

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

1DT0/1F

Design and Technology

COMPONENT 1: Timbers

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



Pearson

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.

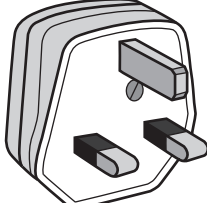
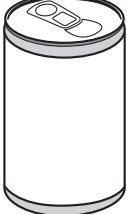
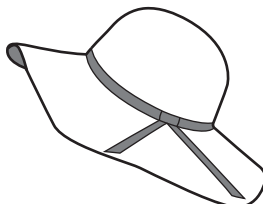

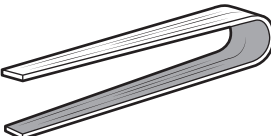
Picture of product	Material and product	Property
	Urea formaldehyde 3-pin plug	Insulator of electricity
	Aluminium drinks can	(1) (i)
	Felted wool fabric hat	(1) (ii)
	Tracing paper	(1) (iii)
	Laminated plywood salad servers	(1) (iv)

Figure 1

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

(2)

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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.

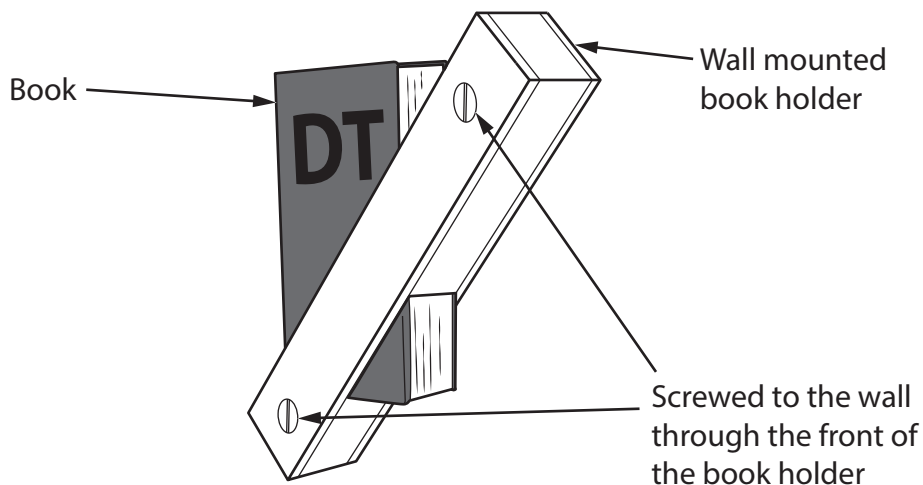


Figure 2

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

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

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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)

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

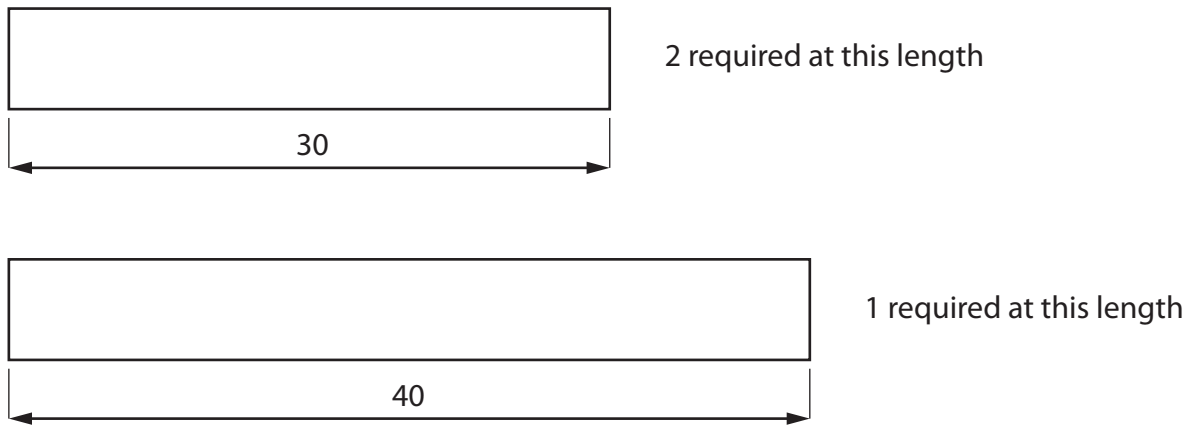


Figure 3

The mahogany has a cross sectional area of 5 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 $\text{£}1,200 \text{ m}^3$.

