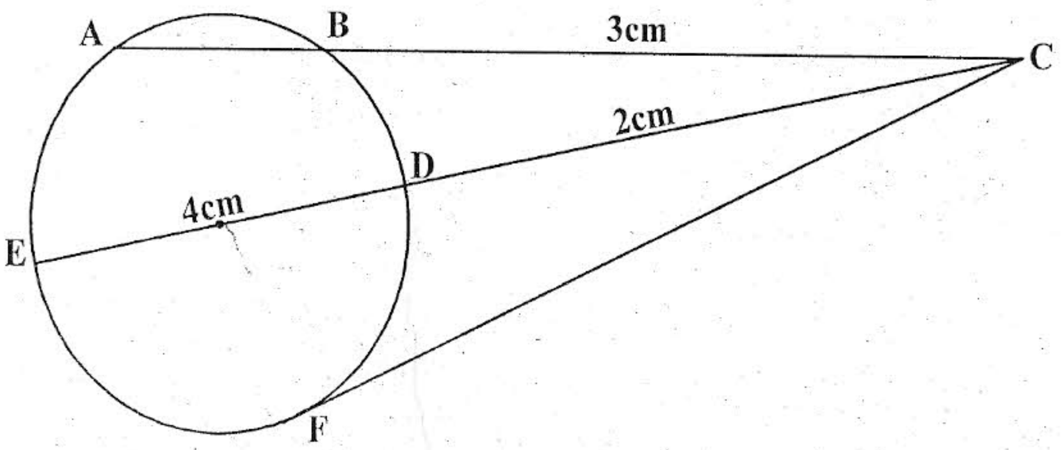
5. A quantity P varies partly as t and partly as the square of t. When t = 20 p = 45 and t = 24, p = 60. Find p when t = 32. **(4mks)**

6. During inter-school competitions, the rugby and football teams from a school in Meru county took part. The probability that rugby would win in the first match is $^1/_8$ while that of football team could lose is $^4/_7$. Find the probability that atleast one team won in the first match. **(2mks)**

7. Expand $\left(2 - {}^{1}/_{5}x\right)^{5}$ up to the term x^3 **(3mks)**

b) Hence use the expansion to find the value of $\left(1.96\right)^{5}$ correct to 3.d.p. **(2mks)**

8. The figure below shows a circle with tangent CF and secants ABC and CDE. BC = 3cm, CD = 2cm and DE = 4cm.



a) Find length CF. (2mks)

b) Find length AB. (2mks)

9. Points A and B lies on the same circle of latitude P°N. If A and B are on longitude 41°W and 3°E respectively and the distance between them is 1370nm. Calculate the latitude P. (2mks)

10. The weight of ten form four girls was recorded as follows 55, 62, 61, 51, 49, 65, 59, 61, 67 and 60 kilograms. Calculate the standard deviation. (3mks)

11. Without using tables or calculator evaluate $\frac{1+3\sin 60^0}{1-\tan 60}$ leaving your answer in surd in the form $a+b\sqrt{c}$ **(3mks)**

12. If $OA = 12\underset{\sim}{i} + 8\underset{\sim}{j}$ and $OB = 16\underset{\sim}{i} + 4\underset{\sim}{j}$. Find the coordinate of the point R which divides AB internally in the ratio 1:3. **(2mks)**

13. The third and the fifth term of an increasing geometric sequence are 2 and 8 respectively.

a) Find i) the common ratio (r) **(1mk)**

ii) the first term (a) **(1mk)**

b) the sum of the first ten terms. **(2mks)**

14. Solve the equation $1 + 2 \sin 2\theta = 0$ where $0° \leq \theta \leq 360°$ **(3mks)**

15. Find the locus of points P of a triangle PAB of area $9cm^2$, given that A and B are 6cm apart. **(3mks)**

16. The diameter of a circle passes through points $A\begin{pmatrix}-3, 0\end{pmatrix}$ and $B\begin{pmatrix}-3, 6.\end{pmatrix}$ If A and B are on the circumference, determine the equation of the circle. **(4mks)**

SECTION II (50 MARKS)

Answer only five question.

17a) Esther bought a motor-bike at Ksh 120,000 its value depreciated by 8% P.A for the first two years and 12% P.A for the subsequent years.

Determine the value of the motor-bike

i) at the end of two years. **(2mks)**

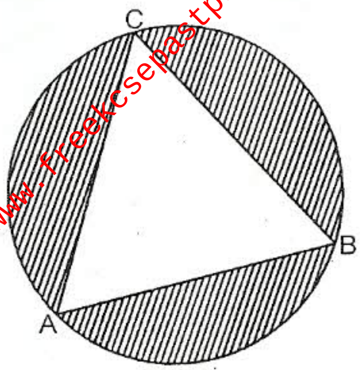
ii) at the end of six years **(2mks)**

b) At the end of 6 years a valuer valued the motor-bike at 25% more than the value at the end of 6 yrs in part (a ii) above.

i) What was the valuer's value of the motor-bike. **(2mks)**

ii) If the value of the motor-bike is taken as the valuer's value calculate the average monthly rate of depreciation. **(4mks)**

18. In the figure below (not drawn to scale), triangle ABC is inscribed in a circle. AB = 8.2cm AC = 6.9cm and BC = 6.2cm.



