

**END TERM EXAMINATIONS – TERM TWO 2023**

**MATHEMATICS ALT. A**

**FORM 2**

**2½ Hours**

**Name:** ..... **Adm No:** .....

**School:** ..... **Class:** .....

**Candidate’s Signature:** ..... **Date:** .....

**INSTRUCTIONS TO CANDIDATES**

- (a) Write your name, admission number, school, and class in the spaces provided at the top of this page.
- (b) Sign and write the date of the examination in the spaces provided above.
- (c) This paper consists of **two** sections: **Section I** and **Section II**.
- (d) Answer **ALL** questions in **Section I** and **all** the questions from **Section II**.
- (e) Show **all the steps in your calculations**, giving your answers at each stage in the spaces provided below each question.
- (f) Marks may be given for correct working even if the answer is wrong.
- (g) **Non-programmable** silent electronic calculators and KNEC Mathematical Tables may be used.
- (h) Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

**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**

**SECTION I (50 MARKS): ANSWER ALL QUESTIONS**

1. Evaluate  $\frac{16 \div -4 + 18 \times 6 - 3 \times 8}{48 \div 6 \times 2}$

(3marks)

2. The volumes of two similar cylinders are  $4096\text{cm}^3$  and  $1331\text{cm}^3$ . If the area of the curved surface of the smaller one is  $352\text{cm}^2$ , find the curved surface area of the larger one. (3marks)

3. John exchanged ksh.600, 000 to sterling pounds after settling bills worth £1200, he changed the balance to Euros. He then purchased goods worth 200 Euros .Using the exchange rates below calculate his balance in Kenyan shillings. (4marks)

	Buying (Ksh)	Selling (Ksh)
1 sterling pound	114.20	114.50
1 Euro	101.20	101.30

4. The interior angle of a regular polygon is  $90^\circ$  more than its exterior angle. Find the number of sides of the polygon. (3marks)



5. John, James and peter shared the profit from their business in the ratio 3:7:9 respectively. If James received Ksh. 63,000, how much profit did the business make. (3marks)



6. Solve the simultaneous equation by elimination method

$$y + x = 7$$

$$3x + y = 15$$

(3marks)

7. Evaluate  $\frac{\frac{1}{2} \text{ of } 3\frac{1}{2} + 1\frac{1}{2} (2\frac{1}{2} - \frac{2}{3})}{\frac{3}{4} \text{ of } 2\frac{1}{2} \div \frac{1}{2}}$  (3marks)

8. Calculate the area of a triangle whose sides are 8cm by 12cm by 10cm. (3marks)



9. Find the equation of the straight line passing through points A (3,9) and B (7,5) in the form  $y = mx + c$ . (3marks)

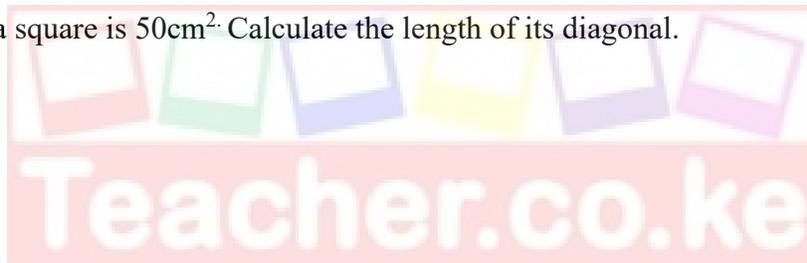
10. Evaluate using logarithm tables

$$\sqrt[3]{\frac{34.5 \times 0.00697}{(0.534)^2}}$$

(4marks)

11. The area of a square is  $50\text{cm}^2$ . Calculate the length of its diagonal.

(3marks)



12. Evaluate without using tables or calculators

$$\frac{0.036 \times 0.0049}{0.07 \times 0.048}$$

(3marks)

13. Given that  $p = 4$ ,  $q = 3$  and  $S = 5$ , find the value of (3marks)
- $$\frac{p+q^2-S}{S}$$

14. The lessons in two adjacent primary and secondary school lasts for 35 minutes and 40 minutes respectively. If the bells for the starting of lessons ring simultaneously at 8:00am, when will they next ring together assuming there are no breaks. (3marks)