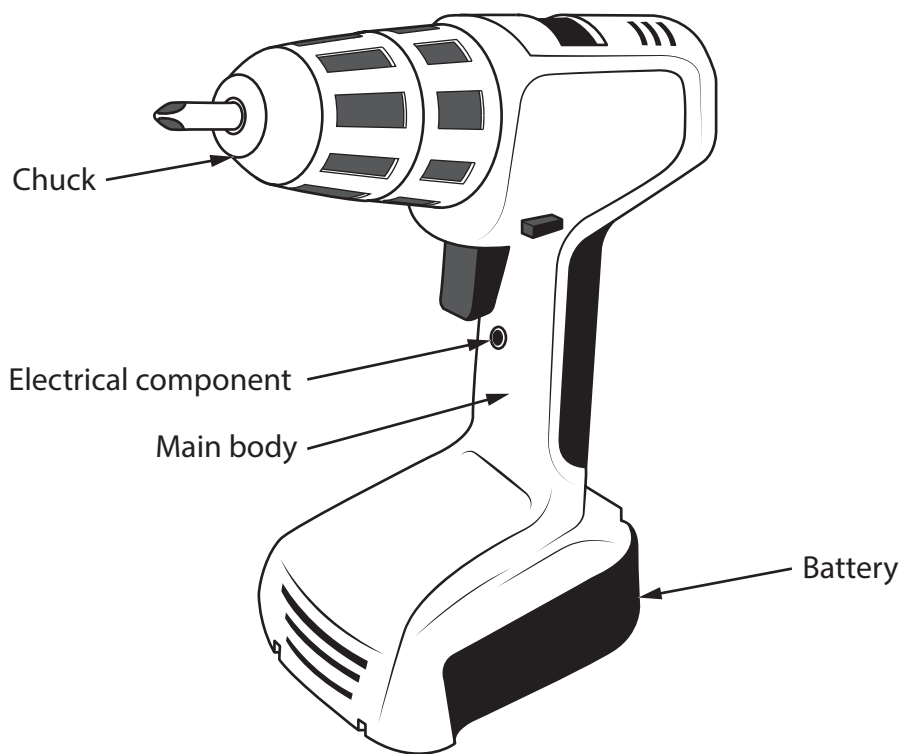
(4)

Cost £

(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)



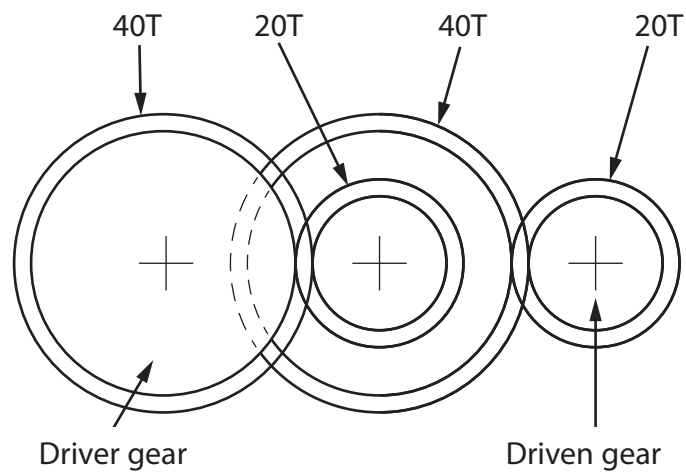
The electrically powered hand drill is being redesigned. The manufacturer is considering using a bevel gear inside.

- (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)

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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)

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(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

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(b) A farmer requires 420 m² 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



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

(6)

Area with horizontal dotted lines for writing the answer.

