

Perimeters, Area and Volumes

Difficulty: Medium

Question Paper 5

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Perimeters, Area and Volumes
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 5

Time allowed: 89 minutes

Score: /77

Percentage: /100

Grade Boundaries:

CIE IGCSE Maths (0580)

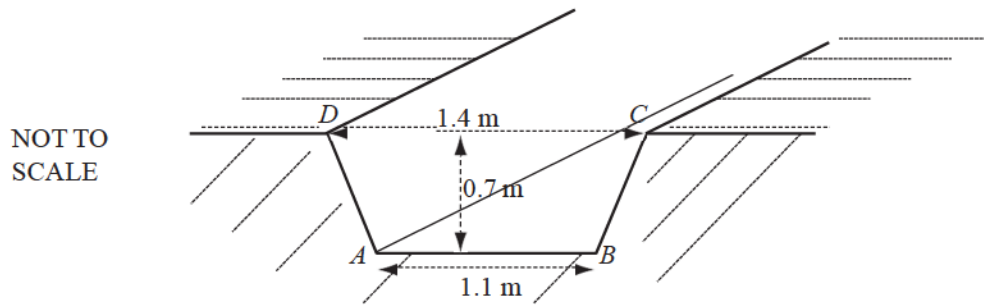
A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

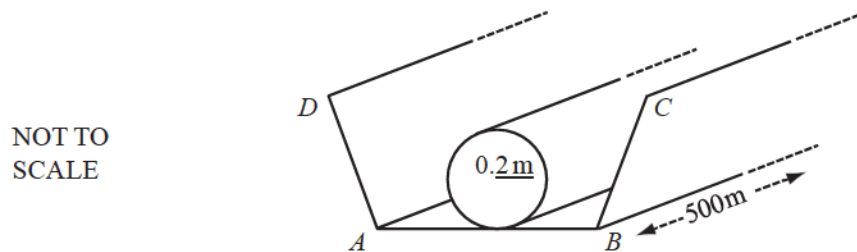
9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

Question 1

Workmen dig a trench in level ground.



- (a) The cross-section of the trench is a trapezium $ABCD$ with parallel sides of length 1.1 m and 1.4 m and a vertical height of 0.7 m.
Calculate the area of the trapezium. [2]
- (b) The trench is 500 m long.
Calculate the volume of soil removed. [2]
- (c) One cubic metre of soil has a mass of 4.8 tonnes.
Calculate the mass of soil removed, giving your answer in tonnes and in standard form. [2]
- (d) Change your answer to **part (c)** into grams. [1]



- (e) The workmen put a cylindrical pipe, radius 0.2 m and length 500 m, along the bottom of the trench, as shown in the diagram.
Calculate the volume of the cylindrical pipe. [2]
- (f) The trench is then refilled with soil.
Calculate the volume of soil put back into the trench as a percentage of the original amount of soil removed. [3]

