TECHNOLOGY — UNIT FOUR - Material Types, Properties & Structures

TIMBERS

SOFT		HARD				MANUFACTURED	
PINE	CEDAR	MAHOGANY	BEECH	BALSA	OAK	PLYWOOD	MDF

METALS

FERROUS			NON-FERROUS		
CAST IRON	STAINLESS STEEL	MILD STEEL	ALUMINIUM	BRASS	COPPER

POLYMERS

THERMOFORMING			THERMOSETTING	
ACRYLIC	HIGH IMPACT POLYSTYRENE	BIOPOL	POLYESTER RESIN	UREA FORMALDEHYDE

PAPERS AND BOARDS

PAPERS			BOARDS		
COPIER PAPER	CARTRIDGE PAPER	TRACING PAPER	FOLDING BOXBOARD	CORRUGATED CARDBOARD	SOLID WHITE BOARD

FIBRES AND FABRICS

NATURAL FIBRES		SYNTHETIC FIBRES	
ANIMAL (**e.g. wool**)	PLANT (**e.g. cotton**)	POLYESTER	ACRYLIC

WOVEN TEXTILES		NON-WOVEN TEXTILES	KNITTED TEXTILES	
PLAIN WEAVE (calico)	TWILL WEAVE (denim)	FELTED WOOL FABRIC	BONDED FIBRES/WEBS	WARP-KNITTED	WEFT-KNITTED

KEYWORDS

Hardwood	Comes from a tree with broad leaves
Softwood	Comes from a tree with needle-like trees and seeds in a cone
Grain	Fibres run the length of a tree trunk, which gives its strength and pattern
Evergreen	A tree that keeps its leaves all year round
Veneer	A thin slice of wood (1mm thick). Used to decorate and to make plywood
Hard	How well a material stops deformation, indentation and penetration
Tough	How well a material can handle being hit
Durable	How well and long a material lasts
Alloy	A mix of two or more metals or elements with improved properties and traits
Ductility	Can deform by bending, twisting, stretching but not breaking. ^ with temperature
Malleability	Can permanently deform in all directions without fracture. ^ with temperature
Synthetic Polymer	Made mostly from oil, referred to as plastic
Thermoforming	Can be reshaped by application of heat; can be recycled
Thermosetting	Cannot be reshaped/reformed by reheating; cannot be recycled
HIPS	High impact polystyrene – most commonly used for vacuum forming
GRP	Glass reinforced plastic: A composite of polyester resin and glass fibres
Insulator	A material with low conductivity preventing electrical current or heat to flow
PVC	A thermoplastic containing chlorine and carbon
Paper	Flat material made from natural fibres weighing less than 220gsm
Board	Thick paper or layers of paper more than 220gsm in weight
Fibres	Thread like elements that can be formed into yarns and fabrics
Fabric	A length of flexible material constructed from fibres
Staple	The length of a fibre
Monomer	A molecule that can be bonded to similar molecules to form long chains

MATERIAL PROPERTIES

TIMBERS

Hardness
Ability to withstand cutting and scratching. Timber is quite soft in general and can be damaged by metal. Oak is hard for a wood but Balsa is soft.

Toughness
Ability to withstand being hit. A tough material can be soft and might bend or deform when hit, but not break.

Durability
Ability to last a long timer. Dried timber is very durable. Oak beams in old buildings can be centuries old. Wet timber can rot quite quickly

METALS

The mechanical properties of metals tells use how they will react to forces. A temporary change is called **elastic deformation** (meaning it can spring back to its original form) but a permanent change is called **plastic deformation** (meaning it stays in its new shape)
All ductile materials are malleable but not all malleable materials are ductile. Both ductility and malleability increase with temperature in a metal – as it heats up, it gets more ductile and more malleable. Hard metals are often brittle and bread easily.

