K.C.S.E. MATHEMATICS PAPER 121/1 2005

SECTION I

Answer all the questions in this section

1. Evaluate

$$\frac{\frac{3}{4}+1\frac{5}{7}\div\frac{4}{7}\text{ of }2\frac{1}{3}}{\left(1\frac{3}{7}-\frac{5}{8}\right)\times\frac{2}{3}}$$

(3 marks)

2. Express the numbers 1470 and 7056, each as a product of its prime factors. Hence evaluate

$$\frac{1470^2}{\sqrt{7056}}$$

, leaving the answer in prime factor form. (3 marks)

3. The area of a rhombus is 60cm^2. Given that one of its diagonals is 15cm long, calculate, calculate the perimeter of the rhombus.

(3 marks)

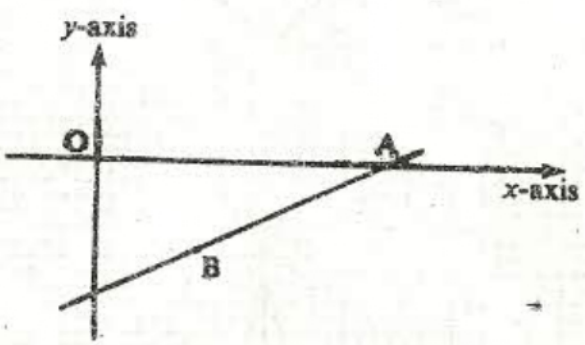
4. Simplify the expresssion $\dfrac{9t^2-25a^2}{6t^2+19at+15a^2}$

(3 marks)

5. The size of each interior angle of a regular polygon in five times the size of the exterior angle. Find the number of the polygon

(3 marks)

6. On the diagram below, the line whose equationis $7y-3x+30=0$ passes through the points A and B. Point A is on the x-axis while point B is equidistant from x-and y- axes.



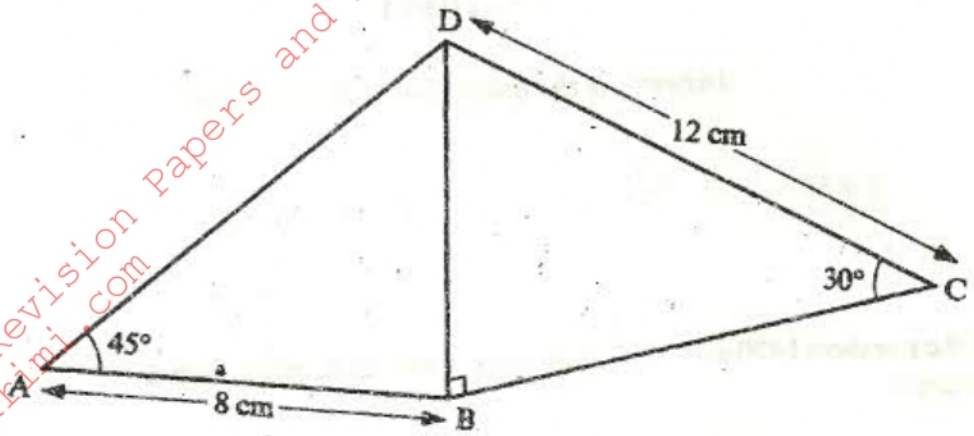
Calculate the co-ordinates of the points A and B.

