

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				
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**Pearson Edexcel Level 1/Level 2 GCSE (9–1)**

**Time** 1 hour 45 minutes

**Paper reference** **1DT0/1B**

**Design and Technology**  
**COMPONENT 1: Papers and Boards**

**You must have:**  
 Calculator, ruler, HB pencil, protractor, compass

**Total Marks**

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
 – *there may be more space than you need.*
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

## Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets  
 – *use this as a guide as to how much time to spend on each question.*

## Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Q:1/1/1/1/1

## SECTION A

## Core

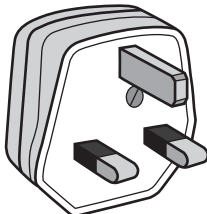
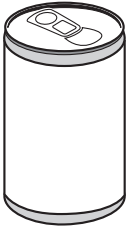
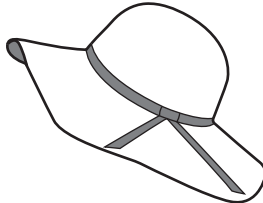

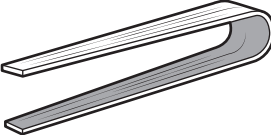
**Answer ALL questions. Write your answers in the spaces provided.**

- 1 (a) The materials that products are made from are chosen because of their properties.

Figure 1 shows a table of products.

For each of the products shown, give a property of the material it is made from that makes the material suitable for the product.

The first one has been done for you.

Picture of product	Material and product	Property
	Urea formaldehyde 3-pin plug	Insulator of electricity
	Aluminium drinks can	(1) (i)
	Felted wool fabric hat	(1) (ii)
	Tracing paper	(1) (iii)
	Laminated plywood salad servers	(1) (iv)

**Figure 1**

(b) Explain **one** disadvantage of using urea formaldehyde for the 3-pin plug.

(2)

The pins of the 3-pin plug are made from brass.

Brass is an alloy of copper and zinc in the ratio of 13:7  
(13 parts copper to 7 parts zinc).

(c) Calculate how much copper is required to make 50 kg of brass.

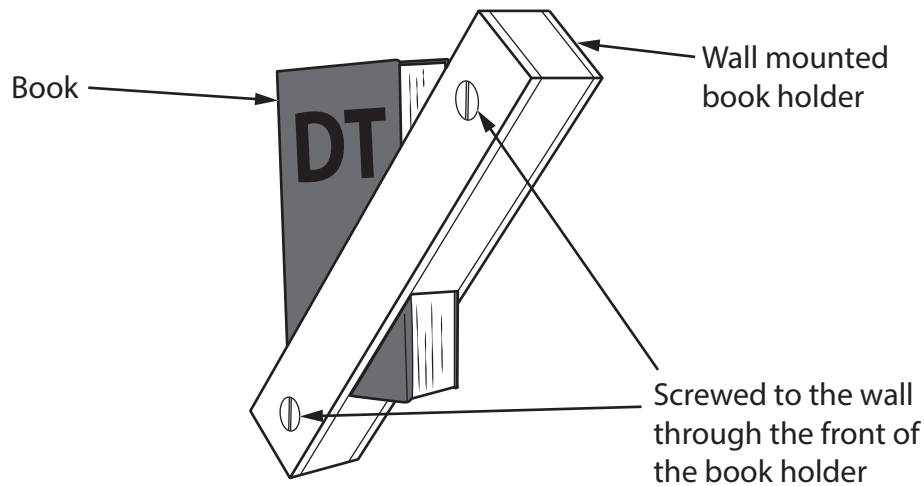
(2)

Answer

kg

(Total for Question 1 = 8 marks)

- 2 Figure 2 shows a wall mounted book holder manufactured from mahogany.



**Figure 2**

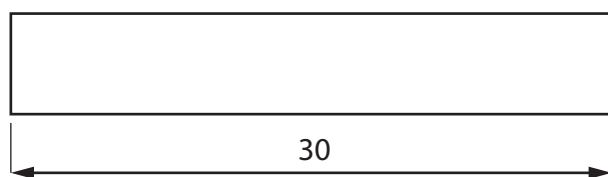
- (a) Name **one** other appropriate hardwood that could be used to make the wall mounted book holder. (1)

- (b) Explain **one** working property of mahogany that makes it an appropriate choice of material for the wall mounted book holder. (2)

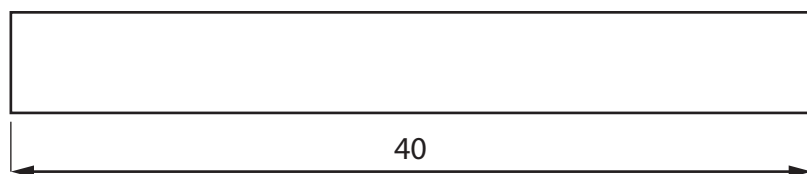
Each wall mounted book holder is made as a one-off.