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Handwriting practice area with 15 horizontal dotted lines.

(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS



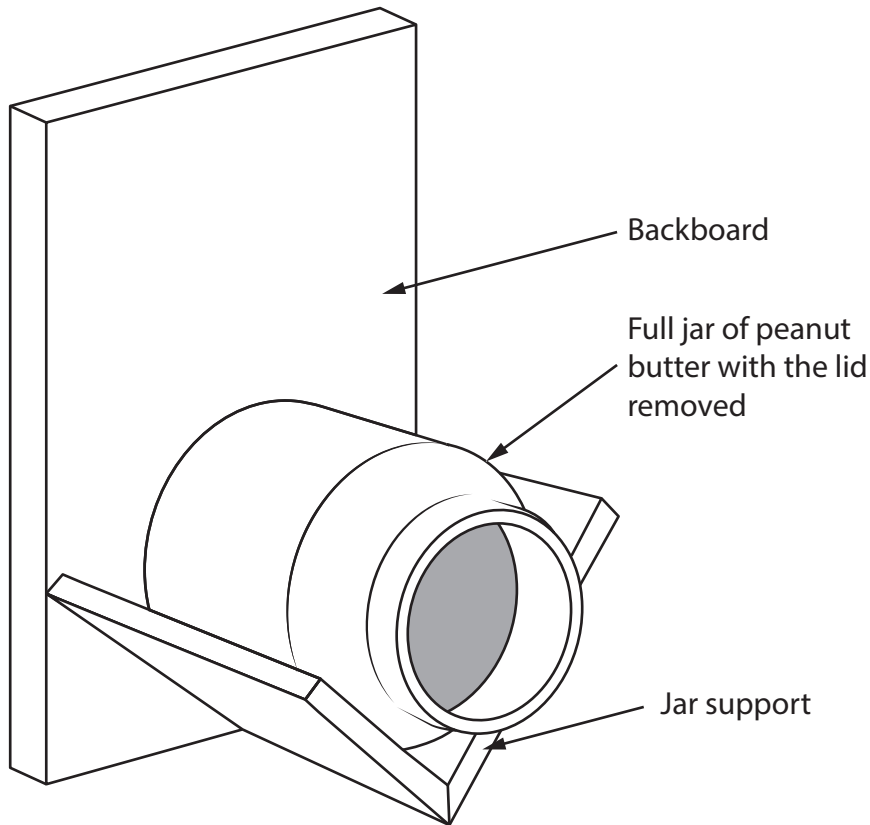
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SECTION B

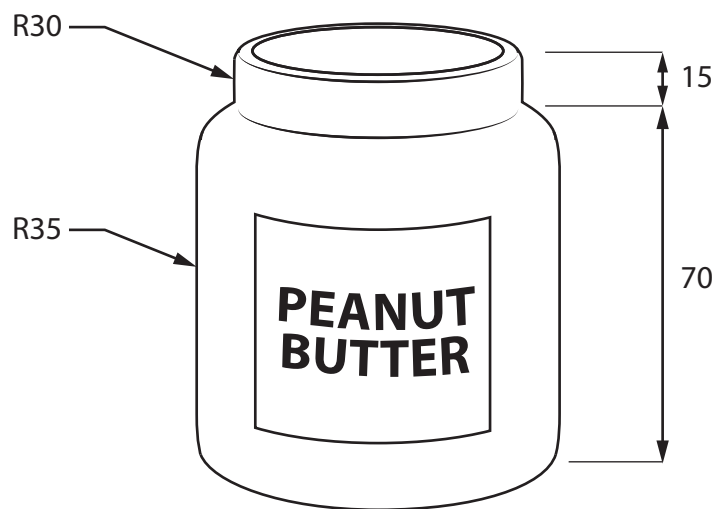
Timbers

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

- 5 Figure 6 shows a design solution for a bird feeder together with some additional information.



