

SECTION I (50 MARKS)

Answer all the questions in this section in the spaces provided.

1. Without using a calculator, evaluate.

$$5\frac{1}{2} - 1\frac{1}{7} (1\frac{1}{5} + \frac{9}{10}) + \frac{1}{3} \text{ of } (\frac{2}{3} \div \frac{5}{6})$$

(3mks)

2. The gradient of a line L through points A (2x, 4) and B (-1, X) is $\frac{1}{7}$.

Find the equation of a line perpendicular to L through B

(3mks)

3. Simplify $\frac{3x^2 - 4xy + y^2}{9x^2 - y^2}$

(3mks)

4. Solve the inequality $3x + 2 < x + 6 \leq 17 - 2x$ and write down the integral values satisfying the inequality

(3mks)

5. A two digit number is such that the sum of the ones and the tens digit is ten. If the digits are reversed the new number formed exceeds the original number by 54
Find the number

(4mks)

6. Find the value of x in the following equation

$$25^{x+1} + 5^{2x} = 130$$

(3mks)

7. Solve for y in the equation

$$(\log_3 y)^2 - \frac{1}{2} \log_3 y = \frac{3}{2}$$

(3mks)

8. Given that $a = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, $b = \begin{pmatrix} -4 \\ 5 \end{pmatrix}$

$$c = \begin{pmatrix} 3 \\ -2 \end{pmatrix} \text{ and } p = 2a + b - 3c \text{ find } |p|$$

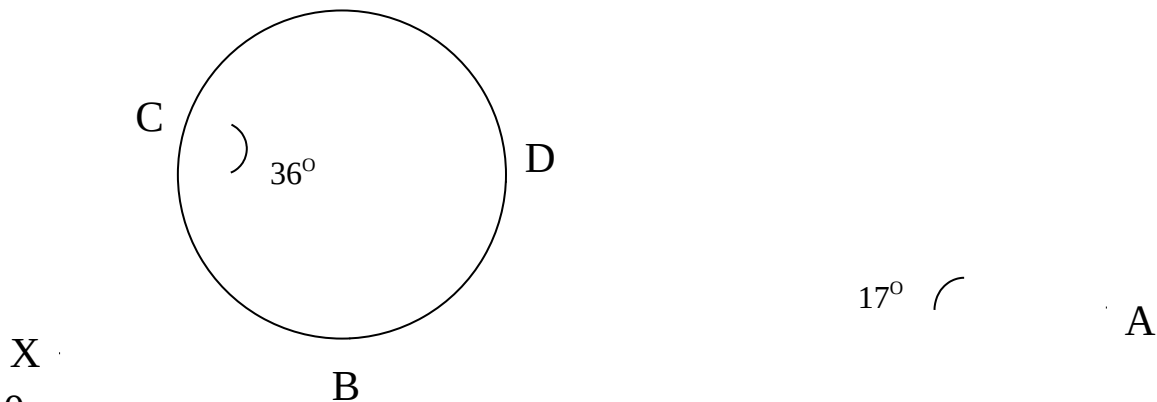
(4mks)

9. In the figure below ABX is a tangent to the circle at

B. Angle CAB = 17° and $\angle ACB = 36^\circ$

Calculate $\angle CBX$

(2mks)



10. A train 100m long travelling at 72km/h overtakes another train travelling in the same direction at 56km/h and passes it completely in 54 seconds. Find the length of the second train

(3mks)

11. Find the least number of sweets that can be packed into polythene bags which contain either 9 or 15 or 20 or 24 sweets with none left over.

(3mks)

12. Mary is four times as old as her last born John. In seven years time, the sum of their ages will be 59 years. Determine their ages three years ago.

(3mks)

13. Measurements of a maize field using a base line xy were recorded as shown below in metres

	Y	
	220	
To R 50	180	
	160	65 To Q
	140	40 To P
To S 80	100	
	80	80 To N
To T 30	40	
	10	20 To M
	X	

Find the area of the field in hectares .

(4mks)

14. A machine is valued at Ksh. 100,000. If the rate of depreciation is 0.9% per month .Calculate the time it takes for the value to drop to Ksh .50, 000.