- (c) Explain **one** advantage for the manufacturer of making each wall mounted book holder as a one-off. (2)

Figure 3 shows the sizes of two pieces of mahogany used to make the wall mounted book holder.



2 required at this length



1 required at this length

**Figure 3**

The mahogany has a cross sectional area of  $5 \text{ cm}^2$

All dimensions in cm

Diagram not to scale

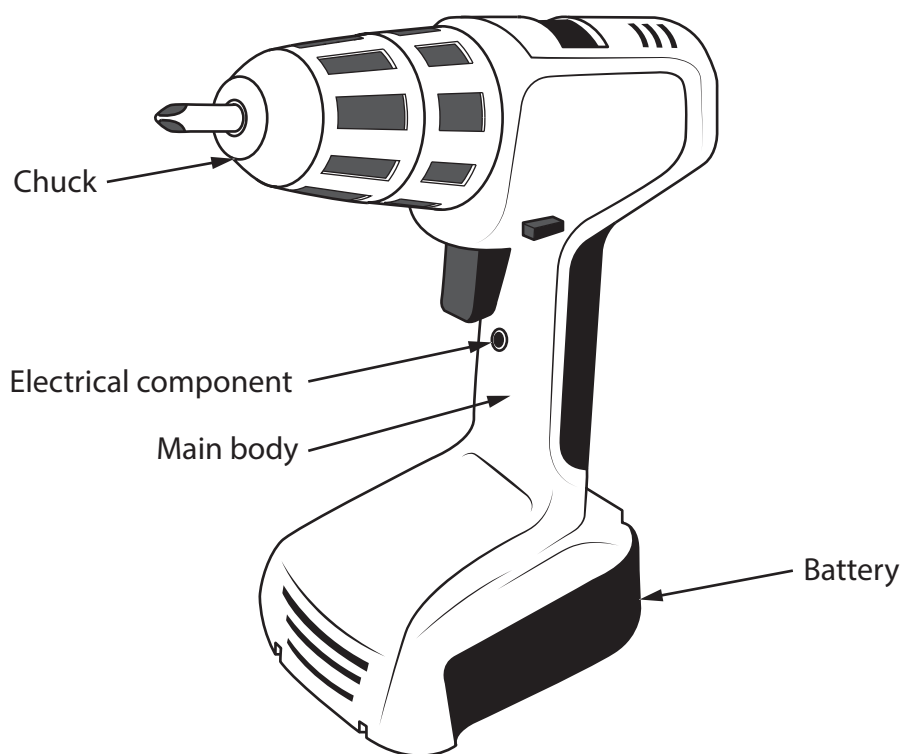
- (d) Calculate the cost of the mahogany required to make one wall mounted book holder if the mahogany costs  $\text{£}1,200 \text{ m}^3$ .

(4)

Cost  $\text{£}$

**(Total for Question 2 = 9 marks)**

- 3 Figure 4 shows an electrically powered hand drill and the circuit symbol for an electrical component.



Circuit symbol for the electrical component

**Figure 4**

- (a) Name the type of electrical component from the circuit symbol shown in Figure 4.

(1)

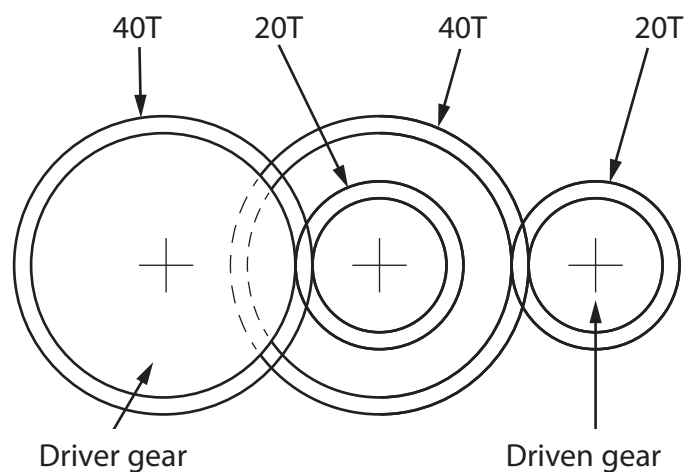
The electrically powered hand drill is being redesigned. The manufacturer is considering using a bevel gear inside.