Additional information



Dimensions of the jar of peanut butter in mm

Diagram not to scale

Figure 6

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- (a) The bird feeder holds a full jar of peanut butter and needs to be improved to include the following specification points.

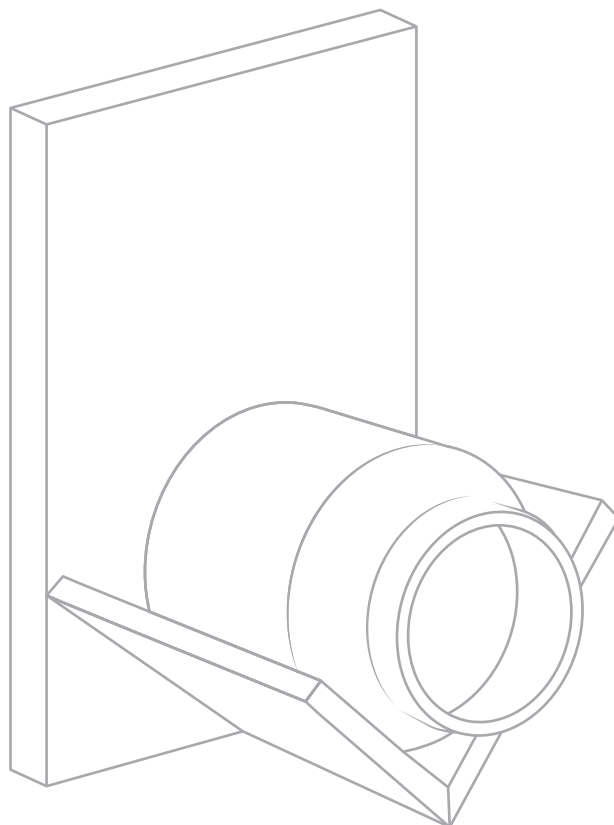
The bird feeder must:

- hold the jar securely and allow an empty jar to be easily replaced
- include a cover that protects the backboard and jar support and keeps the jar dry
- be able to be hung up in a tree and easily moved to another tree.

Use notes and sketches, on the outline below, to show how the bird feeder 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 wooden money box in the shape of a tea cup.

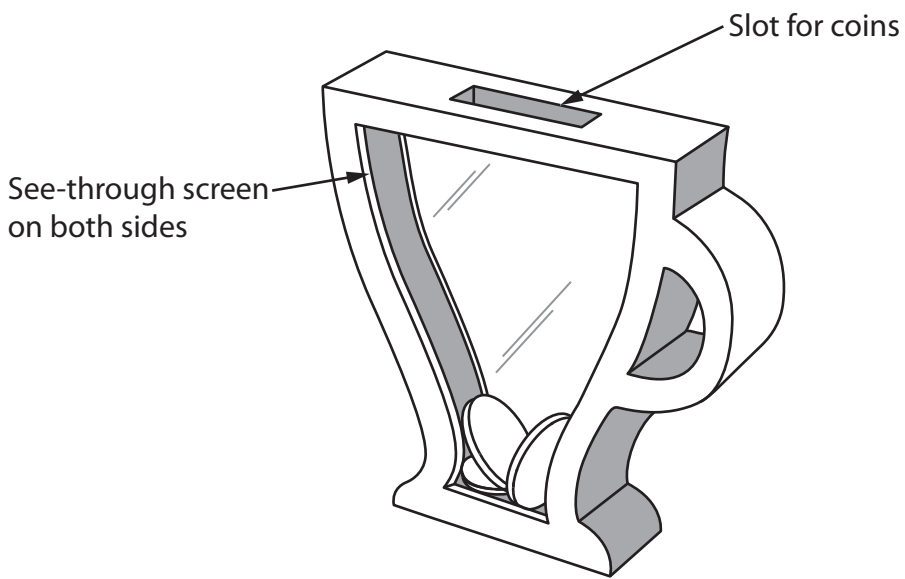


Figure 7

Explain **two** ways that the wooden 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 children's easel.

The front and back sections of the frame are made from a hardwood and open using hinges.