POLYMERS

Polymers are **insulators of heat** and **electricity** and are commonly used to increase the safety of products, such as handles on saucepans or covering metal wires in electronic products using PVC.
Polymers are mostly tough. They can withstand rough handling so they are suitable for a range of products that need to be used for a long time e.g. bins, classroom chairs, car bumpers. Some polymers will fatigue (tire and wear down) and fail to perform.

PAPERS AND BOARDS

The properties may affect the quality of the finished product.
Flexibility is the amount a material bends when a force is applied. This is determined by its thickness & weight.
Printability is how well material can accept a printed image onto its surface. This is affected by the surface properties such as the smoothness. It's not the same as print quality.
Biodegradability is the ability to be broken down by bacteria or other biological means. Uncoated papers products can biodegrade. If it happens in less than 12 weeks, its compostable.

FIBRES AND TEXTILES

Elasticity: amount of stretch. Tested by gradually increasing the force on fibres until it breaks. Clothes that have high flexibility will maintain their shape and not crease as much
Resilience: Resistance to being deformed or compressed. Fibres should spring back vigorously after pressure is applied. Loft is the ability to return to original thickness after being compressed or squashed. Also the ability to resist creasing.
Durability: ability to resist wear. Depends on the choice of fibres and fabrics and the user's activities & size.

https://www.bbc.co.uk/bitesize/examspecs/zb6h92p Exam

https://www.technologystudent.com/despro_flsh/NEW_GCSE3.html Exam

https://www.technologystudent.com/despro_flsh/nea1.html NEA

Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Friday 24 May 2019

Afternoon (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**.

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

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- 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.

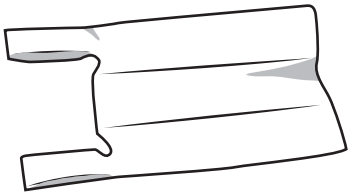
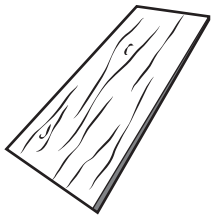
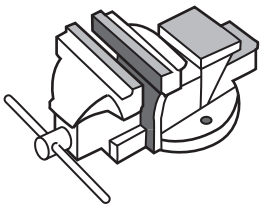
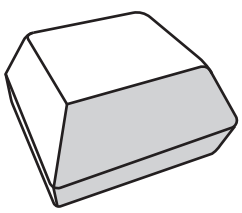
Product	Product material	Property
	Biodegradable plastic shopping bag	Will degrade in soil
	Cedar roof tile	(1) (i) .....
	Cast iron workshop vice	(1) (ii) .....
	Polyester raincoat	(1) (iii) .....
	Solid white board burger package	(1) (iv) .....

Figure 1

(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)

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.