- (b) Explain **one** reason for using a bevel gear inside the electrically powered hand drill.

(2)

- (c) The electrically powered hand drill also has a compound gear train inside.

Figure 5 shows a schematic diagram of the compound gear train.



T = Teeth

**Figure 5**

Calculate the revolutions per minute (RPM) of the driven gear if the driver gear rotates at 400 RPM.

(2)

Driven gear

RPM

(d) Explain **one** benefit of using a battery for the electrically powered hand drill.

(2)

The manufacturer of the electrically powered hand drill is considering using carbon fibre for the main body.

(e) Explain **two** benefits of using carbon fibre for the main body of the electrically powered hand drill.

(4)

1

2

(Total for Question 3 = 11 marks)



- 4 A not-for-profit organisation has developed some agro-textiles that can be used by farmers.

(a) Explain **two** ways that agro-textiles can be used by farmers.

(4)

1

2

(b) A farmer requires  $420 \text{ m}^2$  of agro-textile to cover their field.

The agro-textile is available in rolls 50 m long measuring 1.2 m wide.

Calculate the number of rolls of agro-textile the farmer needs to cover their field.

(2)

Number of rolls

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(c) Discuss how fair trade products have been used to support farmers and societies in developing countries.

(6)



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(Total for Question 4 = 12 marks)