Question 2

NOT TO SCALE

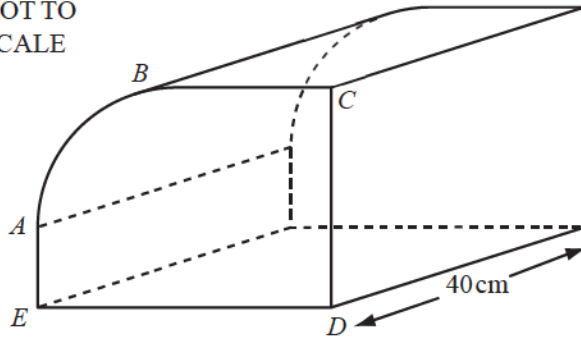


Diagram 1

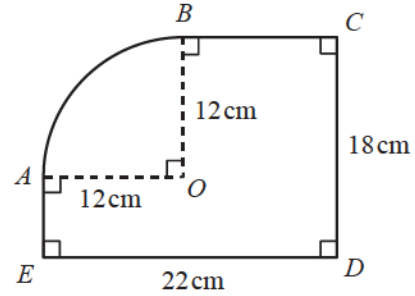


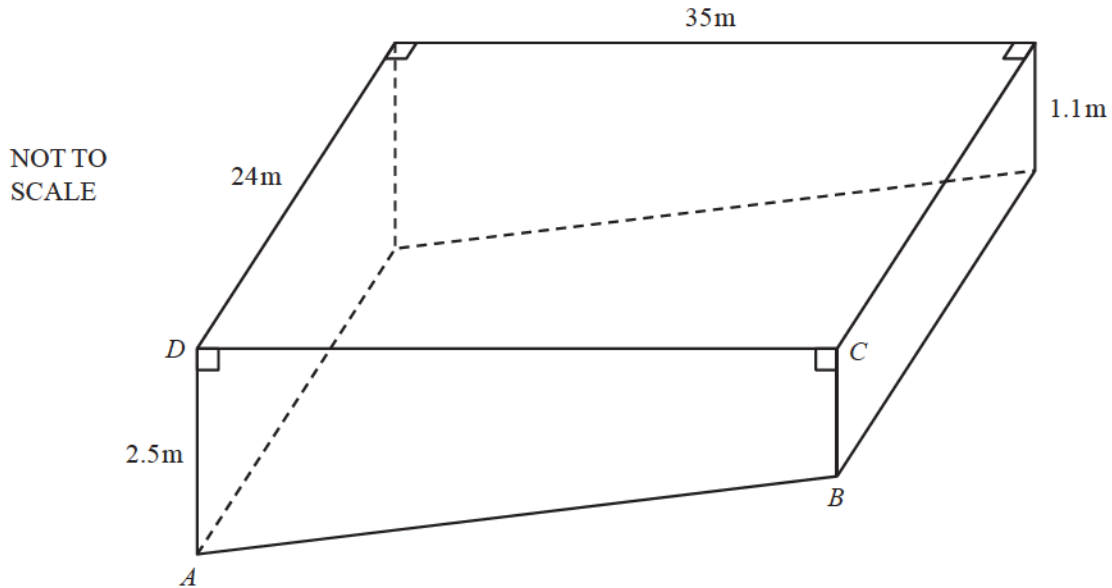
Diagram 2

Diagram 1 shows a closed box. The box is a prism of length 40 cm.
The cross-section of the box is shown in Diagram 2, with all the right-angles marked.
 AB is an arc of a circle, centre O , radius 12 cm.
 $ED = 22$ cm and $DC = 18$ cm.

Calculate

- (a) the perimeter of the cross-section, [3]
- (b) the area of the cross-section, [3]
- (c) the volume of the box, [1]
- (d) the **total** surface area of the box. [4]

Question 3



The diagram shows a swimming pool of length 35 m and width 24 m.
A cross-section of the pool, $ABCD$, is a trapezium with $AD = 2.5$ m and $BC = 1.1$ m.

(a) Calculate

- (i) the area of the trapezium $ABCD$, [2]
- (ii) the volume of the pool, [2]
- (iii) the number of litres of water in the pool, when it is full. [1]

(b) $AB = 35.03$ m correct to 2 decimal places.

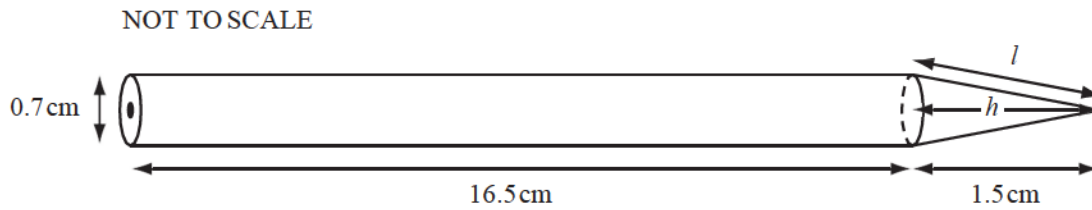
The sloping rectangular floor of the pool is painted.
It costs \$2.25 to paint one square metre.

