NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ INDEX NO. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SCHOOL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGNATURE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**121/1**

**MATHEMATICS ALT A**

**PAPER 1**

JUNE/JULY, 2015

**TIME: 2½ HOURS**

121/1

MATHEMATICS ALT A

PAPER 1

TIME: 2½ HOURS

**INSTRUCTIONS TO CANDIDATES**

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. This paper consists of **TWO** sections. **Section I** and **Section II**.
4. Answer **ALL** the questions in **section I** and only **FIVE** questions from **Section II.**
5. All answers and working must be written on the question paper in the space provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
7. Marks may be given for correct working even if the answer is wrong.
8. Non-programmable silent calculators and KNEC mathematical tables may be used except where stated otherwise.
9. This paper consists of **16** printed papers.
10. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

**FOR EXAMINER’S 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** |  |
|  |  |  |  |  |  |  |  |  |  |

**SECTION I (50 MARKS)**

***Answer ALL questions in this section***

1. Evaluate. (3 marks)

1. The cost of 5 skirts and 3 blouses is sh. 1750. Mutua bought three skirts and one of the blouses for sh. 850. Find the cost of each item. (3 marks)
2. A point T is at the intersection of the lines x−y=0 and 3x+y=12. Line Q which is parallel to line

2y−5x−8=0 passes through point T. Find the equation of line Q. (4 marks)

1. Solve the inequalities and illustrate your solution on a number line. (3 marks)

1. Use tables of reciprocals to find the value of given that: (3 marks)

1. Last year, Mulatya was four times as old as her son, Dennis; in four years’ time the sum of their ages will be 53. Determine their present ages. (3 marks)
2. Solve the equation. (3 marks)

− 121= 7 −

1. A test tube is made up of hemispherical bottom and a cylindrical stem, both of internal radius 0.7cm. Calculate the capacity of the test tube, given that its height is 12cm. (3 marks)
2. A bus travelling at an average speed of 63km/h left the station at 8.15 am. A car left the same station at 9.00am and caught up with the bus at 10.45 am. Find the average speed of the car. (3 marks)
3. Form a quadratic equation in t whose roots are −4 and 7. (3 marks)
4. The figure below (not drawn to scale) shows a triangle ABC inscribed in a circle.

AB =6cm, BC=9cm and AC=10cm. Calculate the area of the shaded region. (3 marks)



1. A salesman gets a commission of 2.4% on sales upto sh. 100,000. He gets an additional commission of 1.5% on sales above this. Calculate the commission he gets on sales worth sh. 280,000 (3 marks)
2. Given that the equation of the normal to the curve y = x2 + 3x + 5 at point C is 5y + x = 46, find the coordinates of C. (3 marks)
3. Water and milk are mixed such that the ratio of the volume of water to that of milk are 4:1. Taking the density of water as 1g/cm3 and that of milk as 1.2g/cm3, find the mass in grams of 2.5 litres of the mixture. (3 marks)
4. Every week the number of absentees in a school was recorded. This was done for 39 weeks.

The observations were tabulated as shown below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. of absentees | 0 - 3 | 4 - 7 | 8 - 11 | 12 - 15 | 16 - 19 | 20 - 23 |
| No. of weeks | 6 | 9 | 8 | 11 | 3 | 2 |

Estimate the median absentee rate per week in the school. (3 marks)

1. Solve without using tables or calculator. (4 marks)

**SECTION II (50 MARKS)**

***Answer ANY FIVE questions in the section.***

1. The capacity of two similar rectangular tanks is 1,000,000 litres and 512,000 litres respectively.
2. Determine the length of the larger tank if the smaller one is 240cm long. (4 marks)
3. Calculate the surface area of the smaller tank if the larger tank’s surface area is 1875m2. (3 marks)
4. Estimate the mass of the smaller tank if the mass of the larger one is 800kg. (3 marks)
5. A school S is 1820 metres from a post office P on a bearing 068°. A house X is 1160m from the post office on a bearing of 198°. House Y is 1650 metres from the school on a bearing of 142°. House Z is 2020 metres from the school on a bearing of 286°.
6. Using a scale of 1cm to represent 200 metres, make a scale drawing of the position of the post office, school and the houses X, Y and Z. (6 marks)
7. How far is the house Y from X.? (2 marks)
8. What is the bearing of X from Y? (2 marks)
9. Use a ruler and a compass only for all constructions in this section.
10. Construct a triangle XYZ in which XY=6cm YZ=5cm and XYZ=120° (2 marks)
11. Measure XZ and angle YXZ. (2 marks)
12. Construct the perpendicular bisector of XZ and let it meet XZ at M. (1 mark)
13. Locate a point W on the opposite side of XZ as Y and that XW=ZW and YW=9cm and hence

complete triangle XZW. (2 marks)

1. Measure WM and hence calculate the area of triangle WXZ. (3 marks)
2. Triangle ABC below has an area of 30cm2. In the triangle, ∠ABC = ∝, ∠ACB = θ and

 Sin ∝ – cosθ = 0. Sides AB = (2x−3) cm, AC = 3x cm and BC = 2(x + 2.5) cm.



**∝**

**θ**

From the triangle, find;

1. The value of x (3 marks)
2. The perimeter of the triangle (2 marks)
3. The perpendicular height from A to base BC (2 marks)
4. The size of angles θ and ∝ (3 marks)
5. A cone is made by cutting off a sector as shown below from a circle and gluing the straight edges of the sector.



**θ**

The cone formed has a slant height of 14cm and a circular base of perimeter 11 cm. (take π =)

1. Calculate the value of θ (2 marks)
2. The radius of the cones circular base (2 marks)
3. The height of the cone (3 marks)
4. The cone is cut uniformly on a horizontal plane 1cm below the apex. Calculate the slant height of the frustum so formed correct to 2 decimal places. (3 marks)
5. A Kenyan business woman wants to pay a company she owes US$ 100, 000 in the United States of America. The woman can either pay through her account in Kenya or her account in the United Kingdom.
6. If the exchange rate is;

1 US dollar = 28.74 Kenya shillings

1 Sterling pound = 1.79 US Dollars

1 Sterling pound = 50.80 Kenya shillings

Which method is cheaper and by how much? Give your answer in Kenya shillings. (4 marks)

1. Three years ago, Joseph was three times older than Agnes. In two years’ time the sum of their ages will be 74. Determine their present ages. (3 marks)
2. Use mathematical tables to evaluate;

 (3 marks)

1. Two circles, with centres O1 and O2 have radii 7 cm and 6cm respectively. The two circles intersect at P and Q, the length of common chord PQ is 10cm.



Calculate the area of the shaded region in the above diagram to four significant figures. (10 marks)

1. A certain number of people agreed to contribute equally to buy books worth sh. 12000 for a school library. Five people pulled out so that others agreed to contribute an extra sh. 100 each. Their contributions enabled them to buy books worth sh. 2000 more than they originally expected.
2. If the original number of people was X, write down.
3. An expression of how much each was originally to contribute . (1 mark)
4. Two distinct expressions of how much each contributed after the five pulled out. (2 marks)
5. Calculate the value of x. (3 marks)
6. Calculate how much each person was expected to contribute originally. (2 marks)
7. Calculate,
8. The number of people who actually made the contribution and how much per person. (1 mark)
9. The ratio of the supposed original contribution to new contribution. (1 mark)