

NAME: .....Adm NO.....Class.....

CANDIDATE SIGNATURE.....DATE.....

121/1  
MATHEMATICS ALT A.  
PAPER 1  
JULY / AUGUST-2026  
2 ½ HOURS

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### INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided
- This paper consists of two sections: **Section I and Section II.**
- Answer all the questions in Section I and only five from section II
- All answers and working must be written on the question paper in the spaces provided below each question.
- Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non- programmable silent electronic calculators **and KNEC** Mathematical tables may be used except where stated otherwise.
- Candidates should check the question paper to ascertain that all the 24 questions are printed.

**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**

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### **SECTION 1( 50 MARKS) COMPULSORY**

1. Evaluate

(3mks)

$$\frac{\frac{3}{4} + \frac{2}{5} \div \frac{3}{5} \text{ of } 1\frac{2}{3}}{\left(1\frac{3}{4} - \frac{5}{8}\right) \times \frac{2}{9}}$$

2. Three years ago, Mary was three times as old as Oloo. In two years' time, the sum of their ages will be 62. Determine their present ages. (4 mks)

3. Use tables of reciprocal only to work out the following correct to 3d.p.

(3mks)

$$\frac{3}{0.6735} + \frac{13}{0.156}$$

4. Two similar solids have surface areas  $108\text{cm}^2$  and  $192\text{cm}^2$  respectively. Find the volume of the smaller solid if the bigger one has a volume of  $512\text{cm}^3$ . (3mks)

5. Two blends of tea costing kshs. 140 at kshs. 160 per kg. Respectively are mixed in the proportion. 2:3 by mass. The mixture is then sold at kshs. 240 per kg. Find the percentage profit made per kilogram. (3 mks)
6. A line K passes through the points  $(-4, 5)$  and  $(-1, 6)$  and its perpendicular to another line M at  $(-1, 6)$ . Find the equation of M in the form of  $y = mx + c$  (3mks)
7. A two digit number is such that the sum of its digits is 13. When the digits are interchanged the original number is increased by 9. Find the original number. (3mks)
8. A businessman arriving from Britain had Uk\$9550. He converted the pounds to Kenyan shillings at a commission of 4.5%. While in Kenya he spent  $\frac{3}{4}$  of his money. He exchanged the remaining to U.s

dollars with no commission. Calculate to the nearest U.s dollar the amount using the exchange rate below. (3 mks)

| Currency     | Buying kshs. | Selling Kshs. |
|--------------|--------------|---------------|
| 1 U.s dollar | 132.50       | 141.95        |
| 1 Uk pound   | 165.57       | 163.30        |

9. Given that  $x^\circ$  is an angle in the first quadrant such that  $8\sin^2x + 2\cos x - 5 = 0$ . Find

(i)  $\cos x$

(ii)  $\tan x$

10. Given the inequality  $x - 5 \leq 3x - 8 < 2x - 3$

(i) Solve the inequality. (2mks)

(ii) Represent the solutions on a number line. (1mk)

11. A bus left a petrol station at 9.20am and travelled at an average speed of 75km/h to a town N. At 9.40am a taxi travelling at an average speed of 95km/h, left the same petrol station and followed the

same route of the bus. Determine the distance from the petrol station covered by the taxi at the time it caught up with the bus. (3 mks)

12. Given that  $OA = 3i - 2j + k$  and  $OB = 4i + j - 3k$ . Find the distance between A and B to 2dp (3 mks)

13. Using a ruler and pair of compass only. (a) Construct a parallelogram ABCD in which AB=6cm, BC= 4cm and  $\angle DAB = 75^\circ$  (3 mks)

- b) Determine the perpendicular distance between AB & CD. (1mk)

14. A girl walks directly from point A towards the foot of a tall building 24m away. After covering a distance of 180m, she observes that the angle of the top of the building is  $45^\circ$ , determine the angle of elevation of the top of the building from A. (3 mks)
15. If 3 is a root of the equation  $x^2 + 5x + p = 0$ , *find the* other root and hence find the value of P. (3mks)
16. Arc AB subtends an angle of  $144^\circ$  at the centre O of a circle. If the area of the sector is  $385\text{cm}^2$ . Calculate the perimeter of the sector. (3mks)

**SECTION II (50 MARKS)**

**17.** The line  $L_1$  passes through the points  $(-2, 3)$  and  $(-1, 6)$  and is perpendicular to  $L_2$  at  $(-1, 6)$ .