**TOTAL FOR SECTION A = 40 MARKS**

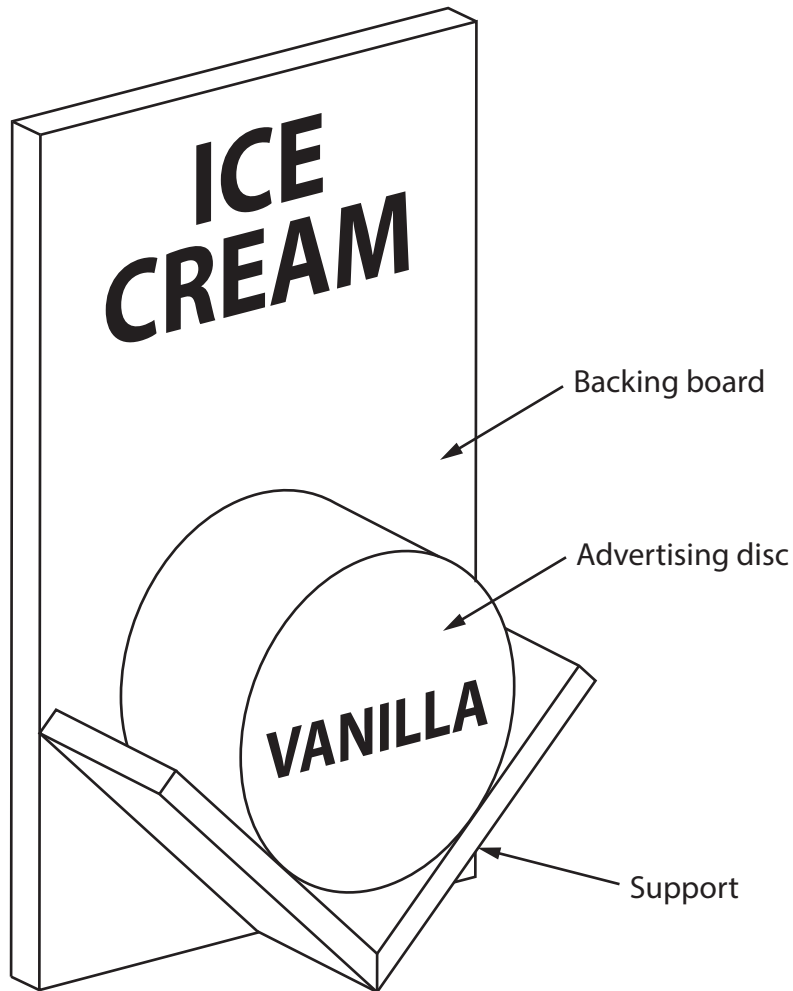


## SECTION B

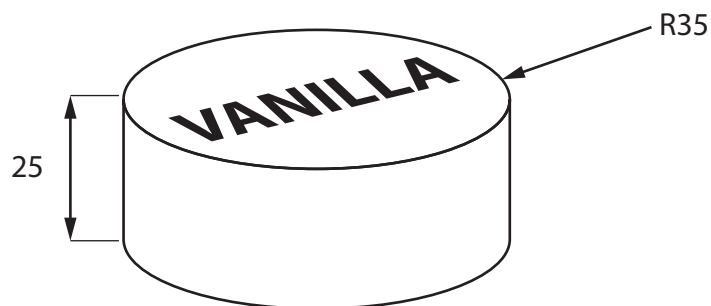
### Papers and Boards

Answer ALL questions. Write your answers in the spaces provided.

- 5 Figure 6 shows a design solution for a display sign that is used by an outdoor ice cream seller together with some additional information.



Additional information



Dimensions of the disc in mm

Diagram not to scale

Figure 6

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- (a) The display sign holds advertising discs that show what flavour of ice cream is on sale and needs to be improved to include the following specification points.

The display sign must:

- hold the disc securely and allow the disc to be easily changed when a different flavour of ice cream is being sold
- include a cover that protects the backing board and support and prevents the disc from being affected by wind and rain
- be able to be hung up on a hook near to the ice cream and easily moved to another hook when ice cream is being sold at a different location.

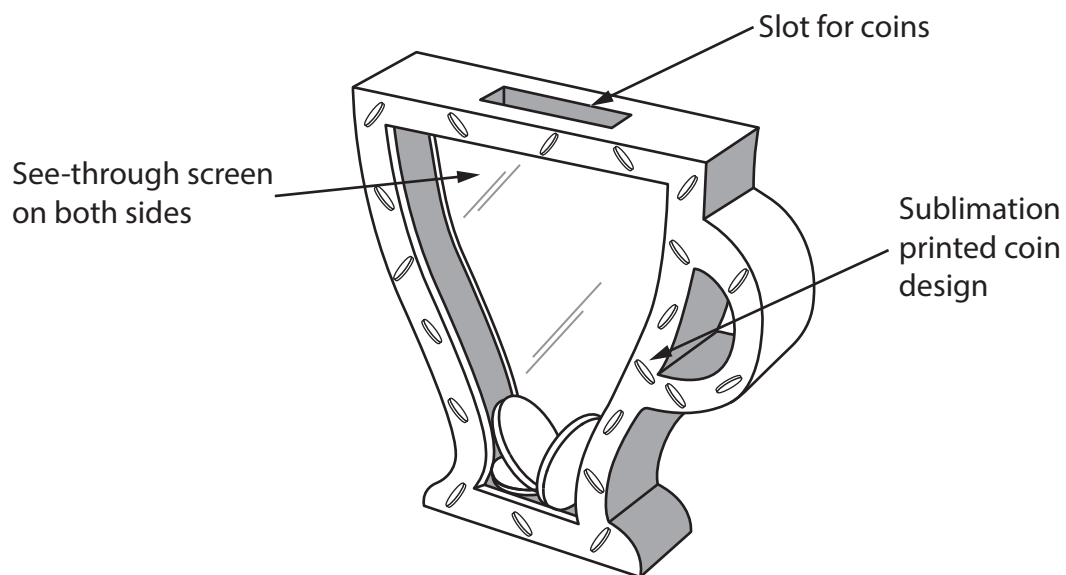
Use notes and sketches, on the outline below, to show how the display sign could be modified to include these three specification points.

You will be marked on how you apply your understanding of design and technology, not your graphical skills.

(6)



- (b) Figure 7 shows a money box made from a polymer in the shape of a tea cup. The tea cup has a design on the front that has been applied using sublimation printing.



**Figure 7**

Explain **two** ways that the money box meets, or fails to meet, the criteria of providing a method to encourage young children to save money.

(4)

1

2

(Total for Question 5 = 10 marks)

6 Figure 8 shows a wedding guest book.

The guest book has front and back covers that have been made from 2 mm thick folding boxboard.

Bonded paper has been used for pages of the guest book.