Paper is placed on the MDF painting surface.

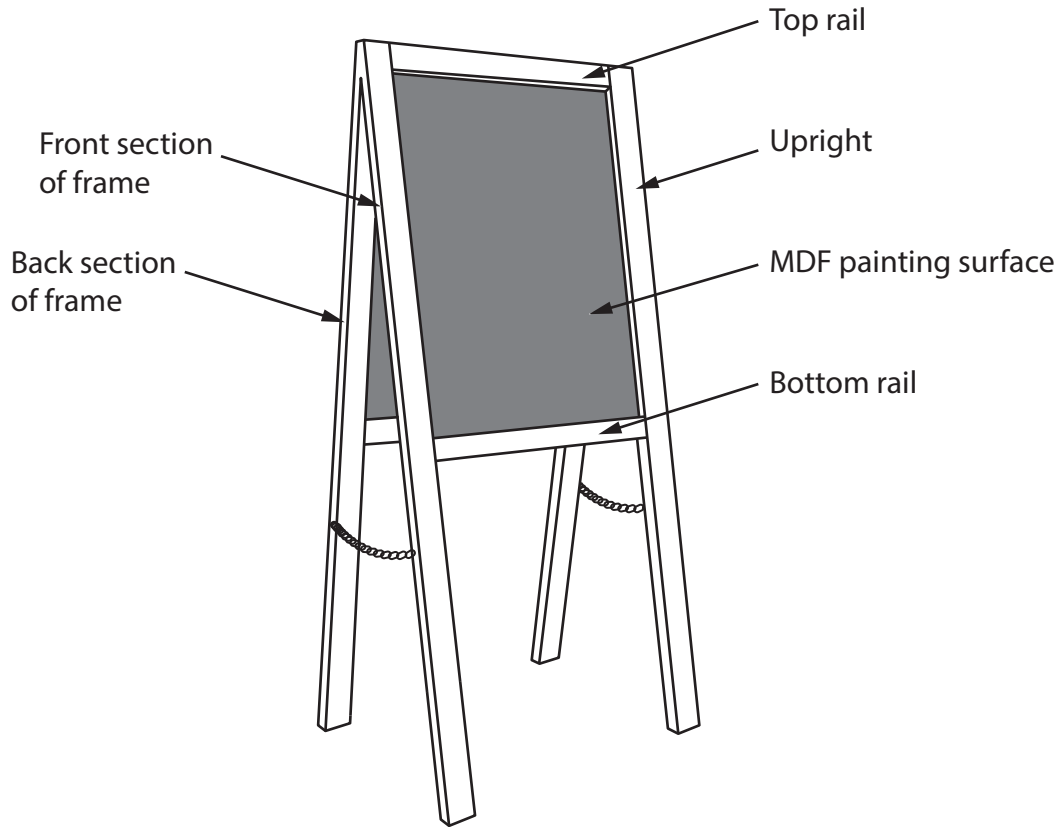


Figure 8

The MDF for the painting surface is manufactured from a standard sized board.

(a) Explain **two** advantages for the manufacturer of using a standard sized board for the MDF painting surface.

(4)

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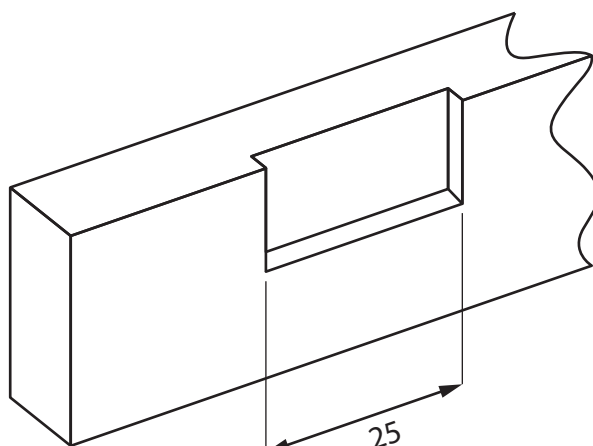
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P 7 1 3 4 4 A 0 1 5 2 8

- (b) Figure 9 shows a rebate on the inside of the top rail of the frame where a 25 mm butt hinge is fixed.