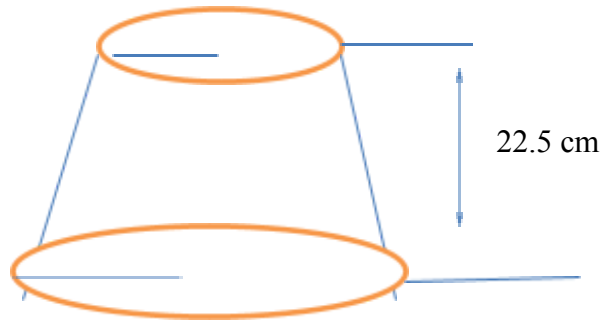
a) Find the equations of  $L_1$ . (2mks)

b) Find the equation of  $L_2$  in the form of  $ax + by = c$  where  $a$ ,  $b$  and  $c$  are integers. (2mks)

c) Given that another  $L_3$  is parallel to  $L_1$  and passes through point  $(1, 2)$ . Find x and y intercept of  $L_3$ . (3mks)

d) Find the point of intersection of  $L_2$  and  $L_3$ . (3mks)

18. The diagram below represent a solid frustum with base **radius 21cm** and top **radius 14cm** the frustum is **22.5cm** high and made of a metal whose density is **3g/cm<sup>3</sup>**. ( Take  $\pi = \frac{22}{7}$  )



**Calculate:**

i) The **volume** of the frustum in **cm<sup>3</sup>**.

(5mks)

ii) The **mass** of the frustum in **kgs**.

(2mks)

iii) The frustum is melted down and recast into a solid cube. In the process 20% of the metal is lost.

Calculate to **(2 d.p)** the length of each side of a cube.

(3mks)