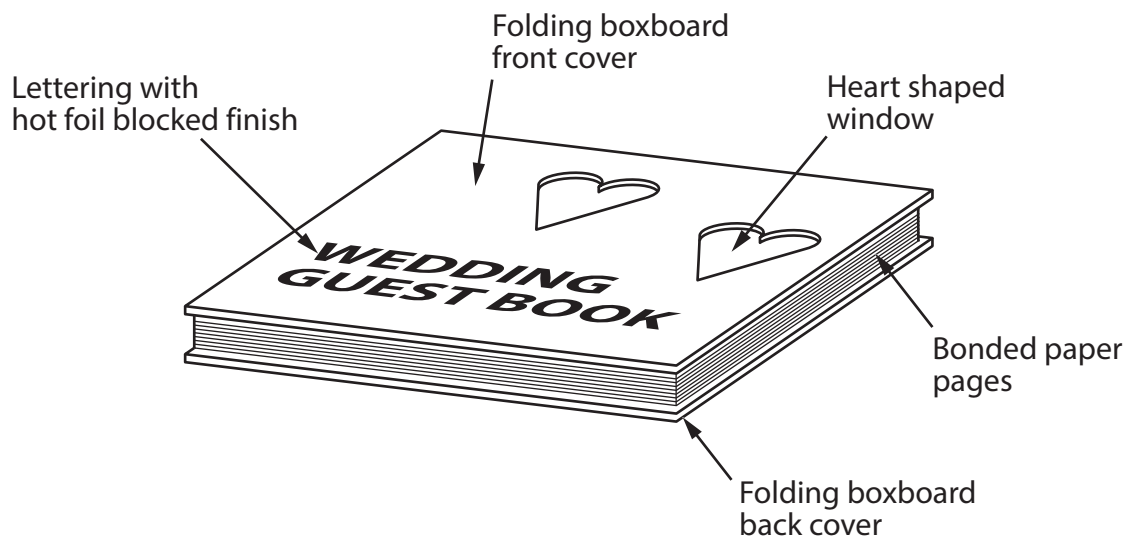


Figure 8

The pages of the wedding guest book are manufactured from standard sized sheets of bonded paper.

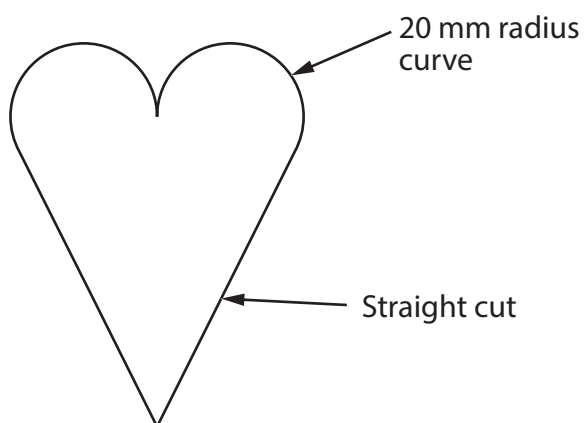
- (a) Explain **two** advantages for the manufacturer of using standard sized sheets of bonded paper for the pages.

(4)

1

2

- (b) Figure 9 shows a window that is cut through the front cover of the wedding guest book.



**Figure 9**

Use notes and sketches, in the space below, to show how the window in the front cover would be accurately cut out using hand tools.

You will be marked on how you apply your understanding of design and technology, not your graphical skills.

(4)



- (c) The lettering on the front cover of the wedding guest book has been produced with hot foil blocking.

Explain **one** reason why hot foil blocking has been used for the lettering.

(2)

- (d) Give **two** different methods that could be used to join the completed front cover, pages and back cover of the wedding guest book together.

For each method, explain **one** advantage of using the method to join the front cover, pages and back cover of the wedding guest book together.

(6)