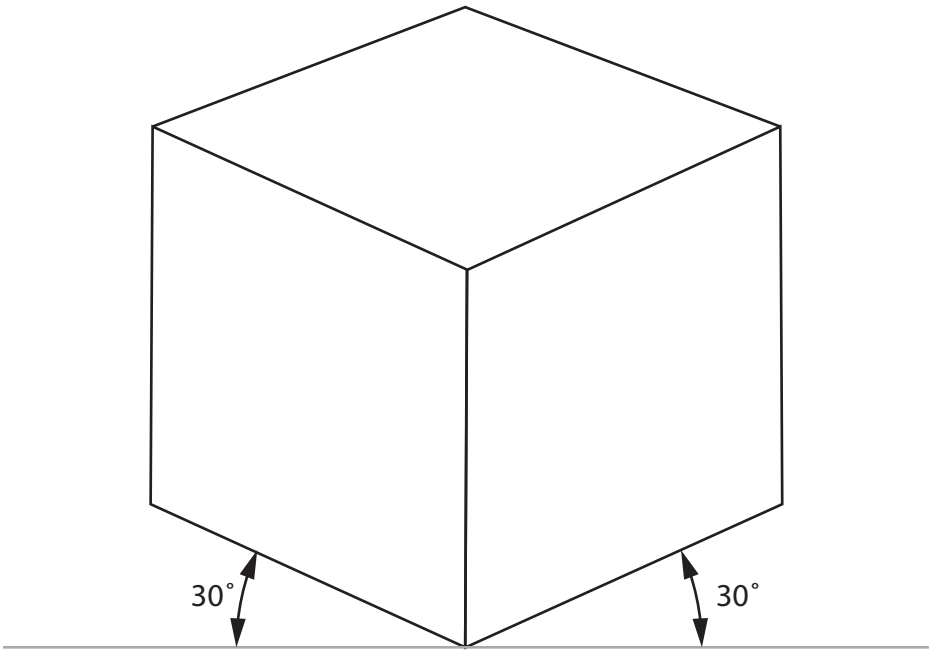

Figure 3

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

(1)

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(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

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(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.

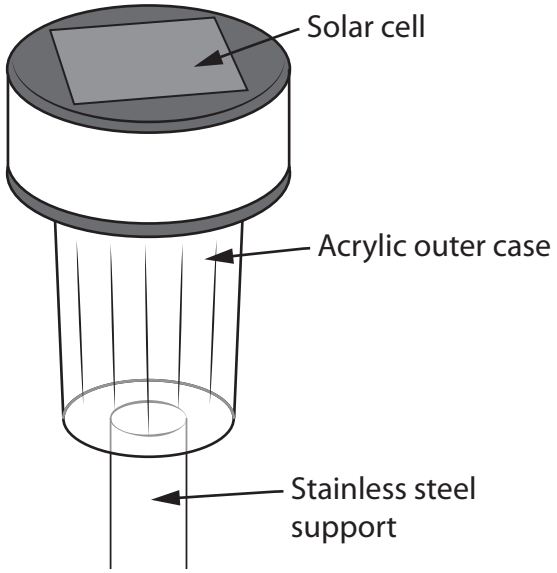

Figure 4

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

(1)

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(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)

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(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)

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(d) The solar cell used in the solar powered garden light costs 1/12th 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)

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

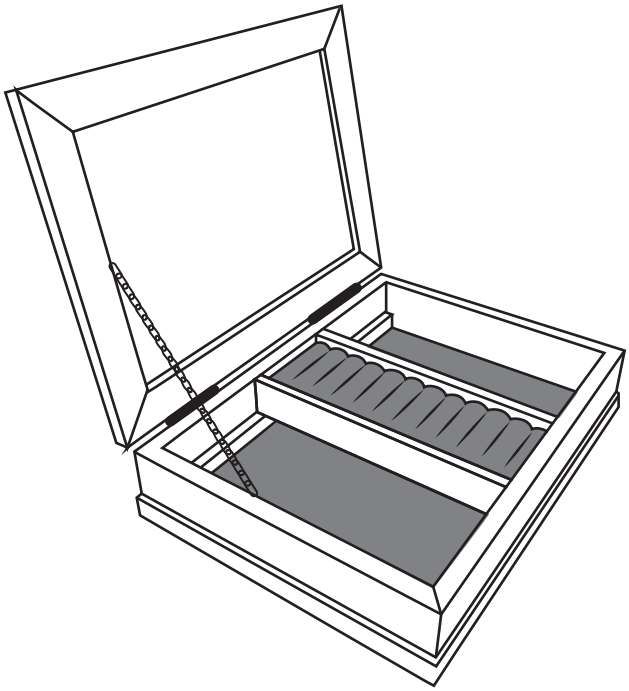

Figure 5

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

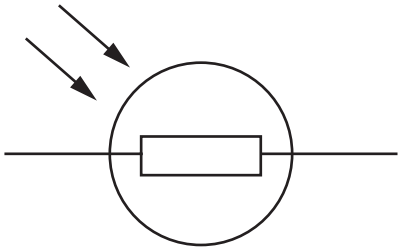

Figure 6

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

(1)