15. The sum of two numbers is 25. The difference between the two numbers is 7. Find the numbers (3marks)

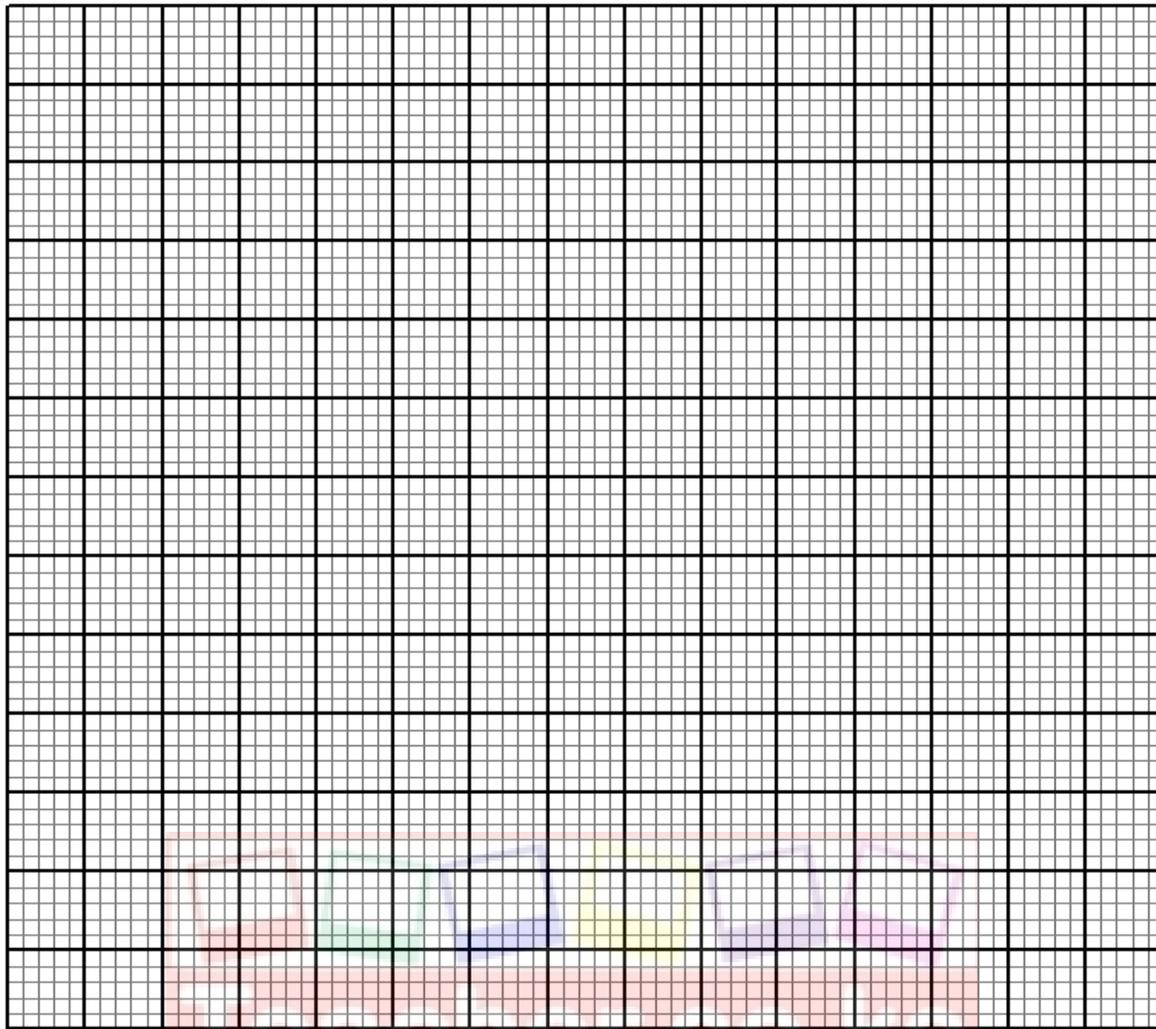
16. Given that  $\sin(90 - \theta) = 0.8$  where  $\theta$  is an acute angle, find without using mathematical tables.  
find the value of  $\tan^2 \theta$  (3marks)



**SECTION II (50 MARKS): ANSWER FIVE QUESTIONS ONLY**

17. A triangle has vertices A (-5,-2), B (-3,-2) and C (-5,-5). The triangle is rotated about the origin through  $+90^\circ$  to give A', B', C'.

