

NAME.....ADM

NO.....CLASS.....

**MATH PAPER 1, FORM 3 TERM III, 2019 TIME: 2 ½ HOURS**

**SECTION I-(answer all the 16 question in this section-50MARKS)**

1. Use tables of square roots and reciprocals tables to evaluate to 3 decimal places the problem below.

$$\frac{10}{\sqrt{0.625}} + \frac{4}{\sqrt{164}}$$

(3marks)

2. The heights of two similar pails are 12cm and 8cm. The larger pail can hold 2 litres. What is the capacity of the smaller pail? (3

marks)

3. Find the equation of the perpendicular bisector of the line AB where A is (3, 9) and B is (7, 5) giving your answer in the form  $ax + by + c = 0$ . (3

marks)

4. Mr. Ochuodho who deals in electronics sells a radio to a customer at Kshs. 1,440 after giving him a discount of 10% but finds that he still makes a 20% profit. Find the profit Mr. Ochuodho would make if he does not give a discount.

(3mks)

5. Simplify the expression

$$\frac{9t^2 - 25a^2}{6t^2 + 19at + 15a^2}$$

(3marks)

6. Solve for x in  $\left(\frac{4}{9}\right)^x \times (8)^{1-x} = 486$   
(4marks)

7. The length and width of a rectangle are stated as 18.5cm and 12.4cm respectively. Both measurements are given to the nearest 0.1cm.

a) Determine the lower and upper limit of each measurement.  
(1 mark)

b) Calculate the percentage error in the area of the rectangle. (3 marks)

8. In a regular polygon, each interior angle is  $x^\circ$  and each exterior angle is  $\left(\frac{x-36}{3}\right)^\circ$

(i) Find angle  $X^\circ$   
(1mk)

(ii) Find the number of sides of the polygon  
(2mks)

9. Find the integral values of x which satisfy the following inequalities;

$$2x + 3 > 5x - 3 > -8$$

(3mks)

10. Two boys and a girl shared some money. The younger boy got  $\frac{5}{18}$  of it; the elder boy got  $\frac{7}{12}$  of the remainder and the girl got the rest. Find the percentage share of the younger boy to the girl's share. (3mks)

11. Simplify the expression below leaving your answer in rationalized surd form of  $a + b\sqrt{c}$

$$\frac{1 + \tan 120^\circ}{1 + \cos 330^\circ}$$

(3mks)

12. Mutua bought 8 pairs of trousers and six shirts at Sh. 4160. If he had bought twice as many shirts and half as many trousers, he would have saved Sh. 160. Find the cost of each item (3 marks)

13. A solid block in the shape of a cylinder has a height of 14cm and weighs 22kg. If it is made of material of density  $5\text{g/cm}^3$ , find the radius of the cylinder. Take  $\pi = \frac{22}{7}$

(3mks)

14. The number 5.81 contains an integral part and a recurring decimal. Convert the number into an improper fraction and hence a mixed fraction.

(3 Marks)

15. Using a pair of compasses and a ruler only construct a triangle ABC such that  $AB = 4\text{cm}$ ,  $BC = 6\text{cm}$  and angle  $ABC = 135^\circ$ .

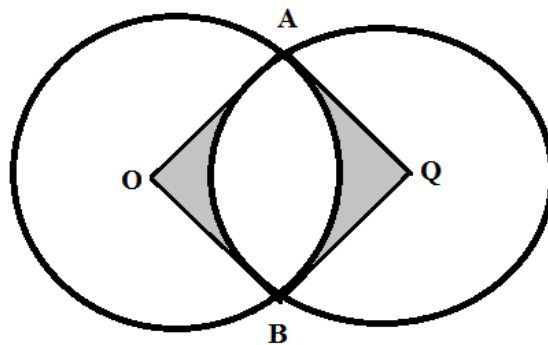
(3mks)

16. The curved surface area of a cylindrical container is  $1980\text{cm}^2$ . If the radius of the container is  $21\text{cm}$ , calculate to one decimal place the capacity of the container in litres (3 mks)  
 (Take  $\pi = \frac{22}{7}$ ).

**SECTION II ANSWER ANY FIVE QUESTIONS**

- 17(a) Train A leaves a station 45 minutes before train B. Both trains travel in the same direction and their speeds are  $36\text{km/h}$  and  $48\text{km/h}$  respectively.
- i) How long will it take train B to catch up with train A? (3 marks)
- ii) How far from the start were the two trains when they met. (2 marks)
- b) A car accelerated from rest to a velocity of  $10\text{m/s}$  in 10 seconds. It travelled at this velocity for 20 seconds and then came to a stop in 5 seconds. Find;
- i) The initial acceleration. (2 marks)
- ii) The distance travelled. (2 marks)
- iii) The average velocity. (1 mark)

18. Two circles with centres O and Q and radii  $8\text{cm}$  intersect at points A and B as shown below.



- Given that the distance between O and Q is  $12\text{cm}$  and that the line AB meets OQ at X, find:
- (a) the length of the chord AB. (3marks)

(b) the reflex angle AOB. (3marks)