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(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)

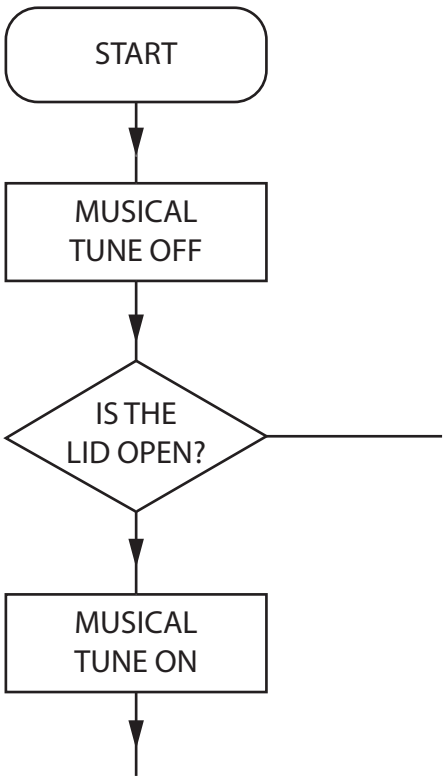


Figure 7

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

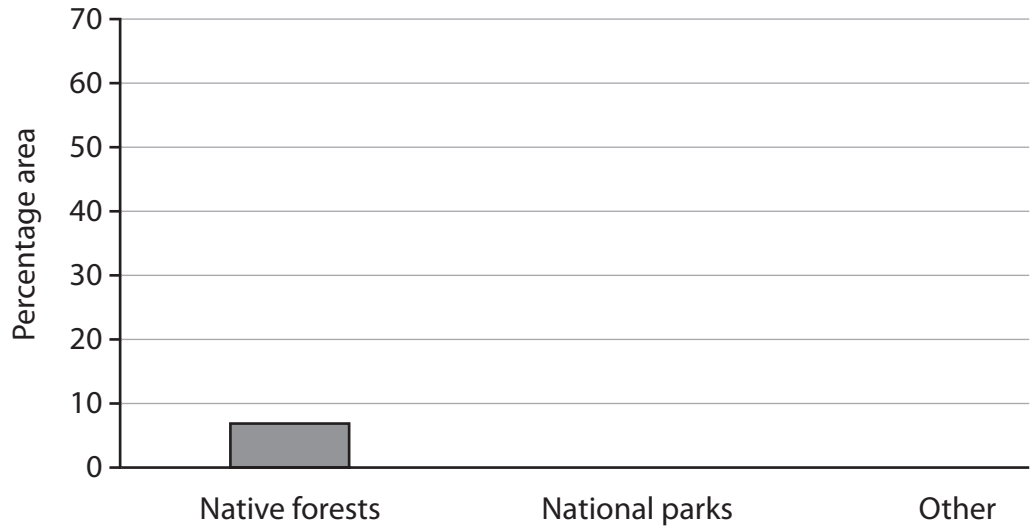
Sources of mahogany	Percentage grown in each area (%)
Native forests	7
National parks	30
Other	63

Figure 8

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

The first one has been done for you.

(2)



(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)

