

NAME:.....

INDEX NO.

SIGNATURE:

121/1
MATHEMATICS
Paper 1
March/April, 2011
Time: 2 ½ Hours

MOKASA JOINT EVALUATION EXAMINATION

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

121/1

Mathematics

Paper 1

March/April, 2011

Instructions To Candidates

Write your name, class and admission number in the space provided at the top of this page.

This paper has two sections: Section I and Section II

Answer all questions in section I and any five questions in section II

Show all the steps in your calculations, giving your answer at each stage in the space below each question.

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

For examiners 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 4 printed pages.

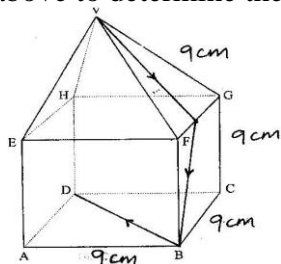
SECTION I (50 marks)

Answer all the questions in this section

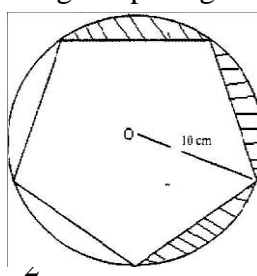
1. Solve for a in the equation (3 mks)

$$\frac{64^{2a} \div 16^a}{128^a \times 4^{2a}} = \frac{1}{4096}$$
2. Given that $A = 2^2 \times 3^2 \times 5^3$, $B = 2^3 \times 3^2 \times 7$ and $C = 2^5 \times 3^3 \times 7^3$, find the L.C.M and G.C.D of A, B and C in power form (3 mks)
 Hence find the value of $\frac{\text{L.C.M}}{\text{G.C.D}}$ leaving your answer in power form (1 mk)
3. A straight line PQ passing through the point p (2,4) is perpendicular to the line whose equation is $2y = 3x - 5$. Determine the equation of the line PQ. (3 mks)
4. Twenty women working 12 hours a day take 12 days to complete a job. How many more days will it take eight women working 20 hrs a day to complete the same job? (3 mks)
5. Without using tables or a calculator, simplify $\tan 30^\circ + \cos 30^\circ$ giving your answer $\sin 120^\circ - \cos 120^\circ$
 In the form $a + b \sqrt{c}$, where a, b and c are constant (4 mks)
6. Solve the inequalities and represent the solution on a number line (3 mks)
 $3x - 9 < 5x + 3 \leq 2x - 6$
7. Without using mathematical table or a calculator, evaluate:

$$\frac{36 - 8x - 4 - 15 \div -3}{3x - 3 + -8 (6 - (-2))}$$
8. Mary bought 3 blouses and 2 books for a total of Kshs. 500. Jane bought 4 blouses and 5 books for a total of Kshs 900, find the cost of 1 blouse and 3 books (3 mks)
9. 1600cm^3 of fresh water of density 1g/cm^3 are mixed with 1400cm^3 of sea water of density 1.25g/cm^3 . Determine the density of the mixture. (3 mks)
10. A sales woman earns a monthly wage of Kshs 3000 and gets a commission for the goods she sells. In a certain month she sells goods worth Kshs 16,000 and her total earning was Kshs. 4,280. Determine the rate of the commission. (3 mks)
11. The figure below shows a right pyramid mounted onto a cuboid.
 $AB = BC = CG = GT = 9\text{cm}$. A string is fixed at V, then passed to M, then B and finally fixed at D tightly as shown
 (a) Using scale of 1 cm to represent 3 cm, draw the net of the above solid accurate (2 mks)
 (b) Use your net above to determine the length of the string over CG (1 mk)



12. Find the quartile deviation of the data shown below (3 mks)
 $10, 16, 15, 12, 16, 20, 13, 16, 18, 12$
13. If the interior of an octagon are $(x - 10)^\circ$, $(x + 15)^\circ$, $(x + 45)^\circ$, $(x - 20)^\circ$, x° , $(x - 5)^\circ$ and $(x + 30)^\circ$. Find the value of x. (3 mks)
14. The diagram below, not drawn to scale, is a regular pentagon circumscribed in a circle of radius 10 cm at centre O
 Calculate the area of the shaded region (3 mks)



15. Find the coordinates of a point P is (-1, 3, 5) and Q is (2, -2, 4)

Find

- (a) PQ in terms of I, j and k (2 mks)
 (b) |PQ| (2 mks)

16. The table below shows marks obtained in mathematics test

Marks	$8 \leq x < 9$	$9 \leq x < 11$	$11 \leq x < 13$	$13 \leq x < 16$	$16 \leq x < 20$	$20 < x < 21$
No of Students	2	6	8	3	2	1

Use the table to represent the above information on a histogram (3 mks)

SECTION II (50 marks)

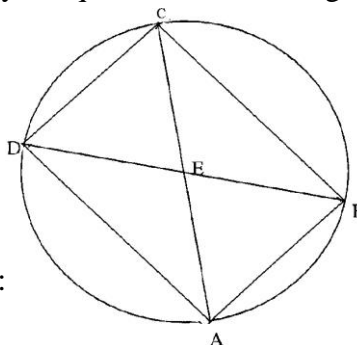
17. The table below shows measurements in metres recorded by surveyors in a field book from a parking bay. The base-line XY is 40 metres

