

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

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Friday 24 May 2019

Afternoon (Time: 1 hour 45 minutes)

Paper Reference **1DT0/1A**

Design and Technology

Component 1: Metals

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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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.

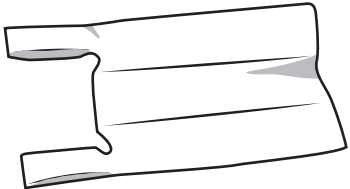
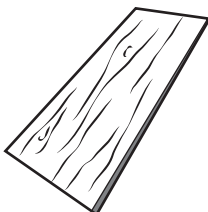
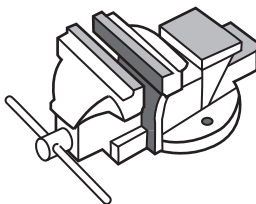

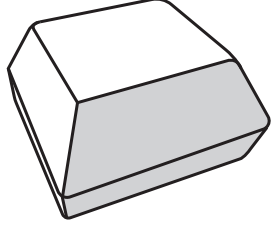
Product	Product material	Property
	Biodegradable plastic shopping bag	Will degrade in soil
	Cedar roof tile	(1) (i)
	Cast iron workshop vice	(1) (ii)
	Polyester raincoat	(1) (iii)
	Solid white board burger package	(1) (iv)

Figure 1

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(b) Figure 2 shows a table with the number of plastic bags given away in England.

Year	Number of bags given away (billions)
2014	7.6
2015	5.4

Figure 2

Calculate the percentage reduction in the number of plastic bags given away between 2014 and 2015.

Give your answer to the nearest whole number.

(2)

Percentage reduction

(c) In 2015 charging for carrier bags was introduced resulting in a reduction in the number of bags being manufactured.

Explain **one** negative effect of this reduction for the manufacturer.

(2)

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(Total for Question 1 = 8 marks)

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- 2 Figure 3 shows a drawing of a fabric play cube for young children.
The fabric play cube has a side length of 60 mm.

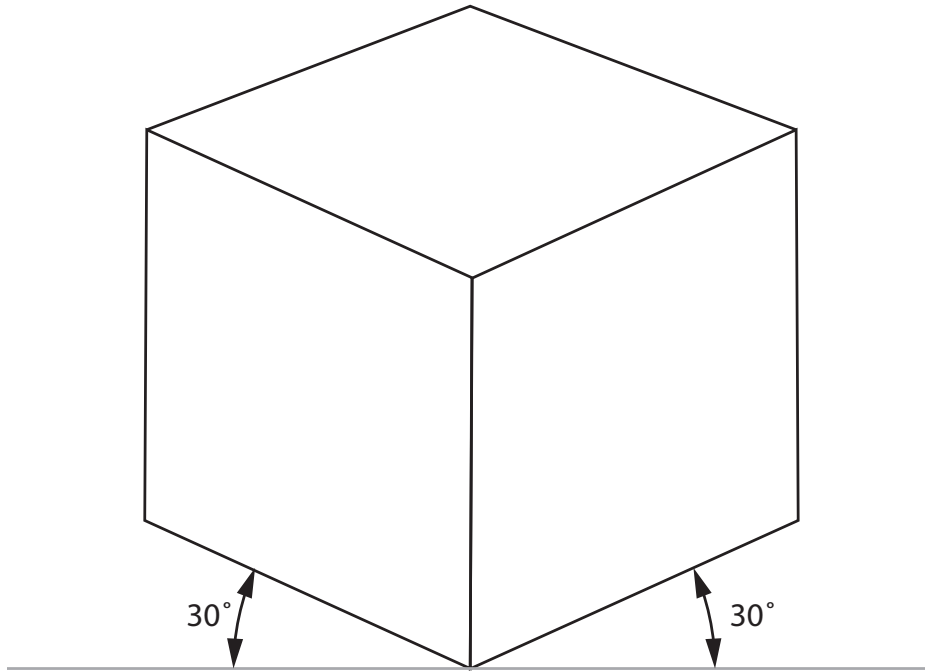


Figure 3

- (a) Name the communication technique that has been used to produce the drawing shown in Figure 3.

(1)

- (b) A prototype play cube was made from calico.

Explain **one** reason for using calico for the prototype play cube.