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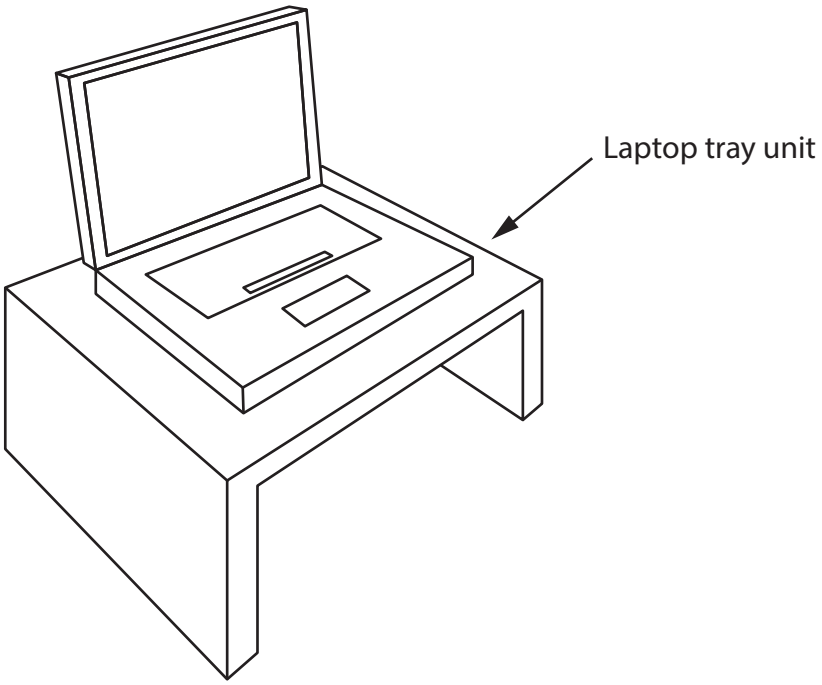
(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS

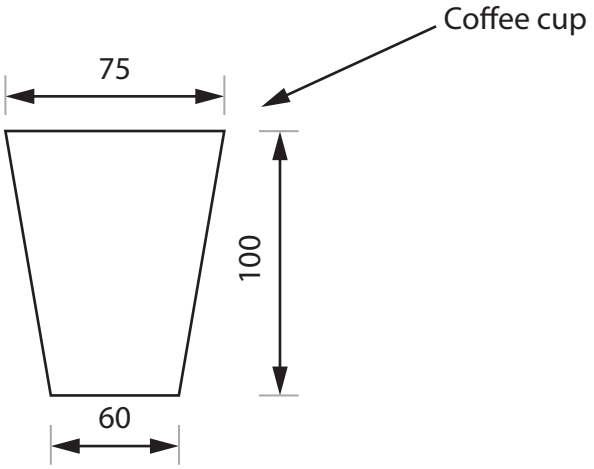
SECTION B – TIMBERS

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

5 Figure 9 shows a design solution for a laptop tray unit together with some additional information.



Additional information



All dimensions in mm

Figure 9

(a) The laptop tray unit needs to be improved to include the following specification points.

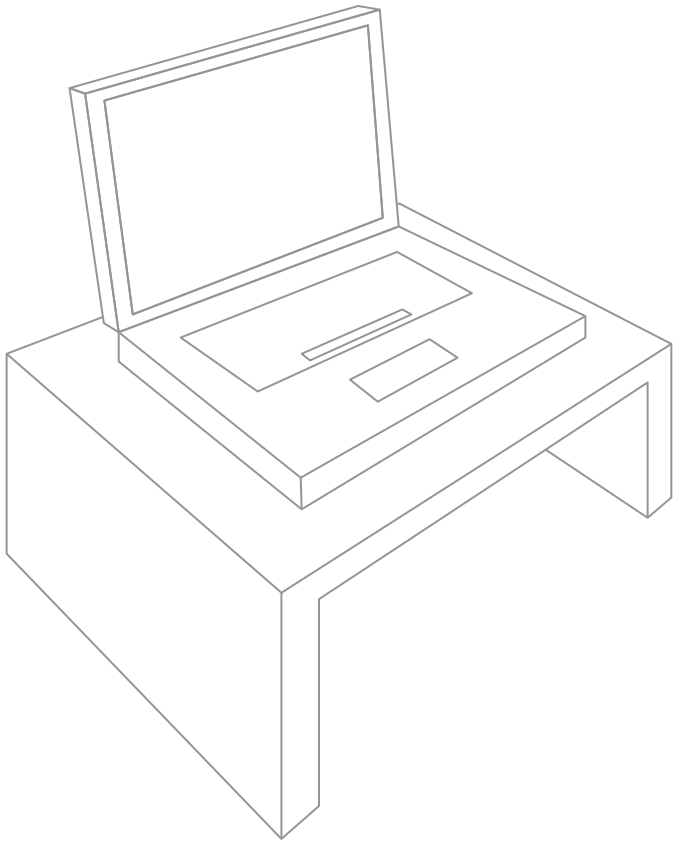
The laptop tray unit must:

- fold away flat but still provide a rigid platform to work on
- provide a method to hold the coffee cup without the risk of it being tipped over
- provide an additional writing surface that is flat and wipe clean.

Use notes and sketches, on the outline below, to show how the laptop tray unit 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 a medium density fibreboard (MDF) retail display unit for a pair of glasses.

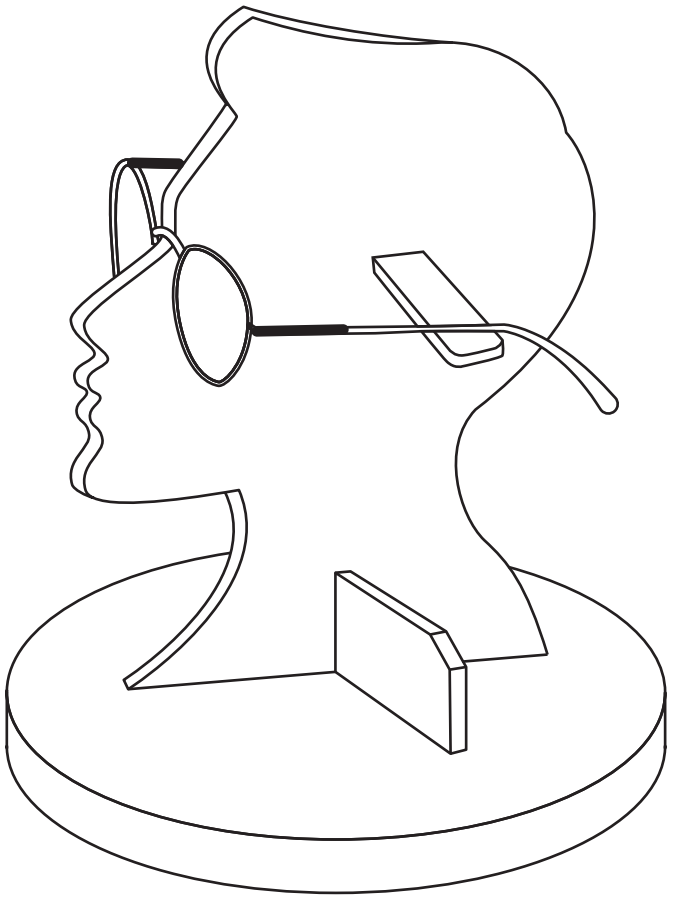


Figure 10

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 toy creature made from sustainable timber.