Method 1

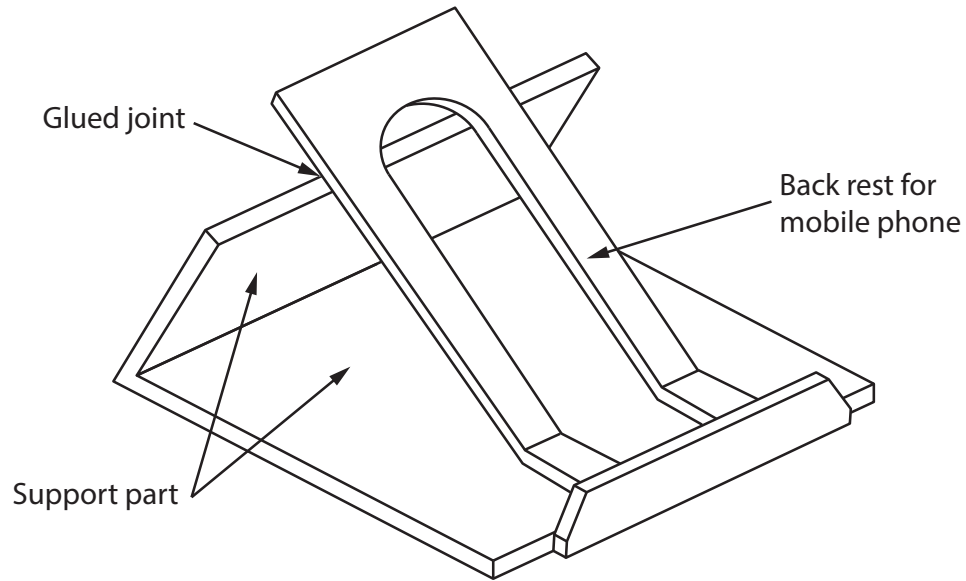
Explanation

Method 2

Explanation

(Total for Question 6 = 16 marks)

7 Figure 10 shows a mobile phone stand made from 4 mm thick solid whiteboard.



**Figure 10**

- (a) State the type of force the back rest is subjected to when the mobile phone is resting on it.

(1)

(b) Explain **two** working properties of solid whiteboard that make it a suitable material for the mobile phone stand.

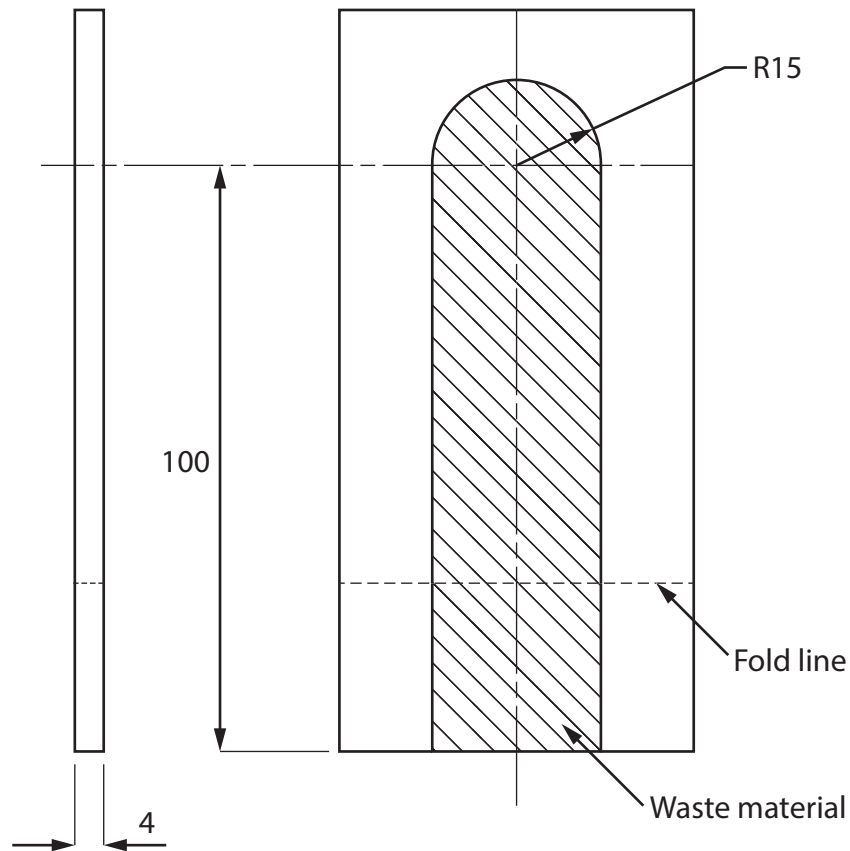
(4)

1

2

Figure 11 shows a dimensioned drawing of the mobile phone stand back rest before it is folded.

The back rest is manufactured from a single piece of solid whiteboard.



All dimensions are in mm

Diagram not to scale

**Figure 11**

(c) Calculate the volume of waste material produced when making the back rest.

Give your answer to the nearest whole  $\text{cm}^3$ .

Use  $\pi = 3.142$

(5)

Answer

$\text{cm}^3$

The support part of the mobile phone stand could be fabricated from separate pieces of solid whiteboard rather than from a single piece.

