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**KENYA NATIONAL EXAMINATION COUNCIL**  
**REVISION MOCK EXAMS 2016**  
**TOP NATIONAL SCHOOLS**

**ALLIANCE BOYS HIGH SCHOOL**  
**MATHEMATICS**  
**PAPER 1**

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**MATHEMATICS  
PAPER 1  
TIME: 2 ½ HOURS**

**ALLIANCE BOYS HIGH SCHOOL KCSE TRIAL  
AND PRACTICE EXAM 2016**

**INSTRUCTIONS TO CANDIDATES**

1. Write your name, index number, class and school in the spaces provided above.
2. This paper consists of TWO sections I & II
3. Answer ALL the questions in section I and only FIVE questions from section II
4. All answers and working must be written on the question paper in the spaces provided below each question.
5. Show all the steps in your calculations giving your answers at each stage in the spaces below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

**FOR EXAMINERS USE ONLY**

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

17	18	19	20	21	22	23	24	TOTAL

GRAND  
TOTAL

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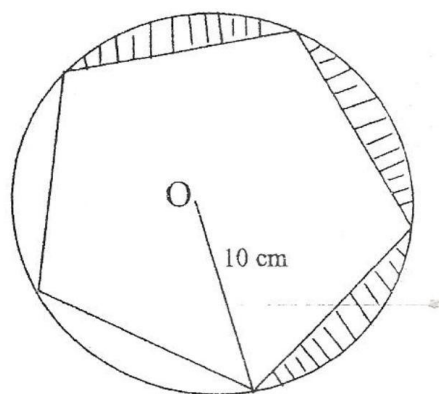
**SECTION 1: 50 MARKS**

**Answer all questions**

1. State the name of the figure sketched (1 mark)
2. Without using log tables or a calculator; solve (3marks)  
Log ¼ + log 64

$\log 32 - \log 1/8$

3. The sum of interior angles of two regular polygons of sides;  $n$  and  $n + 2$  are in the ratio 3:4 Calculate the sum of the interior angles of the polygon with  $n$  sides. (4 marks)
4. A group of 10 soldiers set off with enough food to last 7 days. After 4 soldiers deserted. How many more days will the food last for the remaining soldiers? (3 marks)
5. The diagram below, not drawn to scale, is a regular pentagon circumscribed in a circle of radius 10cm at centre O



Find

- (a) The length of any side of the pentagon (2 marks)
  - (b) The area of the shaded region (2 marks)
6. A line whose gradient is positive is drawn on the Cartesian plane and its equation is  $x - y\sqrt{3} = -3$ . Calculate the angle formed between the line and x-axis. (3 marks)
  7. Find all the integral values of  $x$  which satisfy the inequality  $3(1 + x) < 5x - 11 < x + 45$  (3 marks)
  8. An arc subtends an angle of 0.9 radians at the centre of a circle whose radius is 13cm. Find the length of the arc. (2 marks)
  9. The scale of a map is given as 1:50,000. Find the actual area in hectares of a region represented by a triangle of sides 6cm by 7cm (Give your answer to the nearest whole number). (3 marks)
  10. Two passenger trains A and B, 240m apart are travelling at 164km/h and 88km/h respectively towards each other on a straight railway line. Train A is 150 metres long, while B is 100 metres long. Determine the time in seconds that elapses before the two trains completely pass each other. (4 marks)
  11. Given that  $\cos A = 5/13$  and angle A is acute, find the value of  $2 \tan A + 3 \sin A$ . (3 marks)
  12. Given that  $4x^2 - 32x - 20 + k$  is a perfect square, find  $k$ . (3 marks)
  13. A watch which loses a half-minute every hour was set to read the correct time at 0545h on Monday. Determine the time, in the 12 hour system, the watch will show on the following Friday at 1945h. (3 marks)
  14. Use the exchange rates below to answer this question.

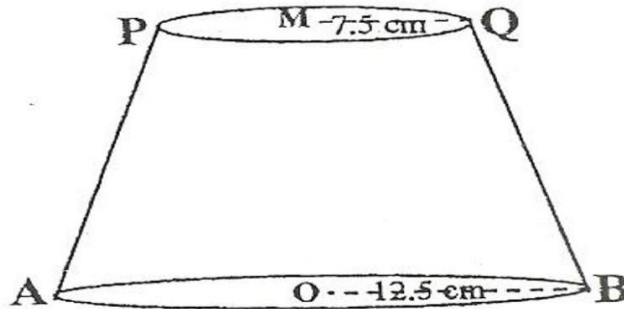
	Buying	Selling
1 US dollar	63.00	63.20
1 UK £	125.30	125.95
  15. A tourist arriving in Kenya from Britain had 9600 UK Sterling pounds (£). He converted the pounds to Kenya shillings at a commission of 5%. While in Kenya, he spent  $\frac{3}{4}$  of this money. He changed the balance to US dollars after his stay. If he was not charged any commission

for this last transaction, calculate to the nearest US dollars, the amount he received.  
(3 marks)