All dimensions in mm

Diagram not to scale

Figure 9

Use notes and sketches, in the space below, to show how the rebate for the hinge would be cut using hand tools.

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

(4)



(c) The frame of the children's easel has been finished with varnish.

Explain **one** reason why varnish has been applied to the frame of the children's easel.

(2)

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(d) Give **two** different wood joints that could be used to join the bottom rail and an upright on the easel.

For each wood joint, explain **one** advantage of using the wood joint to join the bottom rail and an upright on the easel.

(6)

Joint 1

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Explanation

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Joint 2

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Explanation

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(Total for Question 6 = 16 marks)



7 Figure 10 shows a flower vase that holds a test tube.

The main body is cut out from a single piece of ash and the two side pieces are bent outwards by placing in the top part to form the curves.

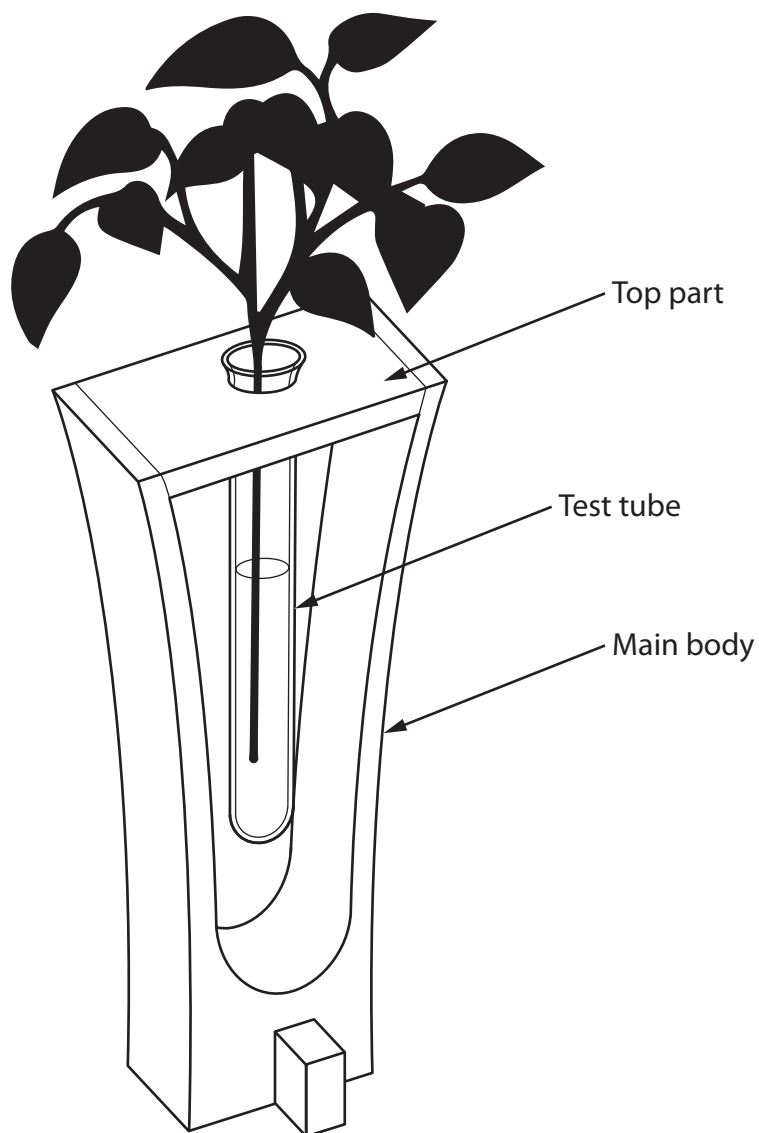


Figure 10

(a) State the type of force the top part is subjected to from the two side pieces of the main body.