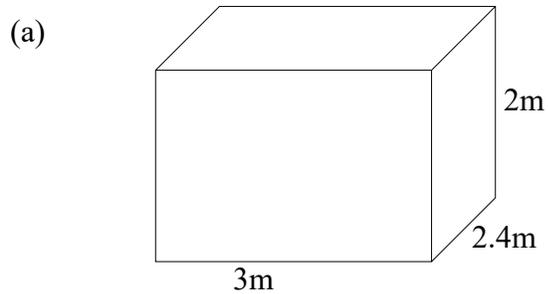
(A) Draw the triangles ABC and A'B'C' and give the coordinates of A'B'C'. (4marks)



(B) Draw the image  $A''B''C''$  of  $A'B'C'$  under a reflection in the line  $X = 0$  and write down the coordinate of  $A'' B'' C''$  (3marks)

(C)  $A''' B''' C'''$  is the image of  $A'' B'' C''$  under reflection in the line  $y = x$ . Draw the triangle  $A''' B''' C'''$  and write down the coordinates. (3marks)

18. The figure below shows a water tank in the shape of a cuboid (internal dimensions)



(a) Calculate its capacity in liters.

(3marks)



(b) The sides of the tank and the floor are to be fitted with square tiles of 20cm. Calculate the number of tiles to be used (thickness of tile negligible) (5marks)

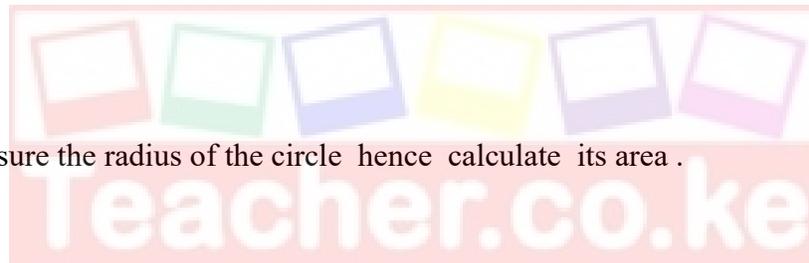
(c) If the price of a tile is ksh.40.calculate the cost of purchasing the tiles. (2marks)



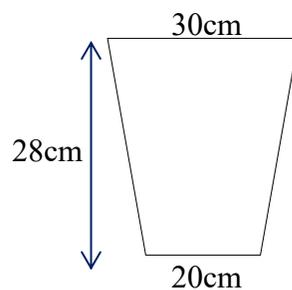
19. (a) Using a ruler and a pair of compass only, construct triangle ABC in which  $AB = 9\text{cm}$ ,  $BC = 8\text{cm}$  and  $\angle BAC = 60^\circ$  (4marks)

(b) Construct a circle which passes through the vertices A,B and C (3marks)

(C) Measure the radius of the circle hence calculate its area . (3marks)



20. The diagram below shows a bucket with top diameter of the bucket is 28cm.



(a) Calculate the amount of water it can hold when full in litres.

(5marks)

(b) Calculate the area in contact with water when full.

(5marks)



21. a) Fill the table below for the equations:  $4y + 3x = 18$  and  $2x - y = 1$

$4y + 3x = 18$

(1mark)

