**NAME……………………………………………………….…… ADM NO. ………………………**

**DATE: ……………………………....SIGN: …………………….…………**

**121/1**

**MATHEMATICS ALT. A**

**PAPER 1**

**APRIL 2023**

**TIME: 2 ½ HOURS**

**SUKELLEMO PRE-MOCK EXAMINATIONS**

**Instructions to Candidates**

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

2. Sign and write date of the examination in the spaces provided.

3. The paper contains TWO sections: Section I and II

4. Answer ALL questions in section I and **STRICTLY ANY FIVE** questions from section II.

5. All working and answers must be written on the question paper in the spaces 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 awarded for correct working even if the answer is wrong.

8. Non-programmable silent electronic calculators and KNEC Mathematical tables may be used except where stated otherwise.

**For Examiner’s use only**

**Section I**

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

**GRAND TOTAL**

**Section II**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 TOTAL |
|  |  |  |  |  |  |  |  |  |

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

**Section I (50 Marks)**

*Answer ALL questions in the section in the space provided.*

1. Evaluate (2 Marks)
2. Mr. Owino spends of his salary on school fees. He spends of the remainder on food and a fifth of what is left on transport. He saves the balance. In certain month he saved Sh. 3400. What was his salary?

 (3 Marks)

1. Simplify: (3 Marks)
2. Find x if + 1 = 28 (2 Marks)
3. The circle below whose area is 18.05cm2 circumscribes triangle ABC where AB = 6.3cm, BC = 5.7cm and AC = 4.2cm. Find the area of the shaded part. (4 Marks)

5.7cm

 6.3cm

4.2cm

A

B

C

1. A salesman gets a commission of 2.4% on sales up to Sh. 100,000. He gets additional commission of 1.5% on sales above this. Calculate the commission he gets for sales worth Sh. 280,000. (3 Marks)
2. A rectangle whose area is 96m2 is such that its length is 4metres longer than its width.

Find

1. It dimensions (2 Marks)
2. Its perimeter (1 Mark)
3. The sum of interior angles of a triangle is given by [10x-2y]0 while that of a hexagon is given by [30x+24y]0 .Calculate the values of x and y (3 Marks)
4. In triangle ABC below, AC = BC, AB is parallel to DE, AB = 15cm, DE = 7.5cm and BE = 6cm.

C

E

D

B

A

Calculate

1. Length CE (2 Marks)
2. Area of quadrilateral ABED. (2 Marks)
3. A measuring cylinder of base radius 5cm contains water whose level reads 6cm high. A spherical object is immersed in the water and the new level reads 10cm. Calculate the radius of the spherical object

(3 Marks)

1. Using a ruler and pair of compasses only, construct triangle ABC in which AB = 6cm, BC = 8cm and angle ABC = 450. Drop a perpendicular from A to BC to meet line BC at M. Measure AM and AC. (4 Marks)
2. In a book store, books packed in cartons are arranged in rows such that there are 50 cartons in the first row, 48 cartons in the next row, and 46 in the next and so on.
3. How many cartons will there be in the 8th row? (2 Marks)

1. If there are 20 rows in total, find the total number of cartons in the book store. (2 Marks)
2. Draw the net of the solid below and calculate the total surface area of its faces. (3 Marks)

10cm

10cm

10cm

10cm

6cm

 6cm

 6cm

6cm

V

A

B

C

D

1. Solve the following inequalities and state the integral values. (3 Marks)
2. Solve for x in - 18 x = 40 (3 Marks)
3. A translation maps triangle ABC onto A1B1C1 where A[1,-1], B[2,2], C[3,1] and C1[-1,3]. Find,
4. Translation vector (1 Mark)

1. The coordinate of A1 and B1  [2 Marks]

**Section II (50 Marks):**

*Answer any* ***FIVE*** *questions in this section in the spaces provided.*

1. The distance between towns A and B is 360km. A minibus left town A at 8.15 a.m. and traveled towards town B at an average speed of 90km/hr. A matatu left town B two and a third hours later on the same day and travelled towards A at average speed of 110km/hr.
2. (i) At what time did the two vehicles meet? (4 Marks)

(ii) How far from A did the two vehicles meet? (2 Marks)

1. A motorist started from his home at 10.30 a.m. on the same day as the matatu and travelled at an average speed of 100km/h. He arrive at B at the same time as the minibus. Calculate the distance from A to his house. (4 Marks)
2. Karis owns a farm that is triangular in shape as shown below.

