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

Candidates signature .....

121/1 Date .....

MATHEMATICS
Paper 1

July/August 2015

Time 2½ hours

KISII CENTRAL FORM FOUR JOINT EVALUATION

Kenya Certificate of Secondary Education

MATHEMATICS

Paper - 121/1

July/August 2015

Time: 2½ hours

INSTRUCTIONS TO CANDIDATES

1. Write your name and Index number in the spaces above.
2. Sign and write the date of the examination in the spaces provided above.
3. This paper contains two sections. Section I and II.
4. Answer all questions in section I and ONLY five in section II.
5. All answers and working must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations giving your answer at each stage in the spaces provided below each question.
7. Marks may be awarded for correct working even if the answer is wrong.
8. Non-programmable silent calculators may be used and KNEC Mathematical tables may be used, except where stated otherwise.
9. Candidates should check the questions paper to ascertain that all the pages are printed as indicated and that no questions are missing.

EXAMINER'S 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									

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

Grand Total

1. Evaluate $\dfrac{4\times 6+\frac{1}{5}\div 0.05+\frac{1}{5}}{(-3)\div(-6)+(23)-6\text{ of }3}$ **(3 marks)**

2. When a certain number is divided by 30, 45 or 54, there is always a remainder of 21. Find the least number. **(3 marks)**

3. Without using calculators of mathematical tables, find the value of **(3 marks)**

$$\frac{\sqrt{45\times(2.04)^2}}{\sqrt{0.05\times 2.89}}$$

4. Solve for b in the equation

$$5^{2b} - \frac{126}{5}(5^{b}) = -5$$

(4 marks)

5. A trader imported a camera for which she paid import duty at 40% of the purchase price. She later sold it to a customer giving 8% discount. If the customer paid shs 18,032 for the camera, find the purchase price.

(3 marks)

6. Solve the simultaneous equations:

$$\frac{1}{a} + \frac{1}{b} = 1$$

$$\frac{2}{a} + \frac{1}{b} = \frac{10}{3}$$

(4 marks)

7. Half of the interior angles of an irregular hexagon are in the ratio 2 : 3 : 4, while the other half are in the ratio 4 : 3 : 5 . List the interior angles of the hexagon. (3 marks)

8. A translation T maps P(5, 3) onto P^1 (2, -5). Find the length of P^1R^1 if point R^1 is the image of R(-2, -3) under the same translation T. (3 marks)

9. Use reciprocal and square root tables to evaluate to 4 significant figures, the expression. (3 marks)

$$\frac{5}{0.04796} \times \sqrt{583.6}$$

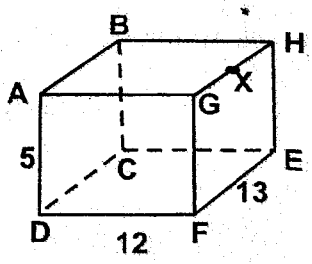
10. Working together two taps A and B can fill a tank in 6 hours. By itself tap A can fill the tank in 8 hrs.

a) How long can tap B take to fill the tank by itself. (1 mark)

b) Tap A and B are opened at the same time and after running for 2 hours, an outlet tap which can drain the full tank by itself in 12 hours is opened. How much longer will it take the tank to be filled. (3 marks)

11. Find the equation of a line passing through (2, -3) and is perpendicular to the line $4y - 6x + 5 = 0$ (3 marks)

12.

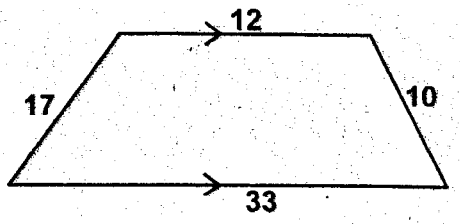


The diagram above shows an open cuboid. Find the distance between points C and X on the surface of the net if t he cuboids is opened up into a net by cutting along BC, HF, GE and AD given the GX is 6cm.

(3 marks)

13. A flower garden is in the form of the trapezium shown below. Find the area of the garden in m^2

(4 marks)



14. Given the vectors $a = 6i + 8j$

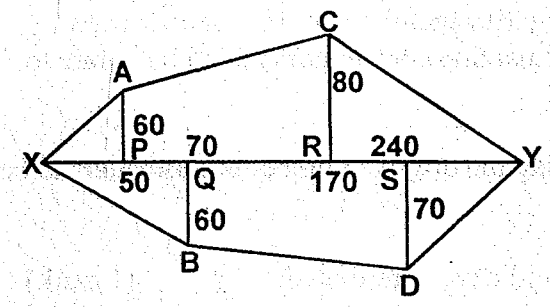
$b = 3i - 9j$

and $c = 4i + j$

Find the value of h and k such that $ha + kb = c$.