(1)



(b) Explain **two** working properties of ash that make it an ideal material for the flower vase.

(4)

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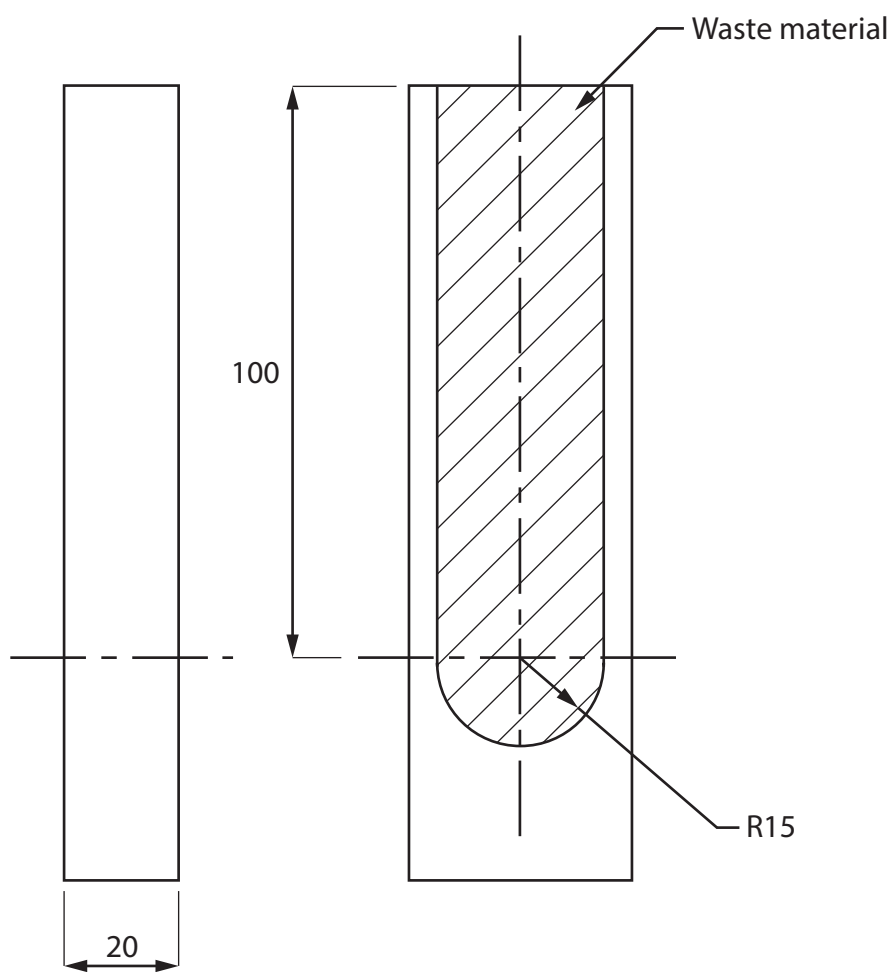
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P 7 1 3 4 4 A 0 1 9 2 8

Figure 11 shows a dimensioned drawing of the main body of the flower vase before the sides are bent.

The main body is manufactured from a single piece of ash.



All dimensions are in mm

Diagram not to scale

Figure 11



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(c) Calculate the volume of waste material produced when making the main body.

Give your answer to the nearest whole cm^3 .

Use $\pi = 3.142$

(5)

Answer cm^3



P 7 1 3 4 4 A 0 2 1 2 8

The main body of the flower vase could be fabricated from separate pieces of ash rather than from a single piece.

(d) Explain **two** reasons for fabricating the main body of the flower vase from separate pieces of ash rather than manufacturing it from a single piece.

(6)

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(Total for Question 7 = 16 marks)



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8 Figure 12 shows a dinner tray manufactured from plywood. The dinner plates, glasses and knife and fork are all placed in slots that are 9 mm deep.