(2)



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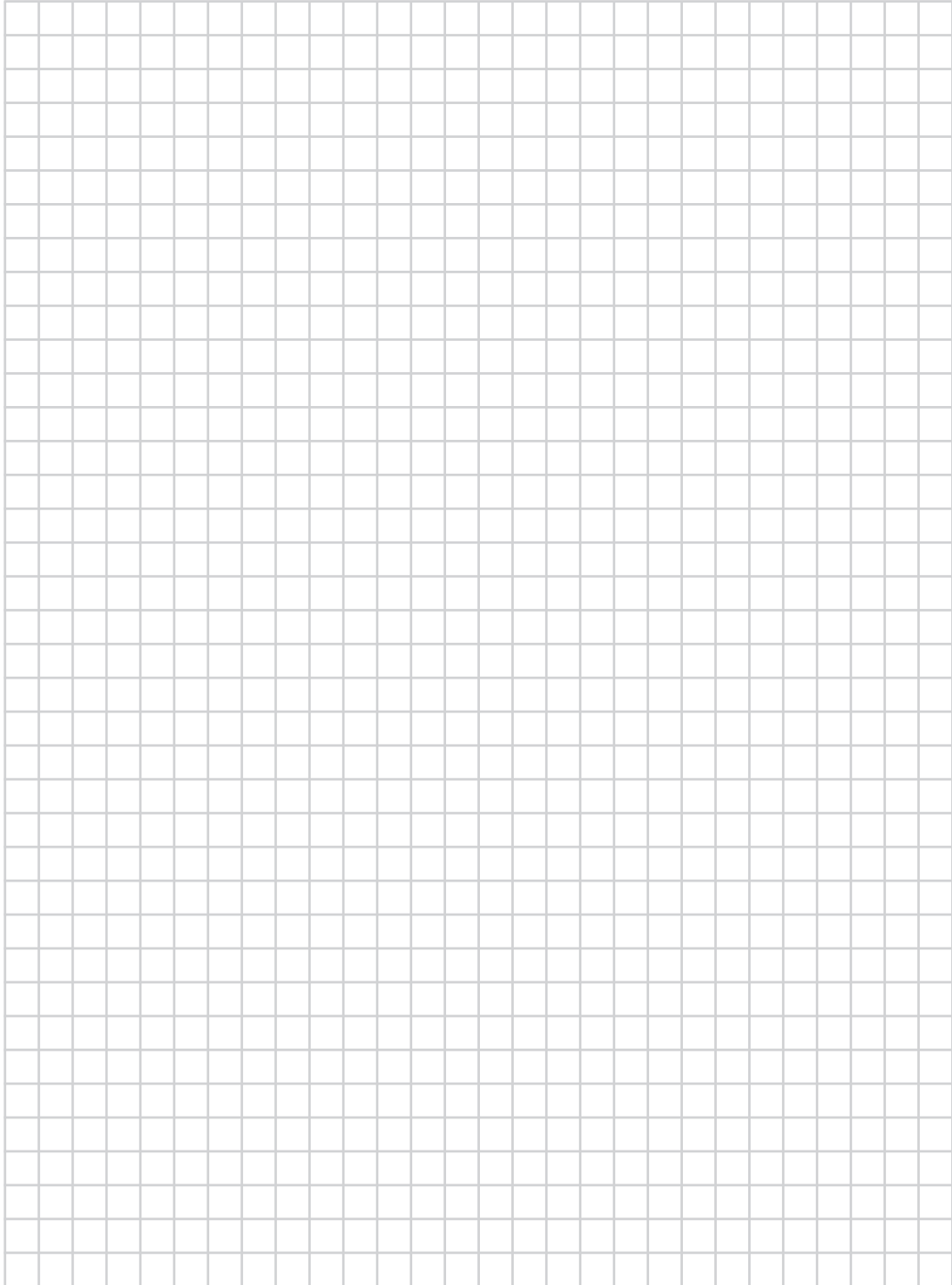
(c) The pattern for the prototype play cube was made from a single net.

Draw a net for the play cube on the grid provided below.

Do not include any seam allowance.

Use a dashed line — — — — to show where the net would be folded.

(4)



Each square represents 10 mm



(d) Tracing paper was used to design the prototype play cube.

Explain **one** reason why designers use tracing paper.

(2)

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(Total for Question 2 = 9 marks)



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3 Figure 4 shows part of a solar powered garden light.

The outer case is made from acrylic.