(3mks)

15. Triangle ABC has co-ordinates A(2,7) B (2,2) and C (7,-2) .The triangle is reflected in the y-axis followed by a reflection in the line $x=2$, without drawing determine the co-ordinates of the final image

(3mks)

16. A Kenyan bank buys and sells foreign currencies as shown in the table below.

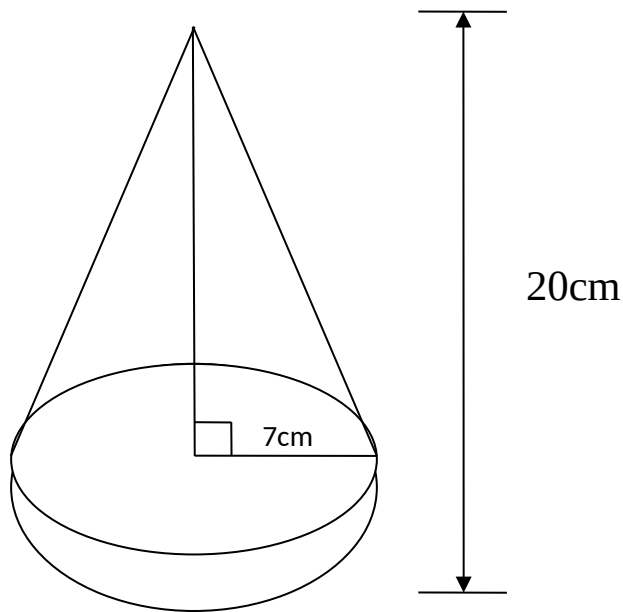
	Buying (Ksh)	Selling (Ksh)
1 Euro	84.15	84.26
1 Sterling pound	118.35	121.47

A tourist came to Kenya from London with 5000 Euros which he converted to Kenya Shillings at the bank .While in Kenya he spent a total of Ksh 289,000 then converted the balance into sterling pounds at the same bank . Calculate the amount in Sterling pound that he received. (Give your answer to the nearest sterling pound).

(3mks)

SECTION II (50 MARKS)

17. The diagram below represents a conical solid which stands on a hemispherical base with a radius of 7 cm.The solid has a perpendicular height of 20cm.



(a) Calculate the Surface area of the solid (5mks)

(b) If the solid is immersed in a cylindrical container full of water with a volume of 3080cm^3 . Calculate the capacity of water that remained in the container (5mks)

18. A road starts at a college and goes due North for 2000m to a bus stage. It then goes 1500m on a bearing of 040° to a market. Finally, it ends at a dispensary 3000M due south east of the market.

(a) By scale drawing show the positions of these places .(use a scale of 1cm represents 500m)

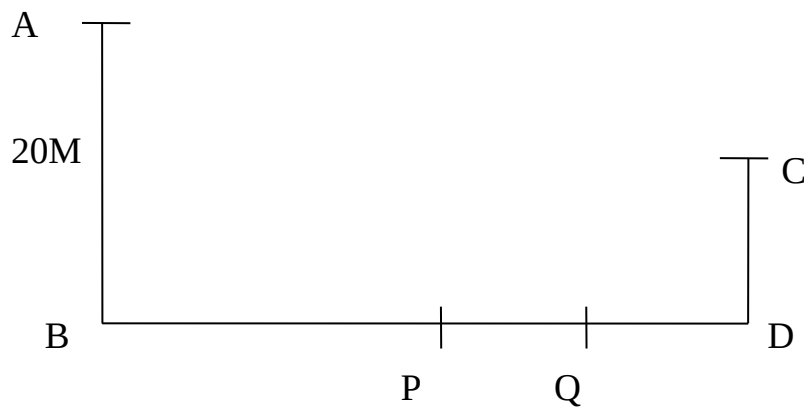
(4mks)

(b) How far is the college from the dispensary (Take the path as a straight road) (2mks)

(c) Find the bearing of the college from the market (2mks)

(d) How far is the bus stage from the dispensary (2mks)

19. Two eagles are at different heights above a level ground. The first is at 20m vertically above point B on the ground. The Second is at a height C vertically above D. The distance between B and D on the ground is 9.7m. The diagram below shows the positions,



- a) A rabbit moved from B to D . At point P the angle of depression of the hen from point A is 11.3° . Calculate the distance BP to 4 S.F

(2mks)