- (a) Using a scale of 1 cm to represent 50 cm, draw the map of the parking bay. (3 mks)

	Y	
G 0	450	
	400	F 0
E 250	360	
	300	D 150
C 100	280	
B 200	150	
A 200	0	
	X	

- (b) Calculate the area of the parking bay in hectares (4 mks)
 (c) Calculate the perimeter of the parking bay in metres (3 mks)

18. In the figure below, ABCD is a cyclic quadrilateral and angle ABD = 42°, angle BAC = 58° and angle DBC = 36°



Giving reasons, find the value of:

- (a) Angle DAC (2 mks)
 (b) Angle ADB (2 mks)
 (c) Angle ACD (2 mks)
 (d) Angle CDB (2 mks)
 (e) Angle CEB (2 mks)

19. A matatu travels from Samoyo to Majengo and back. The average speed from Samoyo to Majengo is 96 km/h while that from Majengo to Samoyo is 60 km/h. It takes the matatu $3\frac{3}{4}$ hours more hours to travel from Majengo to Samoyo.

- (a) Determine the distance between the two towns (3 mks)
 (b) At 60 km/h, the fuel consumption is 0.65 litres per kilometer and 96 km/h, the consumption is 0.42 litres per kilometer.

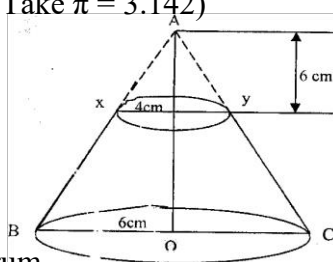
Find the

- (i) Total fuel consumption for the round trip (2 mks)
 (ii) Average fuel consumption per hour for round trip (3 mks)
 (c) If the cost of fuel was Kshs 92 per litre, find the total cost of fuel consumed by the Matatu in two round trips

20. The figure below shows a cone which is cut off along line XY as shows below. The top radius is 4 cm and the bottom radius is 6 cm. (Take $\pi = 3.142$)

Determine

- (a) The vertical height AO



(2 mks)

- (b) The curved surface area of the frustum

(4 mks)

- (c) The volume of the frustum

(4 mks)

21. (a) Complete the table given below by filling the blank, spaces

(2 mks)

x	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°
$4 \cos 2x$	4	2	0	-2	-3.46	-4	-3.46	-2	0	2	2		4
$2\sin(2x+30)^\circ$	1	1.73	2	1.73		0	-1	-1.73	-2	-1.73		0	1

- (b) On the grid provided draw on the same axes, the graph of $y = 4 \cos 2x$ and $y = 2 \sin (2x + 30^\circ)$ for $0^\circ < x < 180^\circ$

Use the scale of 1cm for 15° on the axis and 2 cm for 1 unit on the y – axis (5 mks)

- (c) from your graph

- (i) State the amplitude of $y = 4 \cos 2x$

(1 mk)

- (ii) Find the period of $y = \sin (2x + 30)$

(1 mk)

- (d) Use your graph to solve $4 \cos 2x - 2 \sin (2x + 30^\circ) = 0$

(1 mk)

22. The product of the first three terms of geometric progression is 64. If the first term is a, and the common ratio is r,

- (a) Express r in terms of a

(3 mks)

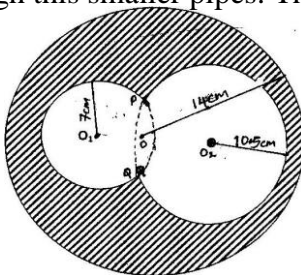
- (b) Given that the sum of the three terms is 14

- (i) Find the values of a and r and hence write down two possible sequences each up to the 4th term

(5 mks)

- (ii) Find the product of the 50th terms of the two sequence (2 mks)

23. The diagram below shows a cross section of an oil pipeline centre O and radius 14 cm. The pipe constitutes two other smaller pipes centres O_1 and O_2 with radii 7 cm and 10.5 cm respectively. Oil flows through this smaller pipes. The pipes with centre O_1 and O_2 intersect at P and Q.



- (a) Find the area of the un shaded region if $PQ = 5$ cm

(6 mks)

- (b) Calculate the volume of the oil flowing through the pipe in seconds at a velocity of 100m/s in cm^3

(2 mks)

- (c) Find the volume of the material used to make the pipe of length 200m

24. (a) Complete the table below whose equation is $y = x^2 - 5x + 12$ by filling in the blank spaces.

X	-4	-3	-2	-1	0	1	2	3	4	5	6	7
X^2	16		4		0	1	4		16	25		49
$-5x$	20	15		5	0	-5		-15	-20		-30	-35
12	12	12	12	12	12	12	12	12	12	12	12	12
Y	48		25	18		8		6		12	18	26

- (b) Draw a graph of $y = x^2 - 5x + 12$

(4 mks)

- (c) Use your graph to solve the following equations

(4 mks)

- (i) $y = x^2 - 2x - 3$

(2 mks)

- (iii) $Y = x^2 - 5x - 8$

(2 mks)