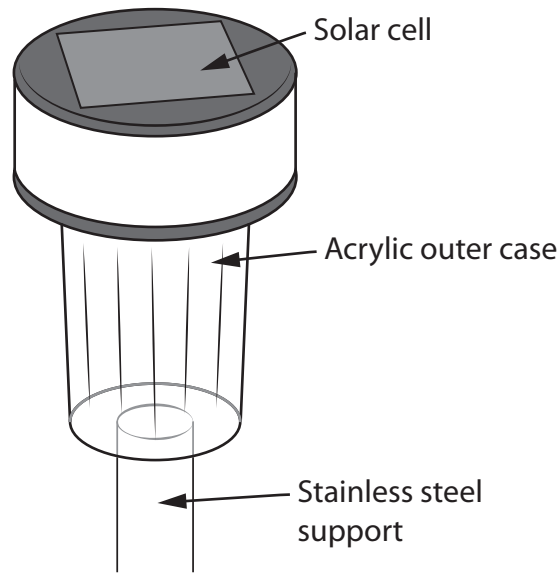


Figure 4

(a) Give **one** property of acrylic that makes it an appropriate material from which to make the outer case.

(1)

(b) The solar powered garden light is held off the ground by a stainless steel support. Explain **one** reason for using stainless steel for the support.

(2)

(c) The manufacturer of the solar powered garden light wants to reduce its carbon footprint.

Explain **one** way new and emerging technologies could be used to reduce the manufacturer's carbon footprint.

(2)



(d) The solar cell used in the solar powered garden light costs $\frac{1}{12}$ th of the total cost of the product.

Calculate the cost of the solar cell if each light costs £4.97 to make.

Give your answer to two significant figures.

(2)

£

(e) The manufacturer of the solar powered garden light employs different groups of people including apprentices.

Explain **two** ways that the use of new and emerging technologies could affect the apprentices.

(4)

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(Total for Question 3 = 11 marks)



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4 Figure 5 shows a drawing of a jewellery box made from mahogany.

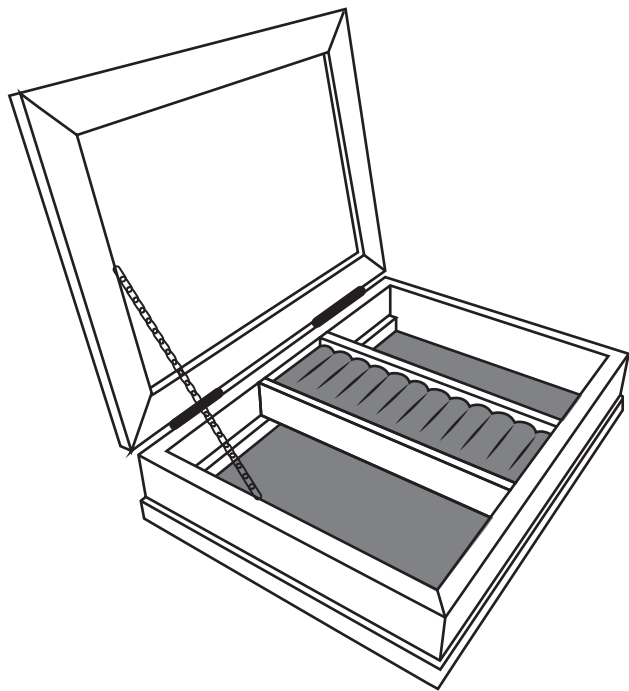


Figure 5

The electronic component shown in Figure 6 is used in the jewellery box.

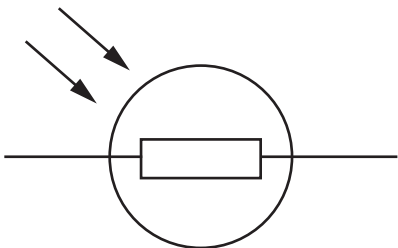


Figure 6

(a) (i) Name the electronic component shown in Figure 6.

(1)



- (ii) The jewellery box uses a programmable component to turn on a musical tune when the lid is opened, that stays on until the lid is closed.

Figure 7 shows a partly completed flowchart for the programmable component.

Correctly label the **decision outputs** and add the remaining **lines** and **arrows** on the flowchart to show how the programmable component:

- turns on the musical tune when the lid is opened
- turns off the musical tune when the lid is closed.