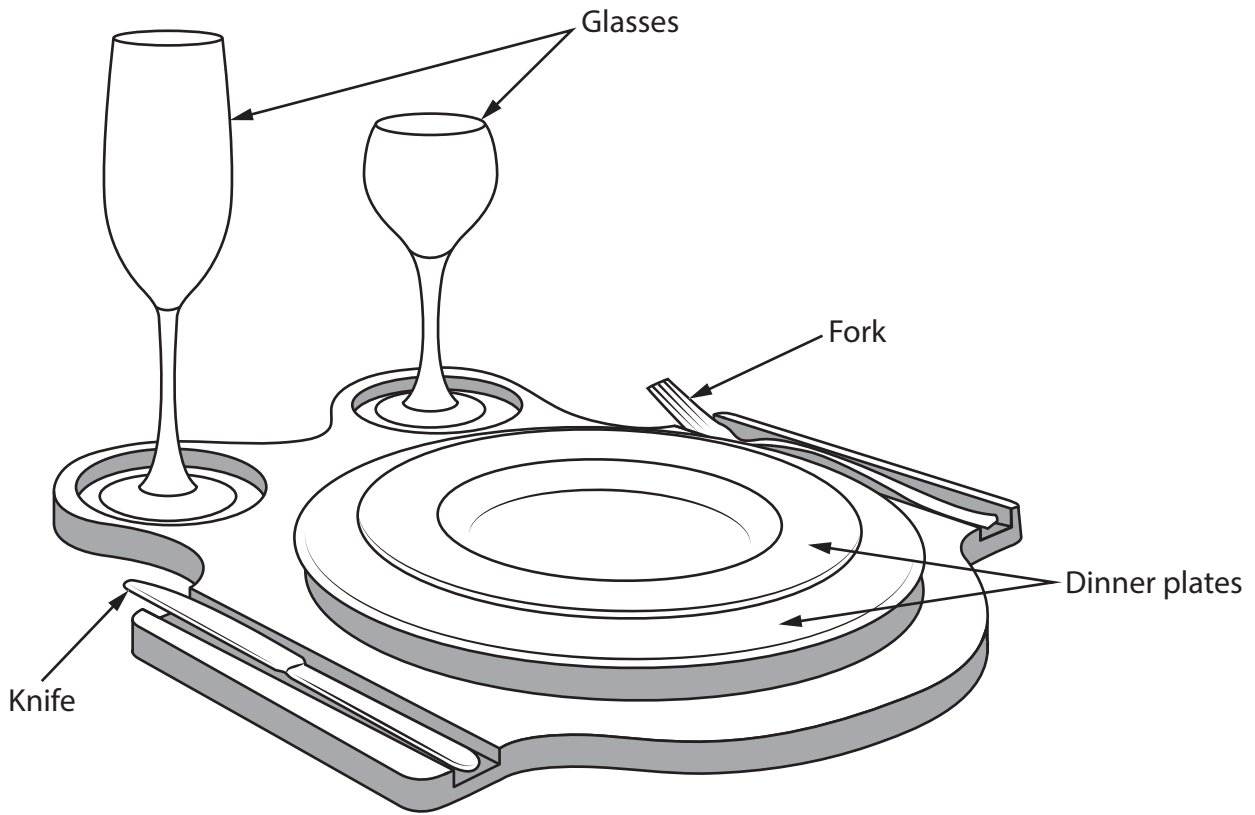


Figure 12

(a) Explain **one** benefit of manufacturing the dinner tray from plywood.

(2)

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The dinner trays are subjected to quality control checks during manufacture.

(b) Explain **one** advantage of carrying out a quality control check on the dinner trays during manufacture.

(3)

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(c) Explain **two** reasons for using a router to manufacture the dinner trays.

(4)

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(d) The dinner tray is manufactured from plywood and has an oak veneer applied to its surface.

Figure 13 shows some additional information about the dinner tray.

Source of oak veneer	European forests
Dinner tray material	Stock sized 18 mm plywood sheet
Potential market	Hospitals, care homes and restaurants
Scale of production	Batch

Figure 13

Analyse the information in Figure 13.

Evaluate the dinner tray 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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