(3 marks)

15. The figure below shows a sketch of a plot of land showing the baseline XY =300m and offsets drawn against it. If all measurements are in metres. Transfer the information on the sketch to field book (all measurements are in metres. (3 marks)



16. Solve the simultaneous inequalities, $1-2x \leq \frac{2}{3}x-5 < 4-\frac{3}{4}x$, Hence represent your solution on a number line. (3 marks)

SECTION 11 (50 MARKS)

Answer ANY FIVE questions in this section in the spaces provided.

17. The football team in school decided to raise shs 3600 for a party. Each student was to contribute the same amount. However before the contributions were made five members of the football team decided to transfer to other schools. This meant that the remaining contributors had to pay more to meet the same target.

a) If the increase in contribution per student was shs 24. Taking the original number of footballers to be n

i) Give an expression for the initial amount that each should have contributed. (1 mark)

ii) Give an expression for the contribution after the transfer. (1 mark)

iii) Form an equation hence find the number of members in the football team originally (5 marks)

b) Calculate the percentage increase in the contribution per student caused by the transfer. (3 marks)

18. The table below shows the distribution of marks scored by 100 candidates in an examination.

Marks	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 -99
No. of candidates	2	5	k	2k + 3	24	18	10	6	5	3

a) Find k.

(1 mark)

b) Using an assumed mean of 44.5 calculate.

i) The mean

(3 marks)

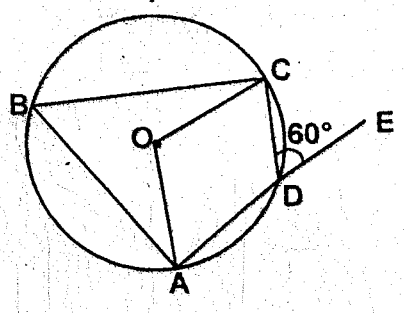
ii) The standard deviation.

(3 marks)

c) Calculate the median

(3 marks)

19. Below is a quadrilateral inscribed in a circle of centre O and radius 6cm. Angle CDE = 60°



a) Giving reasons find.

i) Angle ABC (2 marks)

ii) Angle CAO (2 marks)

iii) Angle ACD given angle CAD = 20° (2 marks)

b) Find the area of the major segment subtended by the major arc ABC (Use π =3.142) (4 marks)

20. A boat at point X is 200m to the south of point Y. The boat sails from X to another point Z. Point Z is 200m on a bearing of 310° from X. Point X, Y and Z are on the same horizontal plane.

a) Calculate the bearing and distance of Z from Y. (4 marks)

b) W is the point on the path of the boat nearest to point Y. Calculate the distance WY. (3 marks)

c) A vertical tower stands at point Y. The angle of depression of point x from the top of the tower is 6°. Calculate the angle of elevation of the top of the tower from point W. (3 marks)

21. A bus left Nairobi at 7.00 am and travelled towards Eldoret at an average speed of 80km/hr. At 7.45am a car left Eldoret towards Nairobi at an average speed of 120km/hr. The distance between Nairobi and Eldoret is 300km.
Calculate

a) the time the bus arrived at Eldoret. (2 marks)

b) the time of the day the two met (4 marks)

c) the distance from Nairobi where the two met. (2 marks)

d) the distance of the bus from Eldoret when the car arrived at Nairobi. (2 marks)

22. A solid cylinder has a radius of 21cm and a height of 18cm. A conical hole of radius r is drilled in the cylinder on one of the end faces. The conical hole is 12cm deep. If the material removed from the hole is $2^2/_3$ % of the volume of the cylinder, find : (Use $\pi = {}^{22}/_7$)

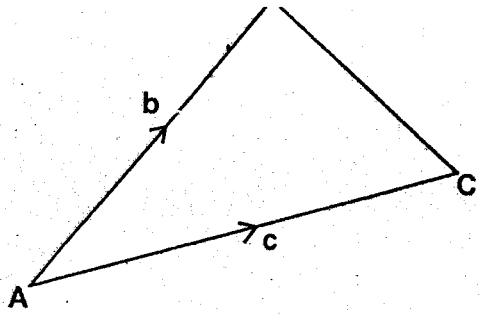
a) the surface area of the hole. (5 marks)

b) the radius of a spherical balls made out of the material. (3 marks)

c) the surface area of the spherical ball. (2 marks)

b) Use trapezium rule taking intervals of 0.5 units to find the area under the curve. $y = -2x^2 - 4x + 6$ within the range $-2 < x \leq 4$. **(4 marks)**

c) Obtain the exact area in (b) above hence calculate the percentage error introduced by using the Trapezium rule. **(3 marks)**



a) Write the following in terms of b and c

i) $\overrightarrow{BC}$

ii) $\overrightarrow{MN}$

iii) $\overrightarrow{BN}$

b) Given further that BC produced intersects MN produced at L and ML = hMN whil h and k are constants write ML in two ways hence find the values of h and k.

c) Show the M, N and L are collinear.