(3)

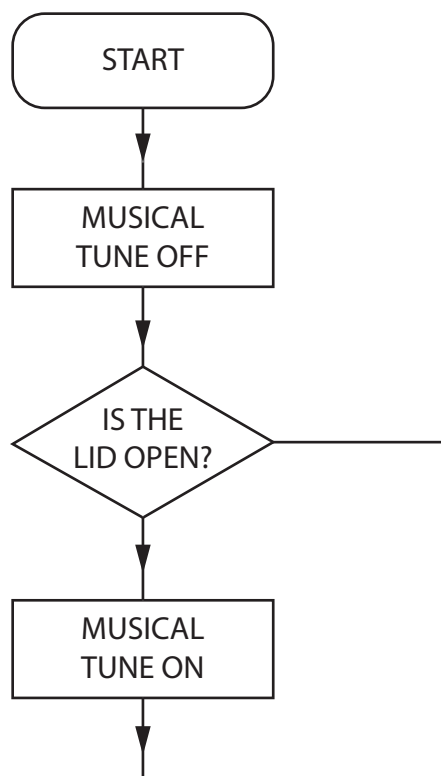


Figure 7



(b) Analyse the information in Figure 8 about the sources of mahogany.

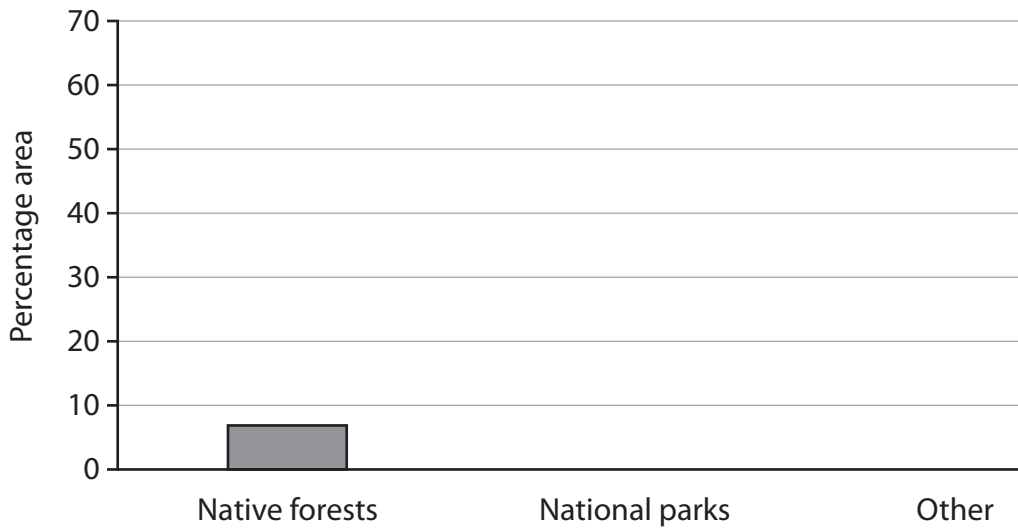
Sources of mahogany	Percentage grown in each area (%)
Native forests	7
National parks	30
Other	63

Figure 8

Complete the bar chart below to show the percentage grown in each area.

The first one has been done for you.

(2)



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(c) A film company is considering launching a range of musical jewellery boxes based on its animated characters.

Discuss the different design strategies the company could use to generate initial ideas and to avoid design fixation.

(6)

Area with horizontal dotted lines for writing.



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Handwriting practice area with 18 horizontal dotted lines.