19. Below are masses of students taken in a medical Centre?

**35 55 32 37 60 35 38 20 54 66 59 34**

**56 42 31 44 47 45 55 48 39 29 27 24**

**33 36 35 43 45 48 28 52 39 64 41**

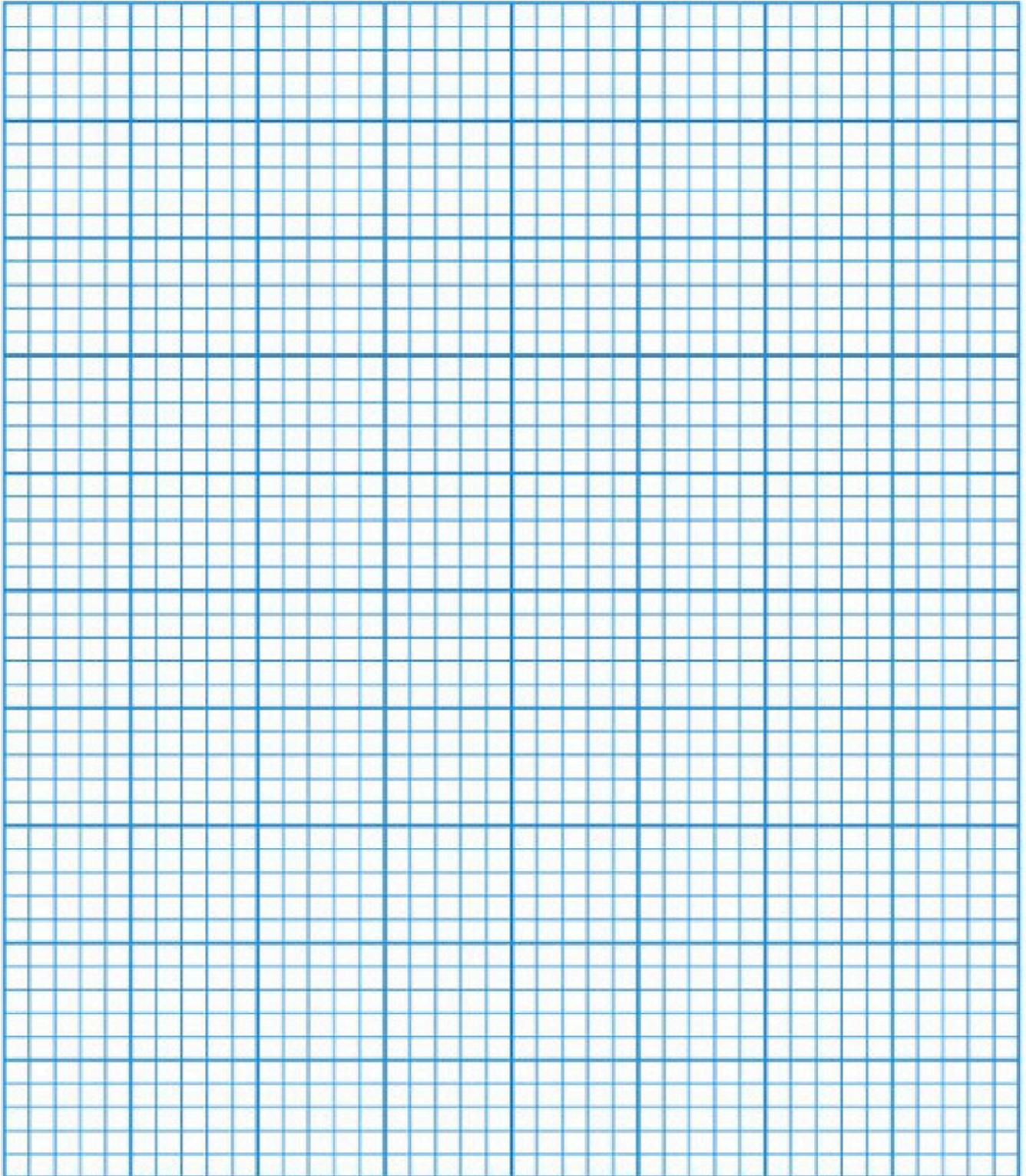
(a) Starting with the **class 20-29** and class size of 10 .make a frequency distribution table for the data (2marks)

(b) Calculate the mean mass

(4marks)

c) On the grid provided draw a histogram to represent the data above

(4mks)



20. Three quantities, P, Q and R are such that P varies directly as the cube of Q and inversely as the square of R.

(a) Given that  $P=16$  when  $Q=2$  and  $R=3$ . Determine the value of R when  $P= 288$  and  $Q=4$ .

(5mks)

b) Q decreases by 30% while R increases by 40%. Find the percentage decrease or increase in P.

(5mks)

21. (a) Given that  $M = \begin{bmatrix} 2 & 3 & 4 & 5 \end{bmatrix}$ , Find  $M^{-1}$ . (3mks)

b) In a certain week, Kadogo's mother bought 4kgs of Pishori rice and 6 Kgs of pigeon peas for a total cost of shs 1280. In the week that followed, she bought 8kgs of same rice and 10 of the peas for shs2360.

(i) Use the information above to form two simultaneous equations. (2mks)

(ii) Use  $M^{-1}$  to find the cost of kilogram of each of the items. (5mks)

22. Four towns A, B, C and D are such that B is 82km directly to the North of A and C is on a bearing of  $285^{\circ}$  from A and at a distance of 65km. D is on a bearing of  $330^{\circ}$  from C and at a distance of 30kms. Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative position of the towns. (3mks)