**SECTION II (50 MARKS)**

**Answer only Five questions from this Section**

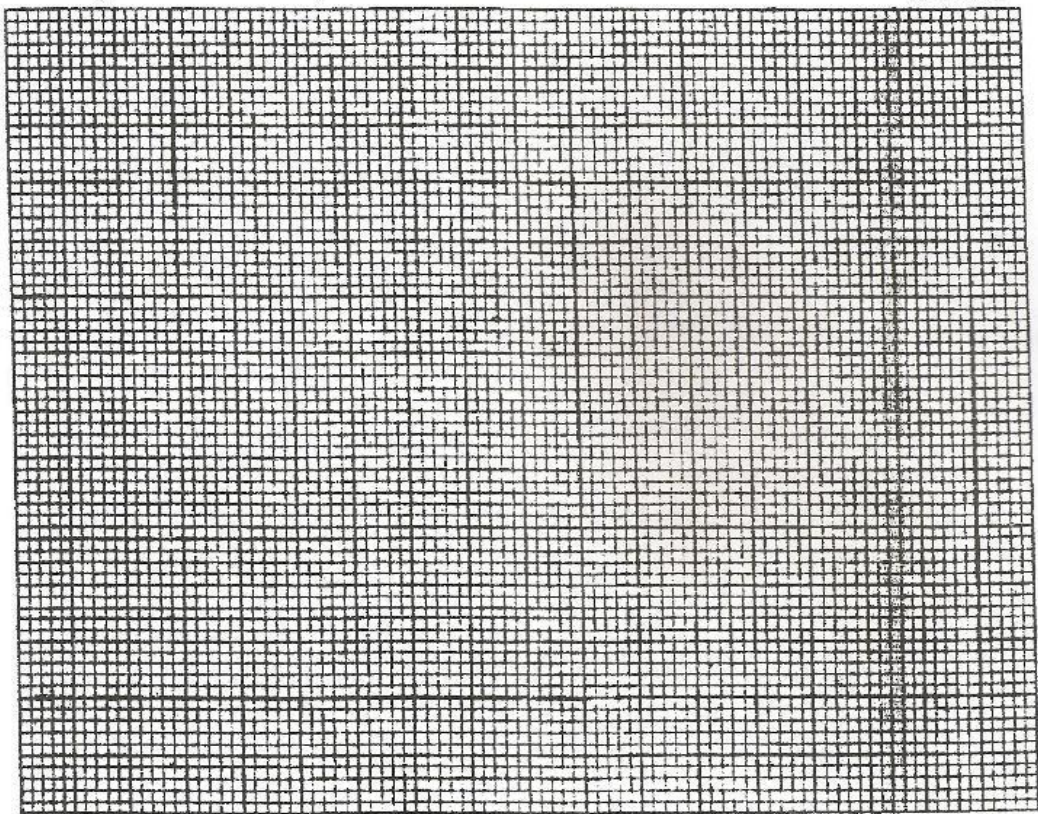
16. PQCB shows a frustum of a cone. The radius of the top and bottom circular parts of the frustum are 7.5cm and 12.5cm respectively, centres M and O are 10cm apart.



- a) Calculate the slant length QB of the frustum correct to d.p. (1 mark)  
 b) Calculate the volume of frustum (5 marks)  
 c) If the frustum is of solid metal and is melted down and recast into a solid cylinder having a radius of 10.5cm, calculate.  
 (i) The height of cylinder correct to 3 d.p. (3 marks)  
 (ii) The surface area of the cylinder (2 marks)
17. a) Complete the table below giving your values correct to 2 decimal places. (2 marks)

$x^\circ$	$-90^\circ$	$-75^\circ$	$-60^\circ$	$-45^\circ$	$-30^\circ$	$-15^\circ$	$0^\circ$	$15^\circ$	$30^\circ$	$45^\circ$	$60^\circ$	$75^\circ$	$90^\circ$
$3\cos 2x^\circ$	-3	-2.60		0	1.50		3	2.60		0	-1.50		-3
$\sin(2x+30^\circ)$	0.5		-1	0.87		0	0.5		1	0.87		0	-0.5