- (i) Calculate the cost of painting the floor of the pool. [2]
- (ii) Write your answer to **part (b)(i)** correct to the nearest hundred dollars. [1]

(c) (i) Calculate the volume of a cylinder, radius 12.5 cm and height 14 cm. [2]

- (ii) When the pool is emptied, the water flows through a cylindrical pipe of radius 12.5 cm. The water flows along this pipe at a rate of 14 centimetres per second. Calculate the time taken to empty the pool. Give your answer in days and hours, correct to the nearest hour. [4]

Question 4

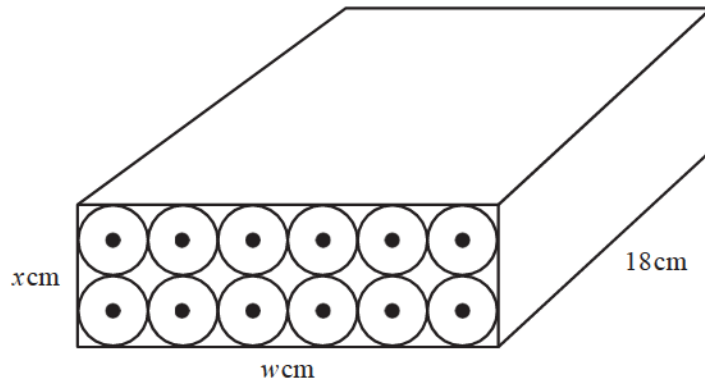


The diagram shows a pencil of length 18 cm.
It is made from a cylinder and a cone.
The cylinder has **diameter** 0.7 cm and length 16.5 cm.
The cone has **diameter** 0.7 cm and length 1.5 cm.

(a) Calculate the volume of the pencil.

[The volume, V , of a cone of radius r and height h is given by $V = \frac{1}{3}\pi r^2 h$.] [3]

(b)



Twelve of these pencils just fit into a rectangular box of length 18 cm, width w cm and height x cm. The pencils are in 2 rows of 6 as shown in the diagram.

(i) Write down the values of w and x . [2]

(ii) Calculate the volume of the box. [2]

(iii) Calculate the percentage of the volume of the box occupied by the pencils. [2]

(c) Showing all your working, calculate

(i) the slant height, l , of the cone, [2]

(ii) the **total** surface area of **one** pencil, giving your answer correct to 3 significant figures.
[The curved surface area, A , of a cone of radius r and **slant** height l is given by $A = \pi r l$.] [6]

Question 5

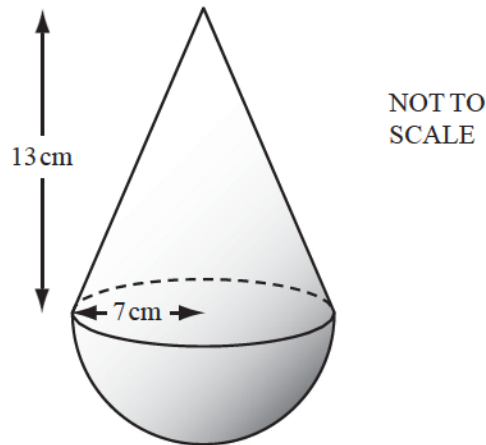
Water flows through a pipe into an empty cylindrical tank.
The tank has a radius of 40 cm and a height of 110 cm.

(a) Calculate the volume of the tank. [2]

(b) The pipe has a cross-sectional area of 1.6 cm^2 .
The water comes out of the pipe at a speed of 14 cm/s.
How long does it take to fill the tank?
Give your answer in hours and minutes, correct to the nearest minute. [4]

(c) All the water from the tank is added to a pond which has a surface area of 70 m^2 .
Work out the increase in the depth of water in the pond.
Give your answer in millimetres, correct to the nearest millimetre. [4]

Question 6



The diagram shows a solid made up of a hemisphere and a cone.
The base radius of the cone and the radius of the hemisphere are each 7 cm.
The height of the cone is 13 cm.

- (a) (i) Calculate the total volume of the solid.

[The volume of a hemisphere of radius r is given by $V = \frac{2}{3}\pi r^3$.]

[The volume of a cone of radius r and height h is given by $V = \frac{1}{3}\pi r^2 h$.] [2]

- (ii) The solid is made of wood and 1 cm^3 of this wood has a mass of 0.94 g.
Calculate the mass of the solid, in kilograms, correct to 1 decimal place. [3]

- (b) Calculate the curved surface area of the cone.

[The curved surface area of a cone of radius r and sloping edge l is given by $A = \pi r l$.] [3]

- (c) The cost of covering all the solid with gold plate is \$411.58.

Calculate the cost of this gold plate per square centimetre.

[The curved surface area of a **hemisphere** is given by $A = 2\pi r^2$.] [5]