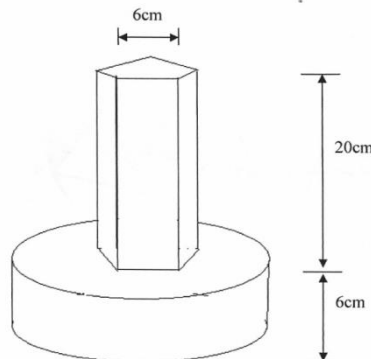
(c) the area of the shaded region.  $\pi = 3.142$  (4marks)

19. A triangle whose vertices are A(1,4) B(2,1) and C(5,2) is given the following transformations.

- i) A reflection along the line  $y = x$  to  $A^1B^1C^1$
- ii)  $A^1B^1C^1$  is given a rotation of a positive quarter turn about the origin  $A^{11}B^{11}C^{11}$
- iii)  $A^{11}B^{11}C^{11}$  is given an enlargement of linear scale factor -2 about (1,2) to  $A^{111}B^{111}C^{111}$

- a) Using the grid provided, plot the triangle ABC and its image  $A^1B^1C^1$  (3mks)
- b) Locate the image  $A^{11}B^{11}C^{11}$  from the grid hence state its co-ordinates. (3mks)
- c) Find the co-ordinates of  $A^{111}B^{111}C^{111}$  hence plot it on the grid (4mks)

20. The figure below shows a prism whose cross section is a regular pentagon of side 6cm and whose length is 20cm joined to a cylinder of radius 14cm and height 6cm to form the model of a solid



(a) Calculate the cross

section area of the pentagon (3mks)

(b) Calculate the total volume of the solid (4mks)

(c) The model represents a pillar of total height 5.2m, calculate the volume of the actual solid in  $m^3$  (3mks)

21. An expedition has 5 sections AB, BC, CD, DE and EA. B is 200m on a bearing of  $050^{\circ}$  from A. C is 500m from B. The bearing of B from C is  $300^{\circ}$ . D is 400m on a bearing  $230^{\circ}$  from C. E is 250m on a bearing  $025^{\circ}$  from D.

(a) Sketch the route (1 Mark)

(b) Use the scale of 1cm to 50m to draw the accurate diagram representing the route. (5 Marks)

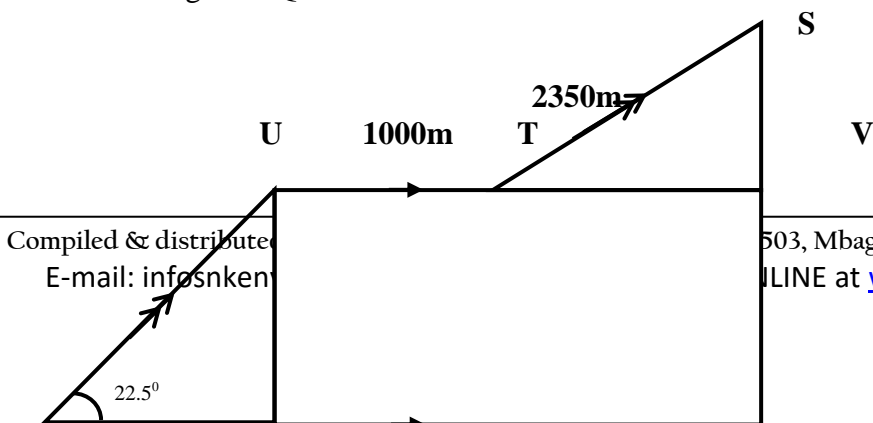
**SKETCH**

**TO SCALE**

(c) Use your diagram to determine  
 (i) Distance in metres of A from E (2 Marks)

(ii) Bearing of E from A (2MKS)

22. In the figure below  $PQ = 2500\text{m}$ ,  $UT = 1000\text{m}$  and  $TS = 2350\text{m}$ . PQR is a straight line. Parallel to UT and angle  $UPQ = 22.5^{\circ}$ .



**P**      **2500m**      **C**

**R**

Calculate to the nearest meter

(a) (i) U Q  
(2marks)

(ii) T V  
(2marks)

(iii) V S  
(2marks)

(iv) P U  
(2marks)

(b) Find the perimeter of the figure.  
(2marks)

23. A circular lawn is surrounded by a path of uniform width of 7m. The area of the path is 21% that of the lawn.

(a) Calculate the radius of the lawn. (4 mks)

(b) Given further that the path surrounding the lawn is fenced on both sides by barbed wire on posts at intervals of 10 metres and 11 metres on the inner and outer sides respectively. Calculate the total number of posts required for the fence. (4 mks)

(c) Calculate the total cost of the posts if one post costs sh 105.

(2 mks)

24. A surveyor recorded the measurements of a field book using  $XY=400\text{m}$  as the base line as shown below.

	Y	
To E 200	320	
	210	150 To D
To F 250	170	150 To C
	50	225 To B
	X	100 To A

a) Use a scale of (5mks)

1cm to represent 50m to draw the map of the field.

b) Find the area of the field in hectares (5mks) (*more working space at back page*)