(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS

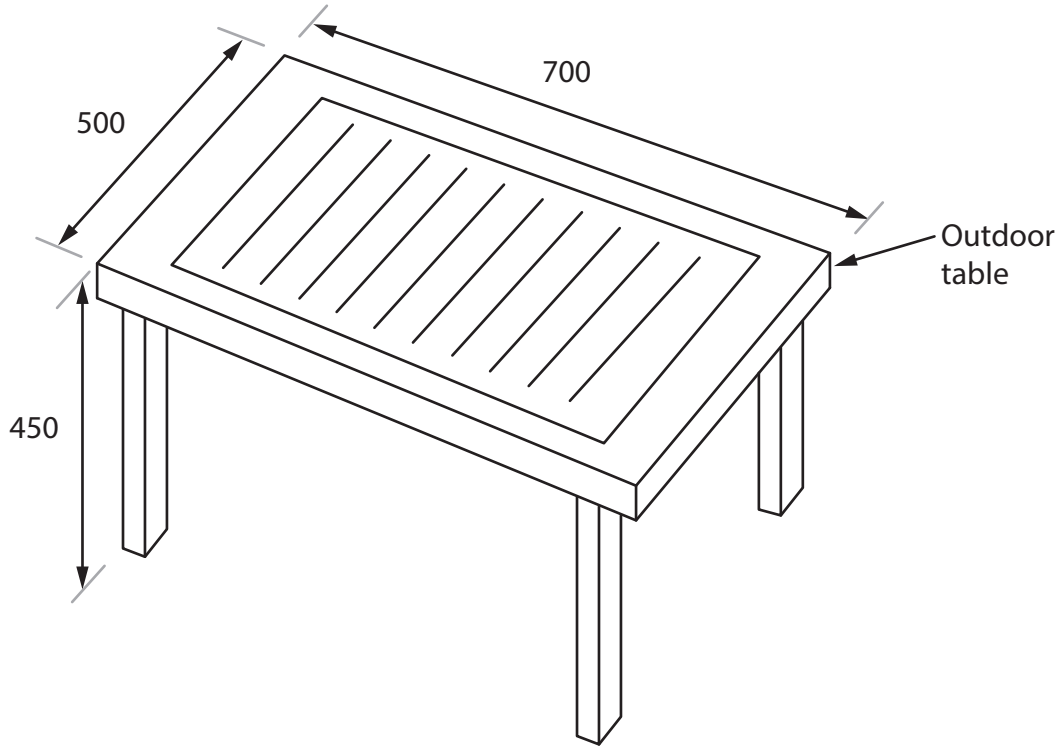


P 5 9 6 6 2 A 0 1 3 2 8

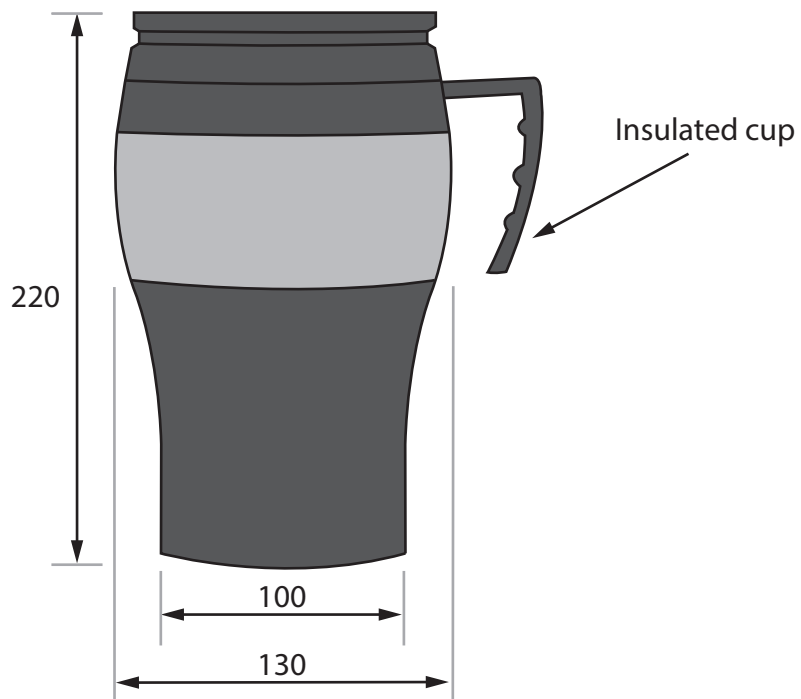
SECTION B – METALS

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

- 5** Figure 9 shows a design solution for an outdoor table together with some additional information.



Additional information:



All dimensions in mm

Figure 9

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(a) The outdoor table needs to be improved to include the following specification points.

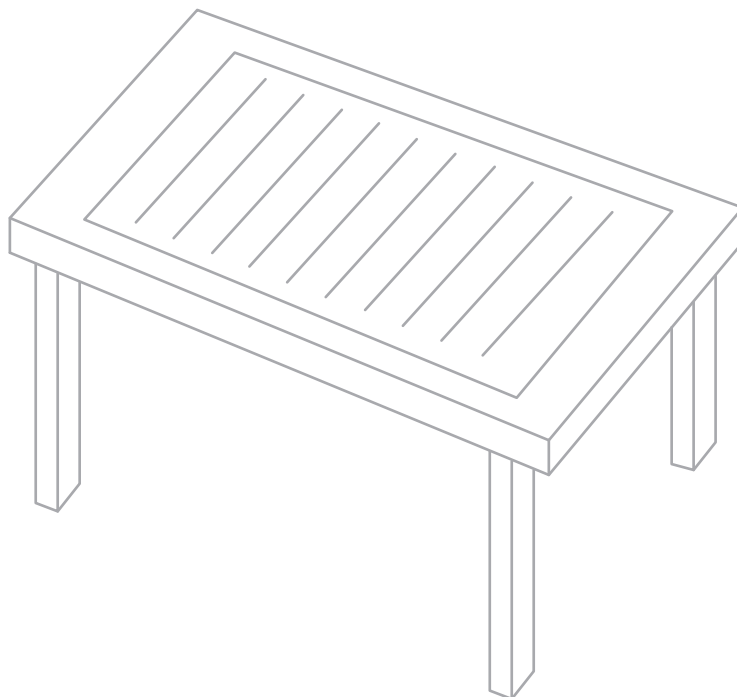
The outdoor table must:

- fold away flat but still provide a level surface when it is in use
- provide a method to hold the insulated cup without the risk of it being tipped over
- include a method that prevents the table from sinking into the ground that is also detachable.

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

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

(6)



(b) Figure 10 shows an aluminium retail display unit for a pair of glasses.

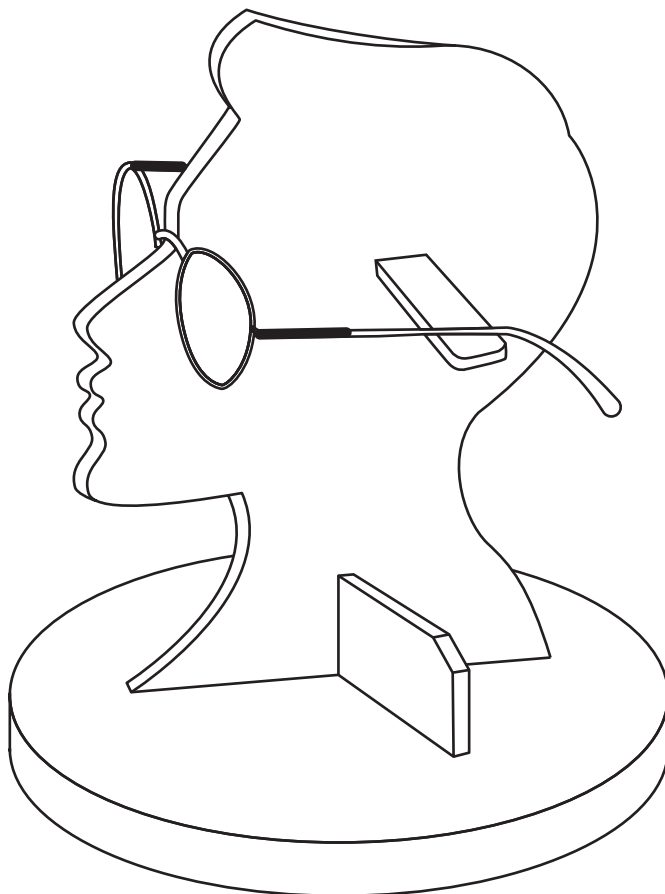


Figure 10

Explain **two** ways that the retail display unit meets, or fails to meet, the criteria of providing a secure way to display the glasses.

(4)

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(Total for Question 5 = 10 marks)