- b) If it takes the rabbit 5 seconds to move from P to Q at an average speed of 36k/h, Calculate the angle of depression of Q from A to 2dp

(4mks)

- c) Given that $QC = 15\text{m}$, calculate

(i) The height of CD in metres to 2dp

(2mks)

(ii) The angle of elevation of A from C to the nearest degree

(2mks)

20. Triangle ABC has vertices A(1,2) B(2,3) and C(4,1) while Triangle A'B'C' has vertices A'(1,2) B'(2,-3) and C'(4,1)

- (a) Draw the two triangles on the Cartesian plane

(2mks)

(b) Describe fully a single transformation that maps triangle ABC on to triangle $A^1B^1C^1$ (2mks)

(c) On the same plane, draw triangle $A''B''C''$ the image of $\triangle ABC$ under a reflection in line $y=x$ (2mks)

(d) Draw $\triangle A'''B'''C'''$ Such that it can be mapped onto triangle ABC by a negative quarter turn about the origin (2mks)

(e) Find the matrix of transformation that map $\triangle A'''B'''C'''$ onto triangle $\triangle ABC$ (2mks)

21. The area of a Trapezium is 99cm. If the longer side of the parallel sides is equal to the perpendicular distance between them and the shorter parallel side is 4cm less than the Larger side

(a) Write down an algebraic expression for the two parallel sides (2mks)

(b) Give an algebraic expression of its area (2mks)

(c) Give the algebraic expression of its area and solve it (3mks)

(d) Find the length of the parallel sides and the perpendicular distance (3mks)

22 (a) The ratio of a spherical balloon increase by 20%. Find the percentage change in its volume (5mks)

(b) Triangle xyz has the points $x(0,0)$ $y(0,2)$ and $z(1,0)$. This triangle is transformed to form triangle $x^1 y^1 z^1$. Such that $x^1(2,2)$ $y^1(2,4)$ and $z^1(3,2)$

(i) Draw the two triangles on the Cartesian plane (2mks)

(ii) Describe the transformation in (b) (i) above fully (3mks)

23 . David, Saul and Mwangi compete to hit the bull's eye in a game of dart. The probabilities of each hitting the bull's eye are $\frac{3}{7}$, $\frac{2}{5}$ and $\frac{1}{9}$ respectively. By use of probability tree diagram or otherwise determine the probability if ;

(a) Only one hits the target (2mks)

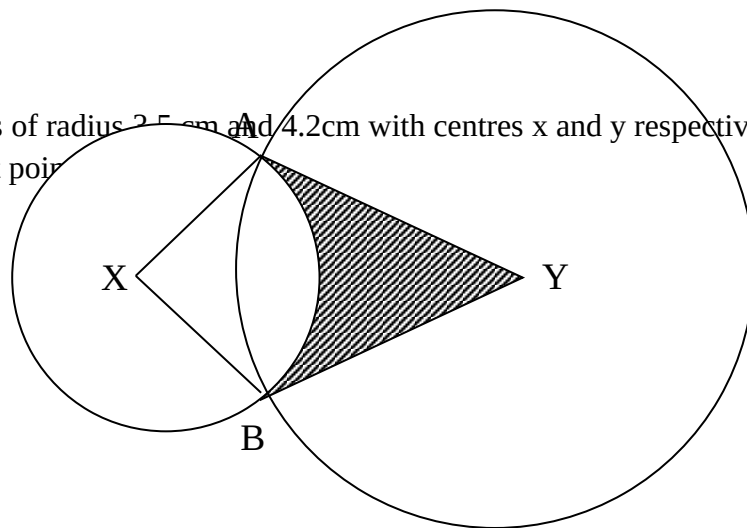
(b) None of them hits the target (1mks)

(c) All three hit the target (1mks)

(d) At least one hits the target (4mks)

(e) Exactly two hit the target given that Saul is one of them who hits the target (2mks)

24. Two circles of radius 2.5 cm and 4.2 cm with centres x and y respectively intersect at point A and B.



Given that the centres of the two circles are 6cm apart. Find;

(a) Angle AXB (3mks)

(b) Angle AYB (3mks)

(c) The area of the quadrilateral XAYB (2mks)
Correct to 3dp.

(d) The shaded area correct to 2 significant figures (2mks)