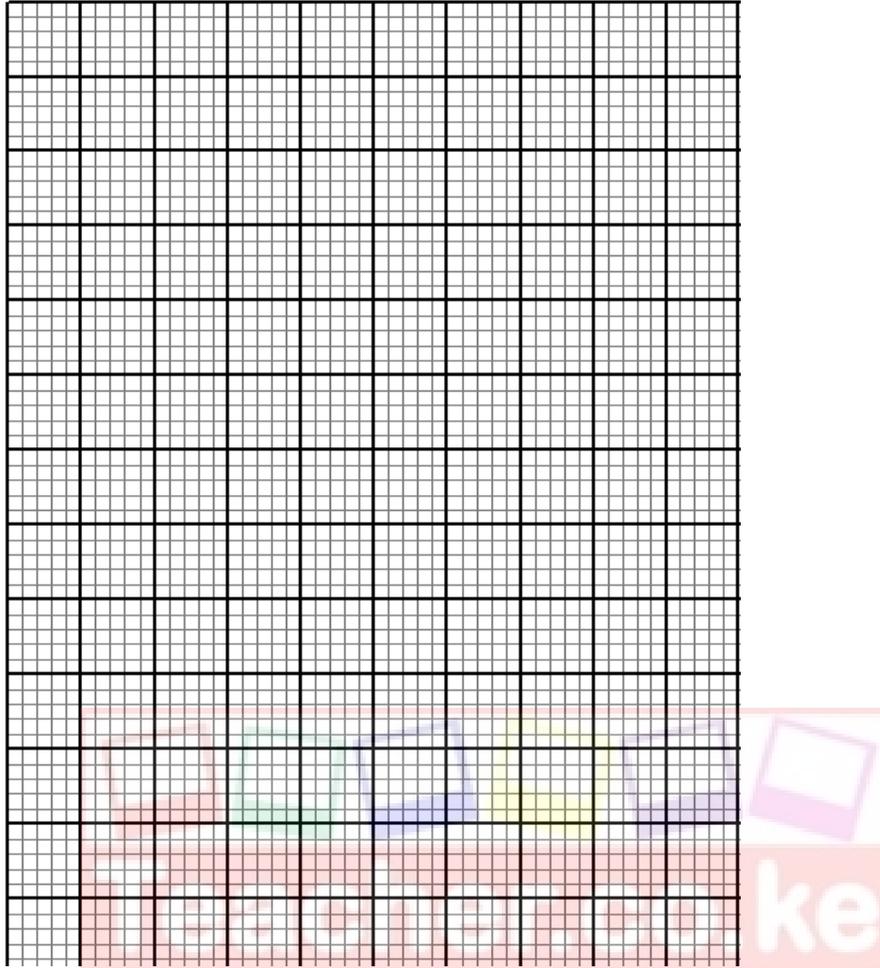
X	-2	-1	0	1	2
Y	6		4.5		

$2x - y = 1$

(1mark)

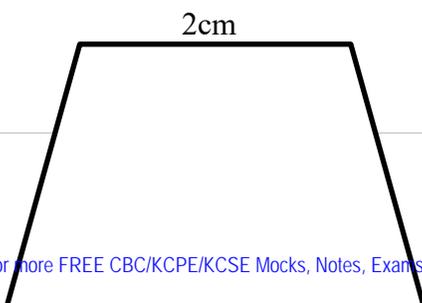
X	-2	-1	0	1	2
Y	-5		-1	1	

b) On the graph provided draw the graphs of the lines  $4y + 3x = 18$  and  $y = 2x - 1$  on the same axis. (5marks)



c) From the graph state the point of intersection of the two lines hence give the simultaneous solution of the equations  $4y + 3x = 18$  and  $2x - y = 1$  (3marks)

22. The diagram below represents the cross section of a solid prism of length 8cm



3cm

3cm

5cm

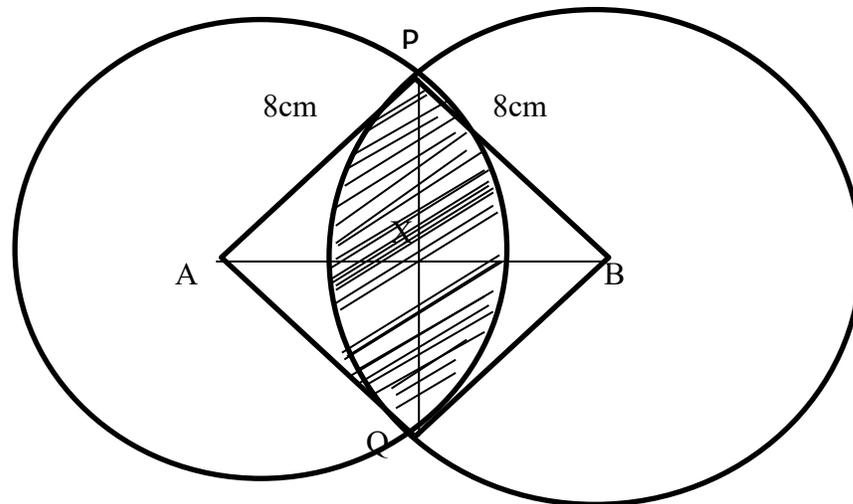
a) Calculate the volume of the prism (3marks)

b) Given that the density of the prism is  $5.75 \text{ g/cm}^3$  Calculate its mass in Kg. (3marks)



c) A second prism is similar to the above but made of different materials. The volume of the second prism is  $246.24 \text{ cm}^3$ . Calculate the cross sectional area of the second. (4marks)

23 Two circles with centres A and B and radius 8cm intersect at point P and Q



Given that the distance between A and B is 12cm and the line PQ and AB meet at x. find correct to four significance figures

a) The length of PQ (2marks)



b) The area of the shaded region (6marks)

c) The reflex angle PAQ (2marks)

24 a) A line L1 passes through point A (7,2) and B (5,4) find the equation of L1 in the form  $ax + by = c$  (3marks)



b) Another line L2 is a perpendicular bisector of L1 find the equation of L2 in the form  $y = mx + c$  (4marks)

c) A third line L3 is parallel to L2 and passes through  $(-2,3)$  find the equation of L3 (3marks)

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