6 Figure 11 shows a candle holder made from sustainable metals.

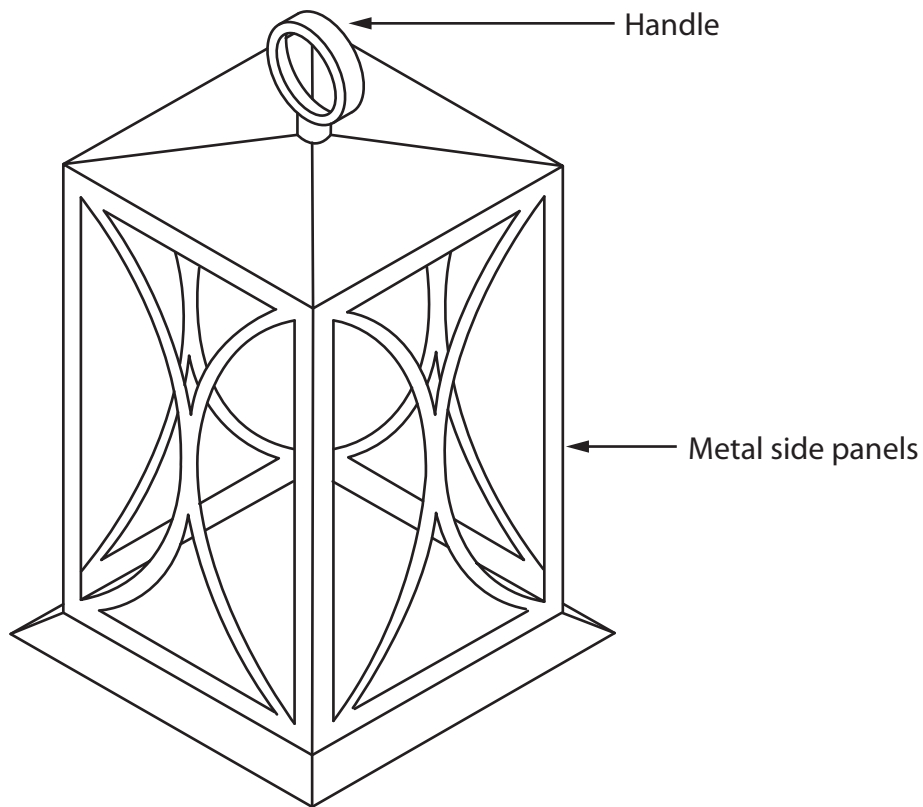


Figure 11

(a) Explain **two** advantages of manufacturing the candle holder from sustainable metals.

(4)

1

2

(b) Figure 12 shows the handle separated from the lid of the candle holder.

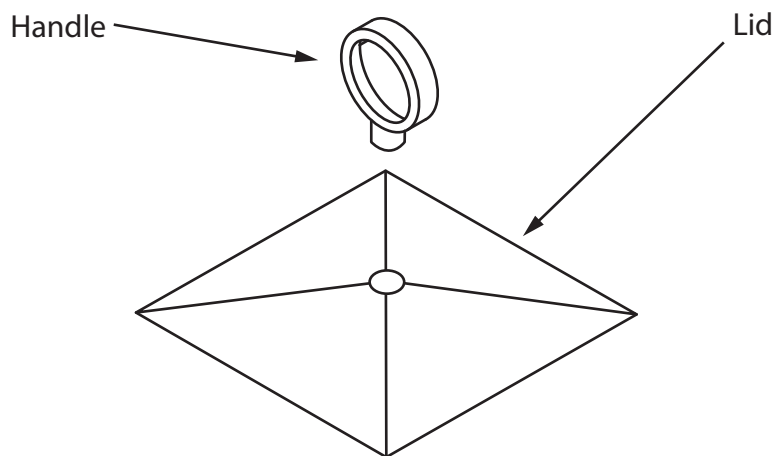


Figure 12

Use notes and sketches, in the space below, to show how the handle and the lid are joined by brazing.

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

(4)

Blank space for student response.



(c) Explain **one** reason for using different metals for different parts of the candle holder.

(2)

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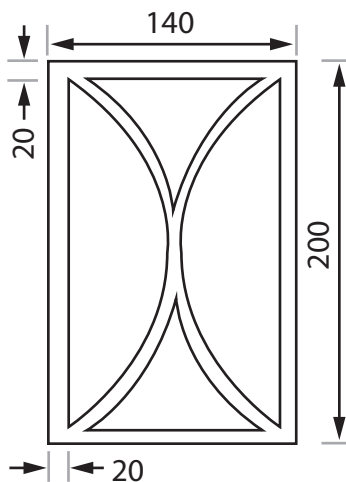
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(d) Figure 13 shows one of the side panels of the candle holder.

The side panels are to be manufactured from sheet metal in a batch of 1000.



All dimensions in mm

Figure 13

Name **two** different techniques that could be used to batch produce the side panels.

Explain **one** advantage of using each technique.

(6)

Technique 1

Explanation

Technique 2

Explanation

(Total for Question 6 = 16 marks)



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7 Figure 14 shows an interior wall lamp made from aluminium and brass.

