

1. The mass of 5 m^3 of copper is 44 800 kg.
- (a) Work out the density of copper.

..... kg/m^3 (2)

The density of zinc is 7130 kg/m^3 .

- (b) Work out the mass of 5 m^3 of zinc.

..... kg (2)
(Total 4 marks)

2.

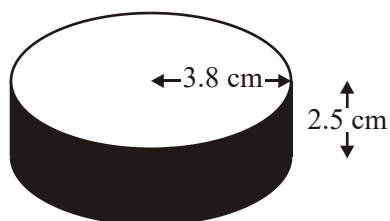


Diagram **NOT**
accurately drawn

An ice hockey puck is in the shape of a cylinder with a radius of 3.8 cm, and a thickness of 2.5 cm.

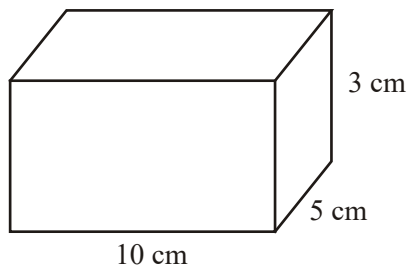


It is made out of rubber with a density of 1.5 grams per cm^3 .

Work out the mass of the ice hockey puck.
Give your answer correct to 3 significant figures.

..... grams
(Total 4 marks)

3.

Diagram **NOT** accurately drawn

The diagram shows a solid cuboid.
The cuboid has length 10 cm, width 8 cm and height 5 cm.

The cuboid is made of wood.
The wood has a density of 0.6 grams per cm^3 .

Work out the mass of the cuboid.

..... grams
(Total 4 marks)

4.

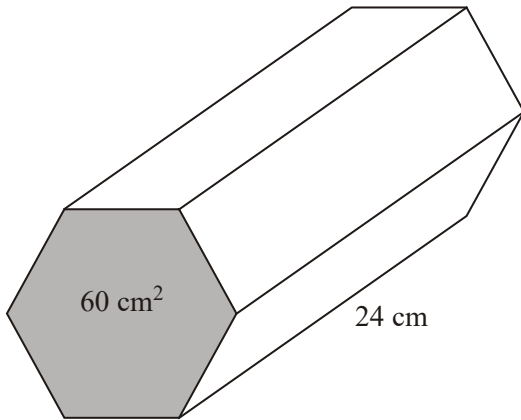


Diagram **NOT** accurately drawn

The diagram shows a solid hexagonal prism.

The area of the cross-section of the prism is 60 cm^2 .
The length of the prism is 24 cm.

(a) Work out the volume of the prism.

..... cm^3 (2)

The prism is made from wood.
The prism has a mass of 648 g.

(b) Work out the density of the wood.

..... g/cm^3 (2)
(Total 4 marks)

5.

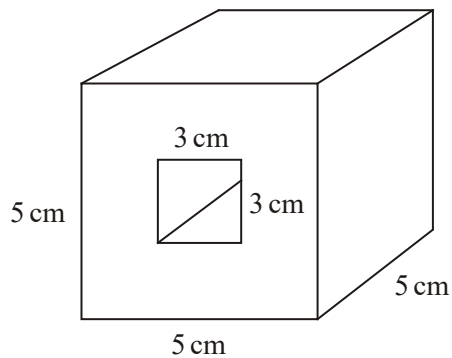


Diagram **NOT** accurately drawn

The solid shape, shown in the diagram, is made by cutting a hole all the way through a wooden cube.

The cube has edges of length 5 cm.

The hole has a square cross section of side 3 cm.

(a) Work out the volume of wood in the solid shape.

..... cm³

(2)

The mass of the solid shape is 64 grams.

(b) Work out the density of the wood.

..... grams per cm³
 (2)
 (Total 4 marks)

6. The density of juice is 4 grams per cm³.
 The density of water is 1 gram per cm³.

315 cm³ of drink is made by mixing 15 cm³ of juice with 300 cm³ of water.

Work out the density of the drink.

..... grams per cm³
 (Total 3 marks)

1. (a) 8960 2
 44800 ÷ 5
MI for 44800 ÷ 5
Al cao

(b) 35650 2
 7130×5
MI for 7130 \times 5
AI cao

[4]

2. 170 4
 $\text{Vol} = \pi \times 3.8^2 \times 2.5 = \pi \times 14.44 \times 2.5$
 $= 45.36... \times 2.5 = 113.411$
 $\text{Mass} = "113" \times 1.5 = 170.1165$
MI for $\pi \times r^2 \times 2.5$ where $r =$ is 3.8 or 7.6
AI if $r = 3.8$
MI for "113" \times 1.5
AI for 169.5 – 170.3 cao

[4]

3. $10 \times 5 \times 8 (= 400)$ 4
 $"400" \times 0.6 = 240$
M2 for $10 \times 5 \times 8 (= 400)$
(MI for two of 10, 5, 8 seen as part of a volume calculation)
MI for "400" \times 0.6
AI cao

[4]

4. (a) $60 \times 24 (= 1440)$ 2
 $= 1440$
MI for $60 \times 24 (= 1440)$
AI cao

(b) $648 \div "1440"$ 2
 $= 0.45$
MI ft for $648 \div "1440"$
AI ft for "0.45"

(a) $60^2 \times 24 = 86400$ gets M0A0
 $60 \times 24 = 1440$ then 1440×60 (or $\times \frac{1}{2}$) = 86400 (720) gets
 M0A0

BUT $60 \text{ cm}^2 \times 24$ gets M1

(b) Candidates will gain the full follow through credit, if their answer to part (b) is 648 divided by their answer to part (a), with or **without** working.