(3 marks)

7. A cylindrical piece of wood of radius 4.2cm and length 150cm is cut lengthwise into two equal pieces. Calculate the surface area of one piece.
(Take π as $\frac{22}{7}$)

(4 marks)

8. The figure below shows a quadrilateral ABCD in which AB = 8cm, DC = 12cm, $\angle BAD = 45^0$, $\angle CBD = 90^0$ and $\angle BCD = 30^0$



Find:

(a) the length of BD (1 mark)

(b) the size of angle ADB (1 mark)

9. Find the value of y in the equation

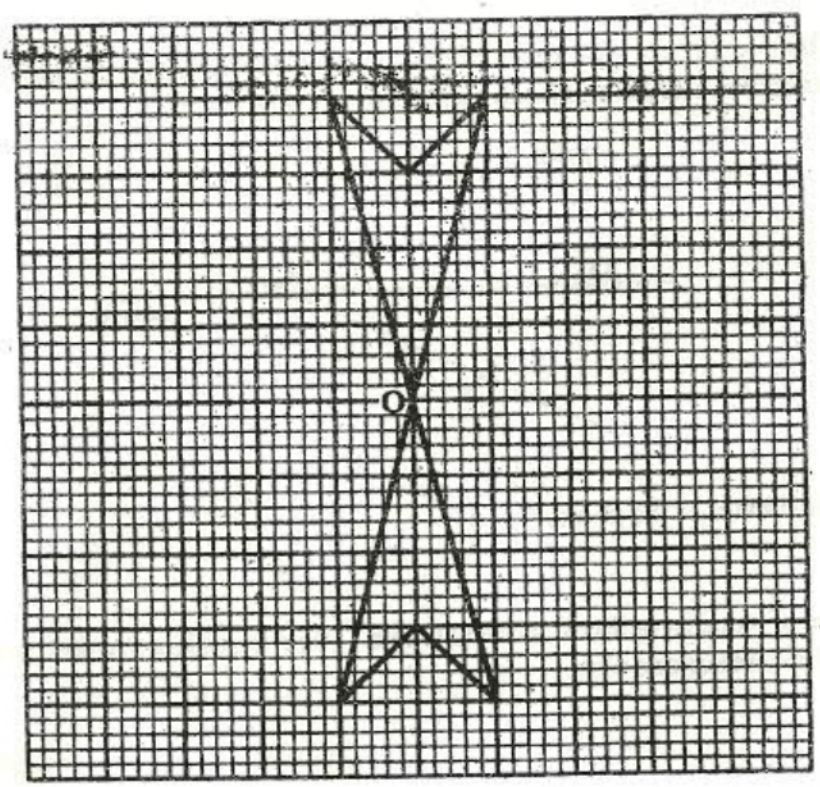
$$\frac{243 \times 3^{2y}}{729 \times 3^{y} \div 3^{(2y-1)}} = 81$$

(3 marks)

10. In a fund-raising committee of 45 people, the ratio of men to women is 7:2. Find the number of women required to join the exisiting committee so that the ratio of men to women is changed to 5: 4

(3 marks)

11. The diagram below is a part of a figure which has rotational symmetry of order 4 about O



(a) Complete the figure (1 mark)

(b) Draw all the line of symmetry of the completed figure (2 marks)

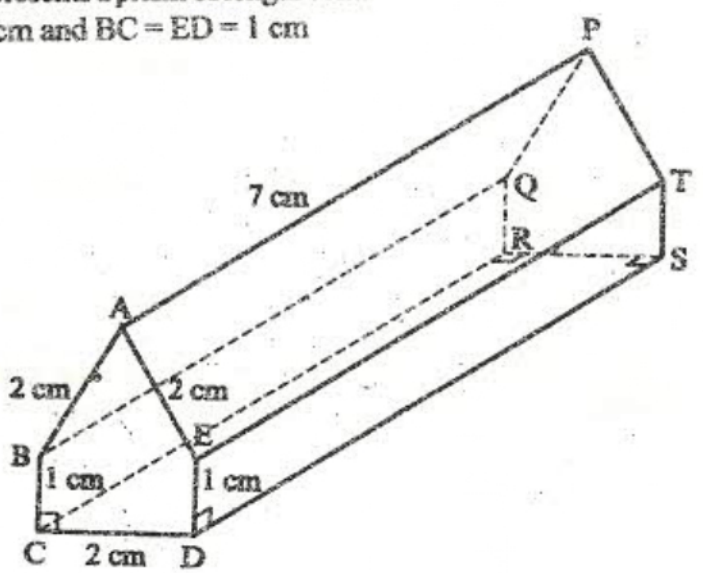
12. Pipe A can fill an empty water tank in 3 hours while, pipe B can fill the same tank in 6 hours. When the tank is full it can be emptied by pipe C in 8 hours. Pipes A and B are opened at the same time when the tank is empty.
If one hour later, pipe C is also opened, find the total time taken to fill the tank (4 marks)