Find:

a) the size of angle ABC. (2mks)

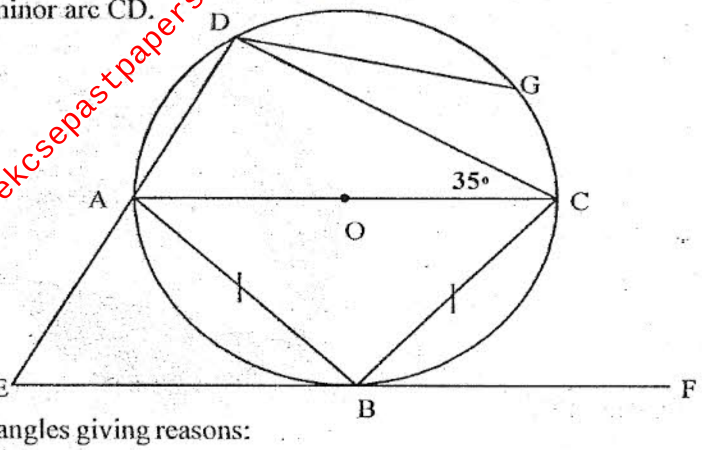
b) the radius of the circle correct to 1 decimal place. (2mks)

c) the area of the triangle. (2mks)

e) the area of the shaded part. (2mks)

e) A pin is thrown within the circle what is the probability that it lands on triangle ABC. (2mks)

19. In the figure below AOC is the diameter of a circle centre O. AB = BC and angle ACD = 35° EBF is a tangent to the circle at B.G is a point on the minor arc CD.



Calculate the size of the following angles giving reasons:

a) ∠ BCD. **(2mks)**

b) Obtuse ∠BOD. **(2mks)**

c) ∠BAD. **(2mks)**

d) ∠CGD. **(2mks)**

e) ∠AEB. **(2mks)**

20. A photograph is mounted on a rectangular frame such that it leaves a uniform border at the bottom and at the top. On each side, a uniform border is left which is half the border at the bottom. If the photograph is a square of side 5cm and the area of the frame is $75cm^2$.

a) Write down a simplified equation for the area of the frame. **(2mks)**

b) What are the dimensions of the frame. **(4mks)**

c) What is the percentage area of the frame that is not covered by the photograph? **(4mks)**

21. Given that $y = 2 \cos (x + 30) + 1$

a) **i)** Complete the table below.

X	-150	-150	-120	-90	-30	0	30	60	90	120	150	180
Y	0.73			2.00		2.73		1			-1.00	

ii) Draw the graph of $y = 2(\cos (x + 30) + 1$ use scale: holizontal 1cm represent 30^0 vertical 2cm represent 1 unit.

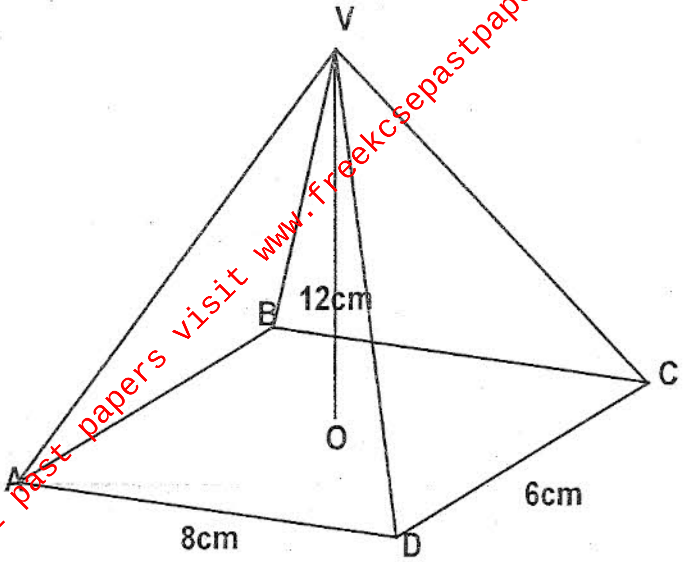
b) Use the graph to determine the

i) Maximum and minimum value of y. **(1mk)**

ii) amplitude of the wave. **(1mk)**

d) Use the graph to solve $\cos (x + 30) = 0.25$. **(3mks)**

22. The figure below shows a right pyramid with a rectangular base. Given that AD= 8cm, DC = 6cm and VO = 12cm.



Find:

a) the slant height VC. **(3mks)**

b) the angle between line VC and plane ABCD. **(2mks)**

c) the angle between line VA and AC. **(2mks)**

d) the angle between planes ABV and CDV. **(3mks)**

23. Use trapezoidal rule to estimate the area bounded by the curve $y = 8 + 2x - x^2$ for $-1 \leq 1\ x \leq 3$ using 5 ordinate. **(4mks)**

bi) Use integration to evaluate the exact area under the curve. **(3mks)**

ii) Find the percentage error in calculating the area using trapezoidal rule. **(3mks)**

24. Karimi goes to a shop to buy some black pens which cost sh. 12 and some blue pens which costs sh. 9 each. She has sh. 144. She buys more than 6 black pens and more than 4 blue pens.

i) Write three inequalities in x (black pens) and y (blue pens) which govern these conditions. **(3mks)**

ii) Represent these inequalities on a graph and find the required region in which x and y must lie by shading the unwanted regions. **(3mks)**

iii) Find the maximum number of pens of each type she can buy so that she is left with minimum balance. **(2mks)**

iv) What is the balance. **(2mks)**