Sorry, we will have to check these answers.

Most do seem to be getting the volume correct.

[4]

5. (a) $5^3 - 5 \times 3 \times 3$
 $125 - 45$

$(5 \times 5 - 3 \times 3) \times 5$

$(25 - 9) \times 5$

16×5

80

2

M1 for attempt to find volume of cube (e.g. $5 \times 5 \times n$ where $n \neq 6$) and subtract volume of the hole (e.g. $3 \times 3 \times n$ where $n \neq 6$) (needs to be dimensionally correct)

A1 cao

Alternative method

M1 for attempt to find area of the cross section and multiply by the depth of the prism (depth $\neq 6$)

A1 cao

(b) $64 \div 80$
 0.8

2

M1 ft $64 \div "80"$

A1 ft (to 2 sf or better)

[4]

6. Mass of water = $300 \times 1 = 300$ g
 Mass of juice = $15 \times 4 = 60$ g

Total mass = 360
 Total volume = 315
 Density = $360 \div 315$

$$1\frac{1}{17}$$

3

MI for 300×1 or 15×4 or 60 or 360 seen

$$\text{MI for } \frac{'300 \times 1' + '15 \times 4'}{'300 + 15'}$$

AI for $1\frac{1}{17}$ oe or 1.14...

[3]

1. About one quarter of the candidates did not attempt this question but many of those that did used a correct method. Unfortunately the standard of arithmetic was poor. In part (a), for example, almost half of the candidates with a correct method could not divide 44800 by 5 correctly. Some candidates chose to multiply by 5 in part (a) and divide by 5 in part (b) and some were confused by 'm³' and attempted to multiply or divide by 125.

2. Mathematics A

Paper 4

Only the more able candidate pursued this question through to a correct answer. The first stage involved recall of the method for calculating the volume of a cylinder. Weaker candidates merely multiplied the given numbers together without any reference to π . However, a greater proportion of the candidature did include π in their answers than previously, which is encouraging, though the common error was to square the π . A majority of candidates therefore arrived at a correct volume for the cylinder, gaining half the marks. Of those who did, many then spoilt their solution by dividing by 1.5. Candidates who attempted to multiply an incorrect volume by 1.5 were given some credit at this stage.

Paper 6

This proved to be more of a challenge than expected. Most candidates could get 113 for the volume of the cylinder, but a substantial number went on to divide their volume by 1.5, instead of multiplying. A few candidates used πDh for the volume.

Mathematics B**Paper 17**

The formulae for the area and circumference of a circle is clearly not as well known as one would like. Very few candidates scored full marks on this question.

A significant number of candidates ignored π and calculated $3.8^2 \times 2.5$ in order to find the volume. Weaker candidates often calculated 3.8×2.5 . Many used the density correctly in an attempt to find the mass and were awarded one mark for multiplying by 1.5.

Paper 19

The majority of candidates were able to gain some marks on this question either for evaluating the volume correctly or for knowing that the volume had to be multiplied by the density in order to find the mass of the ice hockey puck. Common errors including using $2\pi rh$ for the volume of a cylinder or dividing rather than multiplying by the density.

3. There were many interesting approaches to this question. Many tried to find the surface area rather than the volume and some tried to divide by the density rather than multiply by 0.6. Only about 35% of candidates obtained the fully correct answer of 240 grams though 40% of candidates achieved partial success.

4. Although in part (a) the correct answer of 1440 was usually seen, a significant number of candidates failed to score by working out $60^2 \times 24$ instead of 60×24 . Sometimes an answer of 1140 was seen after a correct method.

There were a number of attempts to find the surface area of the prism. This was usually achieved by assuming that 10 cm was the length of each edge of the cross section; $10 \times 6 \times 20 = 1440$ then followed, gaining no marks.

In part (b), dividing "1440" by 648 was seen as often as the correct method. Weaker candidates commonly found the product of volume and mass.

5. Fully correct answers to this question were only given by 23% of candidates. In part (a) it was common to see the volume of the 5cm cube being given correctly but then incorrect calculations for the hole were frequently seen. Some candidates thought the hole was a 3 cm cube and not a square prism with length 5cm. Where candidates tried to subtract two sensible volumes they were awarded a mark, however it was quite common to see candidates try to subtract 9cm^2 away from 125cm^3 and therefore achieve no marks.

In part (b) full marks were awarded for dividing the mass of 64 grams by the volume calculated in part (a) and 39% of candidates scored 2 marks usually for doing this. A large number of candidates divided volume by mass or multiplied mass and volume and so gained no credit. It was disappointing to see 39% of candidates gaining no marks at all in this question.

6. Over 60% of candidates were awarded at least one mark for their responses to this question. These candidates were able to find the mass of the juice or of the combined drink to gain one mark.

However, relatively few candidates could make any further progress.

Only about one in eight were able to complete the question successfully. Of those candidates who scored no marks on this question, a significant minority worked out $15 \div 4$ and $300 \div 1$ or $315 \div 5$.