- (d) Explain **two** reasons for fabricating the support part of the mobile phone stand from separate pieces of solid whiteboard rather than manufacturing it from a single piece.

(6)

1

2

(Total for Question 7 = 16 marks)

8 Figure 12 shows a plant carrier manufactured from corrugated board.

The plants are placed in compartments that are 100 mm × 100 mm.

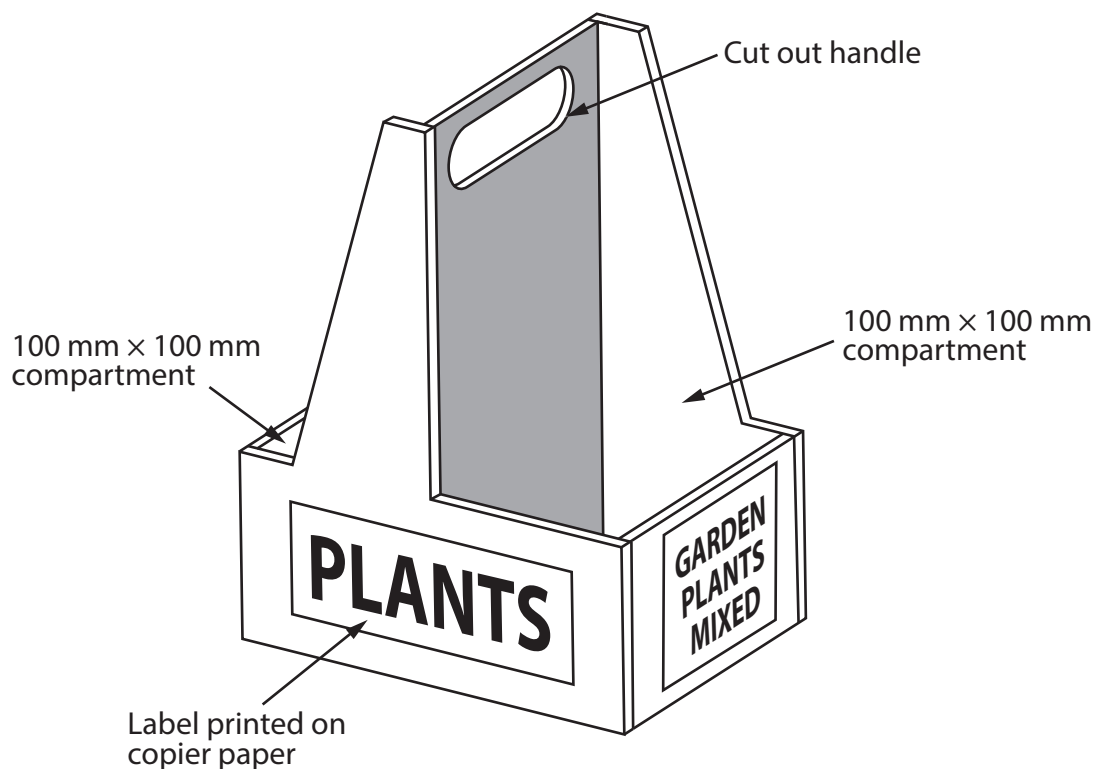


Figure 12

(a) Explain **one** benefit of manufacturing the plant carrier from corrugated board.

(2)

The plant carriers are subjected to quality control checks during manufacture.

- (b) Explain **one** advantage of carrying out a quality control check on the plant carriers during manufacture.

(3)

- (c) Explain **two** reasons why printing would be used to manufacture the labels for the plant carriers.

(4)

1

2



- (d) The plant carrier is manufactured from corrugated board and has labels that are printed on copier paper that are then applied to its surfaces.

Figure 13 shows some additional information about the plant carrier.

<b>Source of copier paper</b>	China
<b>Plant carrier material</b>	Stock sized 3 mm corrugated board
<b>Potential market</b>	Garden centres, supermarkets
<b>Scale of production</b>	Batch

**Figure 13**

Analyse the information in Figure 13.

Evaluate the plant carrier with reference to social and availability factors including:

- use for different social groups
- use of stock materials
- use of specialist materials.

(9)

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(Total for Question 8 = 18 marks)

**TOTAL FOR SECTION B = 60 MARKS**  
**TOTAL FOR PAPER = 100 MARKS**



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