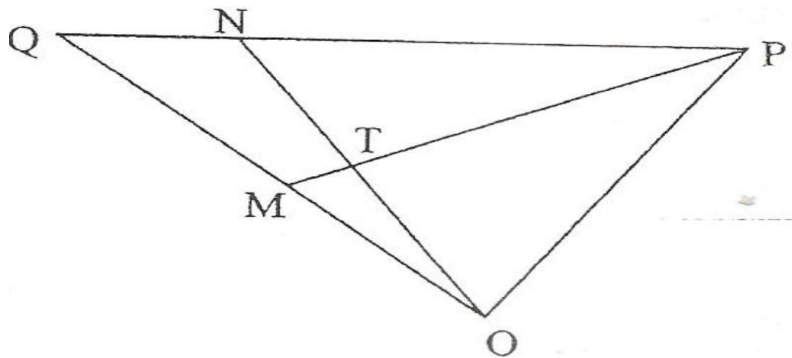
- b) On the grid provided draw, on the same axes the graph of  $y = 3 \cos 2x$  and  $y = \sin(2x + 30^\circ)$  for interval  $-90^\circ \leq x \leq 90^\circ$ . Take the scale: 1cm represent  $15^\circ$  on x-axis and 2cm to represent 1 unit on the y-axis. (4 marks)



(c) Use the graph in (b) above to solve the equation.

- (i)  $3\cos 2x = \sin (2x + 30)$  (2 marks)  
 (ii)  $6\cos 2x + 5 = 0$  (2 marks)

18. The diagram below shows a triangle OPQ in which  $QN:NP = 1:2$ ,  $OT:TN = 3:2$  and M is the midpoint of OQ.



a) Given that  $\vec{OP} = p$  and  $\vec{OQ} = q$ , Express the following vectors in terms of  $p$  and  $q$

- i)  $\vec{PQ}$  (1 mark)  
 ii)  $\vec{ON}$  (2 marks)  
 iii)  $\vec{PT}$  (2 marks)  
 iv)  $\vec{PM}$  (1 mark)

b) (i) Show that point P, T and M are collinear (3 marks)

(ii) Determine the ratio MT: TP (1 mark)

19. The displacement  $s$  meters of a particle moving along a straight line after  $t$  seconds is given by  $S = 6t^3 - t^2$

$$3 \quad 2$$

(3 marks)

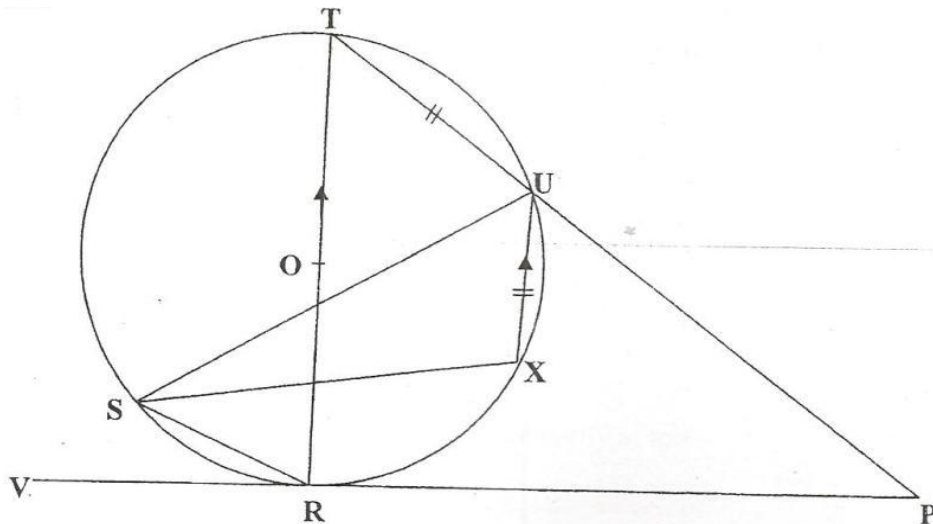
(b) Calculate:

- (i) The time when particle was momentarily at rest (3 marks)
- (ii) Its displacement by the time it comes to rest momentarily (2 marks)
- (d) Calculate the maximum speed attained (2 marks)

20. Three ports A, B and C are situated in such a way that port A is 140km on a compass bearing of  $N65^{\circ}E$  from port B. Port C is 200km on a compass bearing of  $S32^{\circ}E$  from A. A ship S is docked in the sea, 86km on a bearing of  $190^{\circ}$  from port B.