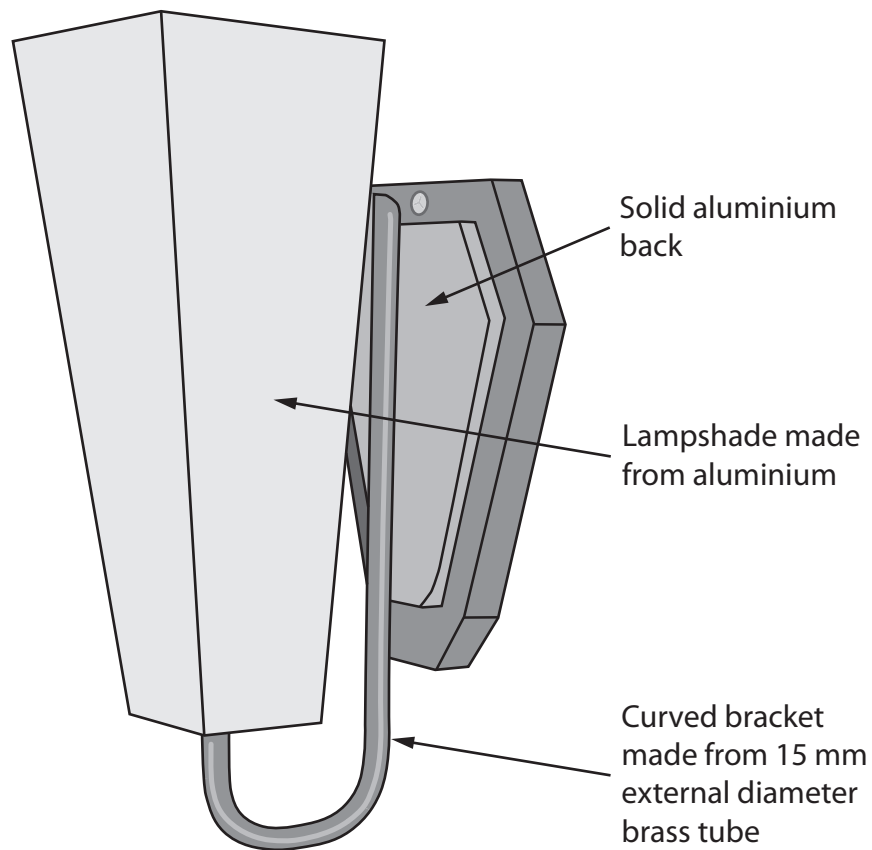


Figure 14

(a) Name **one** surface finish or surface treatment that could be applied to the aluminium back.

(1)



(b) The brass tube for the curved bracket has been cut from a 2400 mm length of stock material.

The stock material is 15 mm diameter brass tube.

Explain **two** reasons for using a stock-sized brass tube.

(4)

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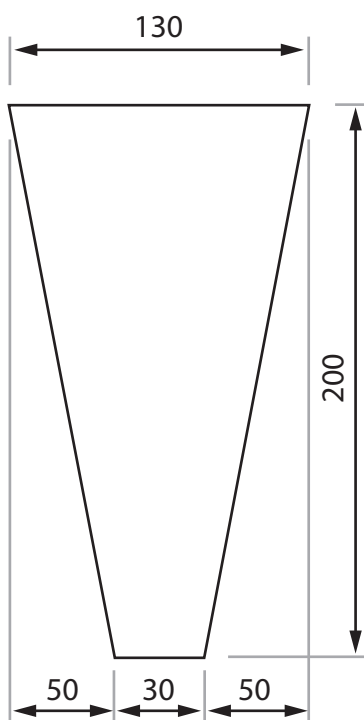
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(c) Figure 15 shows the dimensions for one side of the aluminium lamp shade.



All dimensions in mm

Diagram not to scale

Figure 15



Calculate the maximum number of whole lamp shade sides that could be cut from a length of aluminium measuring 320 cm long by 20 cm wide.

Ignore the width of any cuts.

(5)

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Answer whole sides



(d) Explain **two** working properties of brass that make it an appropriate choice of material for the curved bracket.

(6)

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(Total for Question 7 = 16 marks)

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8 Figure 16 shows a set of steel cutlery.



(Source: © grey_and/Shutterstock)

Figure 16

(a) (i) Explain **one** cost factor that will affect the choice of steel for the cutlery.

(2)

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(ii) It is decided that the cutlery will be manufactured from stainless steel.

Explain **one** working property of stainless steel that makes it suitable for the cutlery.

(3)

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(b) Explain **two** negative effects on the environment of producing stainless steel.

(4)

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(c) The cutlery sets are manufactured in North America and transported worldwide.

Figure 17 shows a table with information about the cutlery sets.

Scale of production	Mass
Material	Stainless steel
Material source	USA, Russia and Sweden
Size of the set	200 mm x 200 mm x 50 mm
Surface finish	Polished

Figure 17

Analyse the information in Figure 17.

Evaluate the cutlery sets with reference to their social footprint including:

- trend forecasting
- impact of extraction on communities
- ease and difficulty of recycling and disposal.

(9)

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(Total for Question 8 = 18 marks)

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