C

B

A

440m

320m

250m

1. Calculate the size of angle BAC (2 Marks)
2. Find the area of the farm in hectares (3 Marks)
3. Karis wishes to irrigate his farm using a sprinkler machine situated in the farm such that it is equidistant from points A, B and C.

(i) Calculate the distance of the sprinkler from point C. (2 Marks)

(ii) The sprinkler rotates in a circular motion so that the maximum point reached by the water jets is the vertices A, B and C. Calculate the area outside his farm that will be irrigated. (3 Marks)

1. A ship leaves port M and sails on a bearing of 0500 heading towards island L. Two Navy destroyers sail from a naval base N to intercept the ship. Destroyer A sails such that it covers the shortest distance possible. Destroyer B sails on a bearing of 200 to L. The bearing of N from M is 1000 and distance

NM = 300KM. Using a scale of 1cm to represent 50km, determine:-

(i) The positions of M, N and L. (3 Marks)

(ii) The distance travelled by destroyer A (3 Marks)

(iii) The distance travelled by destroyer B. (2 Marks)

(iv) The bearing of N from L. (2 Marks)

1. A number of people agreed to contribute equally to buy books worth KSh. 1200 for a school library. Five people pulled out and so the others agreed to contribute an extra Shs. 10 each. Their contributions enabled them to buy books worth Shs. 200 more than they originally expected.
2. If the original numbers of people was x, write an expression of how much each was originally to contribute. (1 Mark)
3. Write down two expressions of how much each contributed after the five people pulled out.

(2 Marks)

1. Calculate the number of people who made the contribution. (5 Marks)
2. Calculate how much each contributed. (2 Marks)
3. Two lines L1,2y - 3x - 6 ═ 0 and L2,  3y + x- 20 = 0 intersect at a point A.
4. Find the coordinates of A. [3marks]
5. A third line L3 is perpendicular to L2 at point A. Find the equation of L3 in the form y = mx + c where m and c are constants. [3marks]
6. Another line L4 is parallel to L1 and passes through [-1,3]. Find the x and y-intercept of L4. [4marks]
7. The vertices of triangle PQR are P (0,0), Q (6, 0) and R (2, 4)

 (a) Draw triangle PQR on the grid provided. (1 mark)

 

1. Triangle  is the image of a triangle PQR under an enlargement scale factor 

and centre (2, 2). On the same grid draw triangle and write down its coordinates.

(3 marks)

1. On the same grid draw triangle  the image of triangle under a positive quarter turn about point (1, 1). (3 marks)

 (d) Draw a triangle the image of triangle under reflection in the line .

 (2 marks)

(e) State the type of congruence between triangle and triangle . (1 mark)

1. The table shows marks obtained by 100 candidates at Goseta Secondary School in Biology examination.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 | 75-84 | 85-94 |
| Frequency | 6 | 14 | 24 | 14 | x | 10 | 6 | 4 |

1. Determine the value of x (1 Mark)
2. State the modal class (1 Mark)
3. Calculate the median mark (4 Marks)
4. Calculate the mean mark (4 Marks)
5. In the triangle below P and Q are points on OA and OB respectively such that OP:PA=3:2 and OQ:QB =1:2 AQ and PQ intersect at T. Given that OA= and OB= 



 **(a) Express** **AQ** and **PQ** in terms of  and  (2mks)

 (b) Taking **BT**=k**BP** and **AT**=h**AQ** where h and k are real numbers.

 (i) Find two expressions for **OT** in terms of  and  (2mks)

 (ii) Use the expressions in b (i) above to find the values of h and k. (5mks)

 (c) In what ratio does T divide **AQ**.? (1mk)