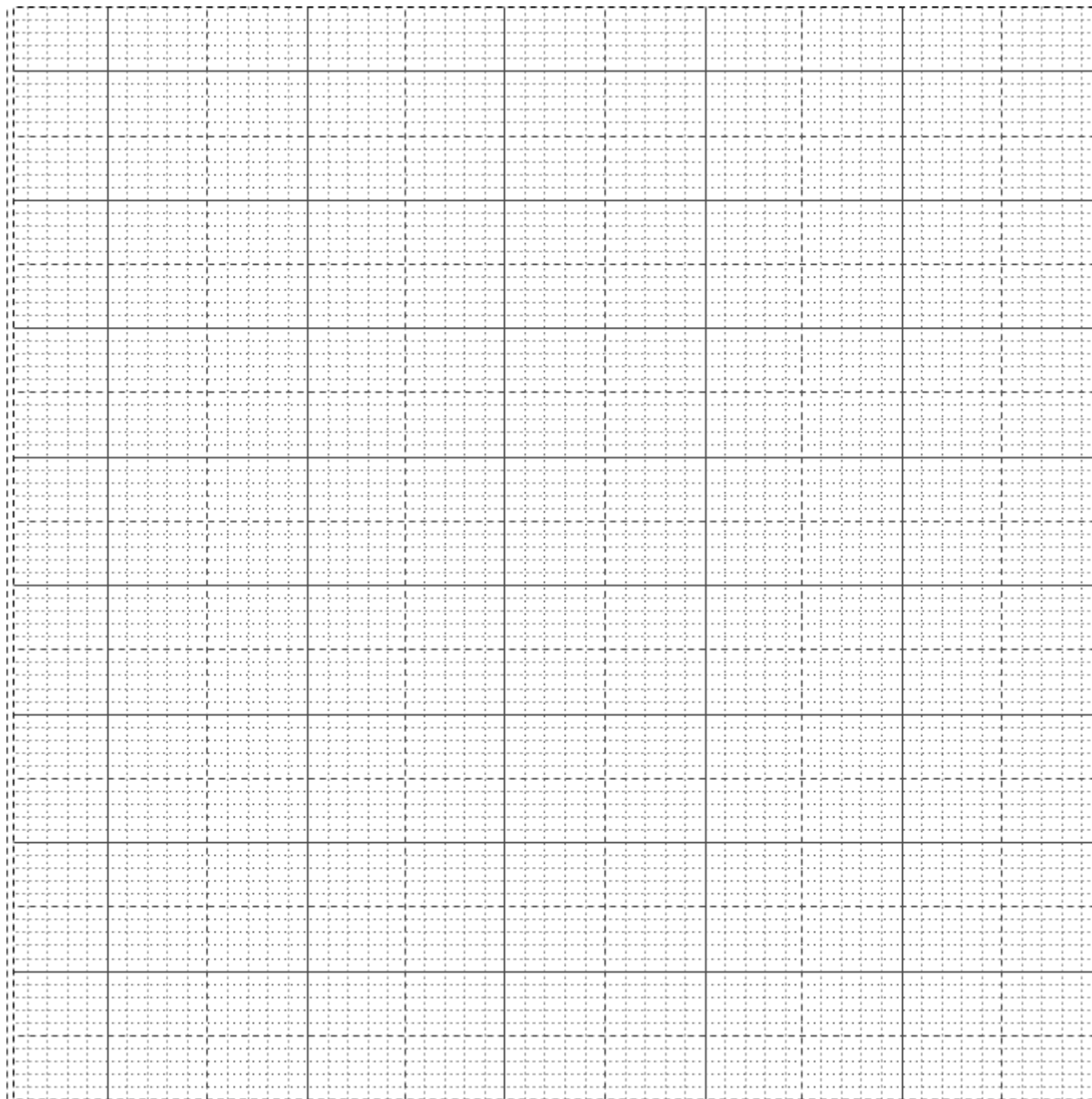
i) Find the distance and bearing of B from C. (1mk)

ii) Distance and bearing of D from B. (3mks)

iii) The bearing of A from D. (3mks)

23. a) Draw the graph  $y = x^2 + x + 2$  for the range  $-3 \leq x \leq 3$

(3mks)



b) Using 6 strips and mid-coordinate rule estimate the area bounded by the curve,  $x$  axis and ordinates  $x=-3$  and  $x=3$ . (3mks)

c) Find the exact area in ( b ) above. (2mks)

d) Calculate the percentage error in the area. (2mks)

24. A particle moves in straight line so that  $t$  seconds are passing a fixed point in the line, its velocity  $V$  m/s is given by  $V = \frac{1}{2}t^2 - 3t + 7$ . Calculate:

a) The velocity after 8 seconds (2mks)

b) The acceleration when  $t=0$ . (2mks)

c) The minimum velocity. (2mks)

d) The distance travelled in the 1<sup>st</sup> two seconds of motion. (2mks)

e) The distance traveled in the third second. (2mks)

*This is the last printed page.*