- ports
- (a) Using a scale of 1cm to represent 20km, draw a diagram to show the position of A, B, C and ship S. (4 marks)
  - (b) Using your diagram find
    - (i) The distance between the ship and the port A (1 mark)
    - (ii) The bearing of the ship from port C (1 mark)
    - (iii) The distance from B to C (1 mark)
    - (iv) Find how far C is south of A (2 marks)
    - (v) Compass bearing of S from A (1 mark)

21. In the figure below, O is the centre of the circle TOR is the diameter and PRV is tangent to the circle at R.



Given that  $\angle SUR = 25^{\circ}$ ,  $\angle URP = 60^{\circ}$ ,  $TU = UX$  is parallel to the diameter; giving reasons calculate;

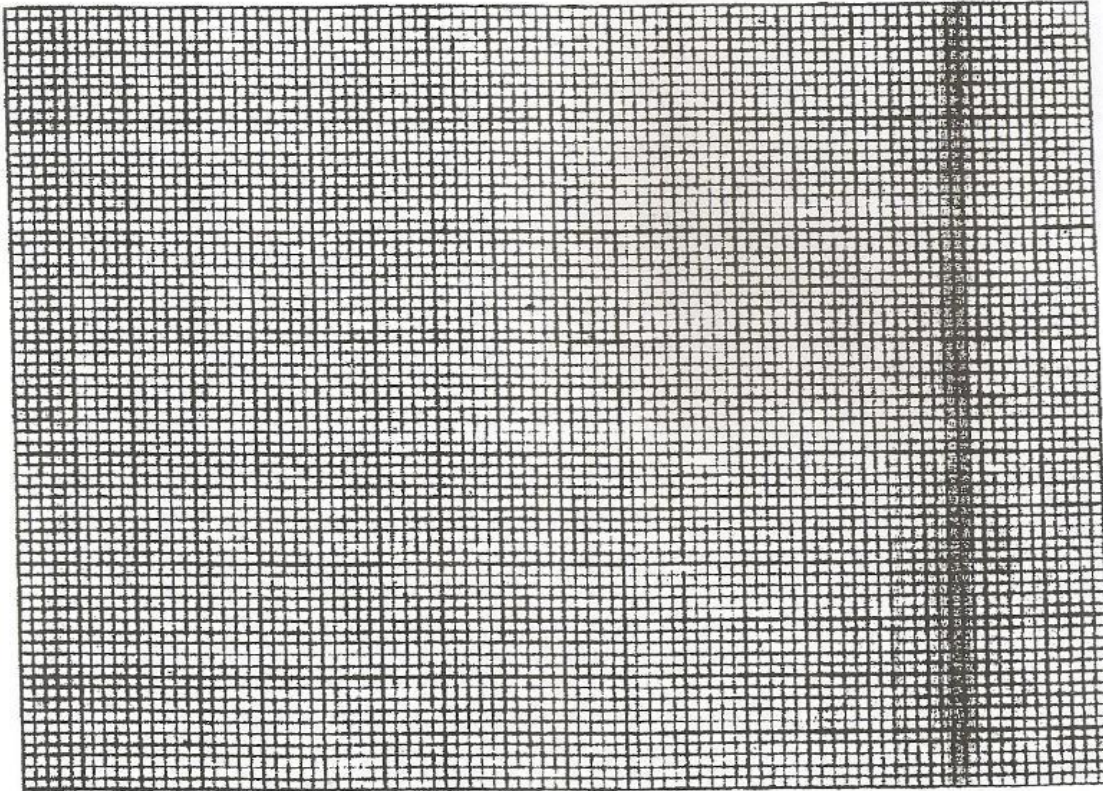
- a)  $\angle TOU$  (2 marks)
- b)  $\angle XUP$  (2 marks)
- c)  $\angle STR$  (2 marks)
- d) Reflex  $\angle SXU$  (2 marks)
- e)  $\angle RPU$  (2 marks)

23. At an agricultural Research Centre, the length of a sample of 50 maize cobs were measured and recorded as shown in the frequency distribution table below.

Length	10-11	12-13	14-15	16-19	20-26
No. of Labs	6	8	11	18	7

- a) Calculate the mean (3 marks)
- b) Draw a histogram to represent the above information (5 marks)





c) (i) State the class in which the median length lies (1 mark)

(ii) Draw a vertical line, in the histogram, showing where the median length lies (1 mark)

24. A youth group decided to raise Ksh.480,000 to buy a piece of land costing Kshs.80,000 per hectare. Before the actual payment was made, four of the members pulled out and each of those remaining had to pay an additional Kshs.20,000.

a) If the original number of the group members was  $x$ , write down;

(i) An expression of how much each was to contribute originally. (1 mark)

(ii) An expression of how the remaining members were to contribute after the four pulled out. (1 mark)

b) Determine the numbers who actually contributed towards the purchase of the land. (5 marks)

c) Calculate the ration of the supposed original contribution to the new contribution. (1 mark)

d) If the land was sub-divided equally, find the size of land each member got. (2 marks)