13. The volumes of two similar solid cylinders are $4752cm^3$ and $1408cm^3$. If the area of the curved surface of the smaller cylinder is $352cm^2$, find the area of the curved surface of the larger cylinder (4 marks)

14. A Salesman earns a basic salary of sh 9 000 per month.
In addition he is also paid a commission of 5% for sales above sh 15000.
In a certain month he sold goods worth sh 120000 at a discount of $2\frac{1}{2}\%$
Calculate his total earnings that month (3 marks)

15. Two lines L_1 and L_2 intersect at a point P. L_1 passes through the points (-4,0) and (0,6). Given that L_2 has the equation: $y = 2x - 2$, find, by calculation, the coordinates of P. (3 marks)

16. The figure below represents a prism of length 7cm.
AB = AE = CD = 2cm and BC = ED = 1 cm



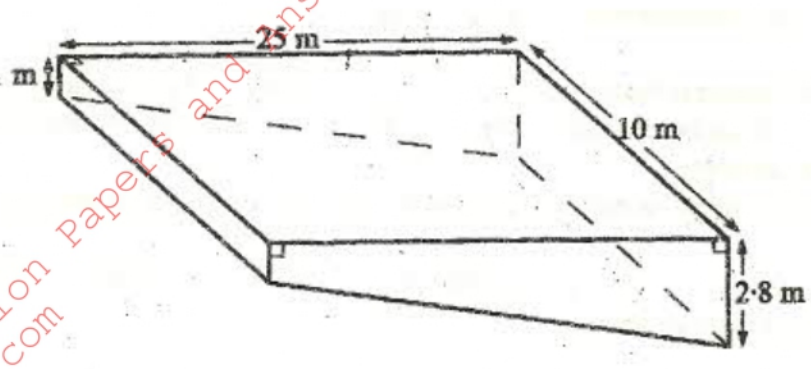
Draw the net of the prism (3 marks)

17. The distance between towns M and N is 280km. A car and a lorry travel from M to N. The average speed of the lorry is 20km/h less than that of the car. The lorry takes 1h 30 min more than the car to travel from M to N.

(a) If the speed of the lorry is x km/h, find x (5 marks)

(b) The lorry left town M at 8.15 a.m. The car left town M later and overtook the lorry at 12.15p.m. Calculate the time the car left town M. (3 marks)

18. The diagram below represents a rectangular swimming pool 25m long and 10m wide. The sides of the pool are vertical.



The floor of the pool slants uniformly such that the depth at the shallow end is 1m and at the deep end is 2.8m.

(a) Calculate the volume of water required to completely fill the pool (3 marks)

(b) Water is allowed into the empty pool at a constant rate through anilet pipe. It takes 9 hours for the water to just cover the entire floor of the pool.
Calculate:

(i) the volume of the water that just covers the floor of the pool (2 marks)

(ii) the time needed to completely fill the remaining part of the pool (3 marks)

19. A boat at point X is 200m to the south of point Y. The boat sails from X to another point Z. Point Z is 200m on a bearing of 310° from X. Points X, Y and Z are on the same horizontal plane.

(a) Calculate the bearing and the distance of Z from Y (3 marks)

(b) W is the point on the path of the boat nearest to Y. Calculate the distance WY (2 marks)

(c) A vertical tower stands at point Y. the angle of depression of point X from the top of the tower is 60°. Calculate the angle of elevation of the top of the tower from W. (3 marks)