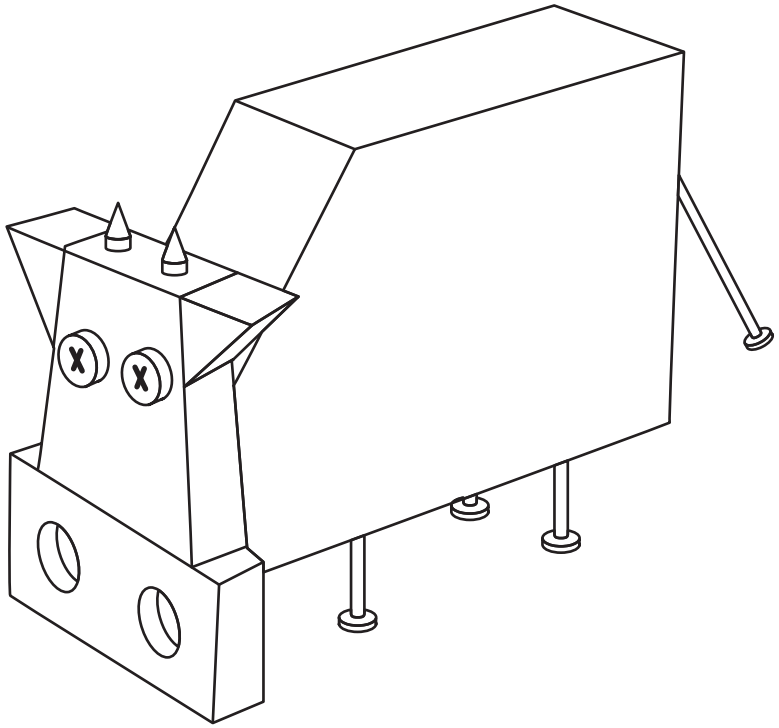

Figure 11

(a) Explain **two** advantages of manufacturing the toy creature from sustainable timber.

(4)

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(b) Figure 12 shows a side view of the head section of the toy creature separated from the main body.

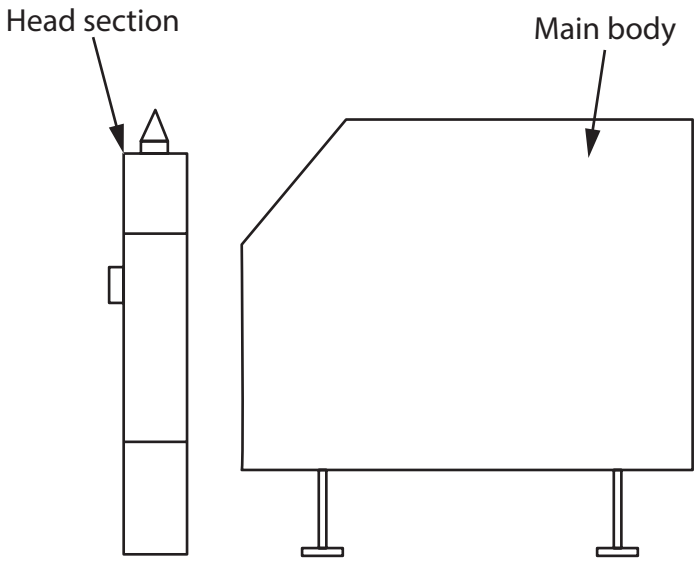

Figure 12

Use notes and sketches, in the space below, to show how the head section would be joined to the main body using a screw.

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

(4)

(c) Explain **one** reason for using different natural timbers for different parts of the toy creature.

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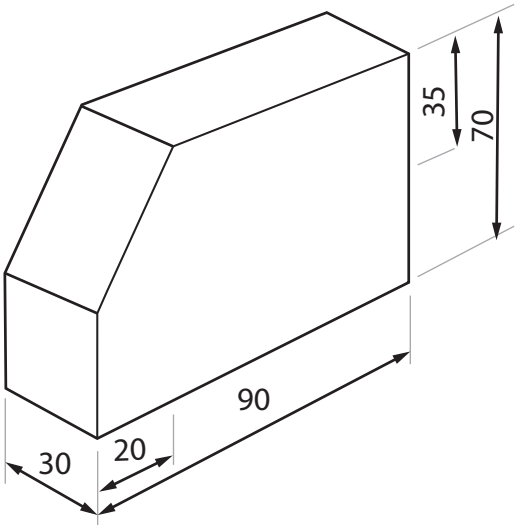
(d) Figure 13 shows the main body for the toy creature.

The bodies are to be manufactured from pine in a batch of 1000.



All dimensions in mm

Figure 13

Name **two** different techniques that could be used to batch produce the main body.

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

(6)

Technique 1

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Explanation

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Technique 2

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Explanation

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(Total for Question 6 = 16 marks)

7 Figure 14 shows a child's wooden toy made from pine and beech.

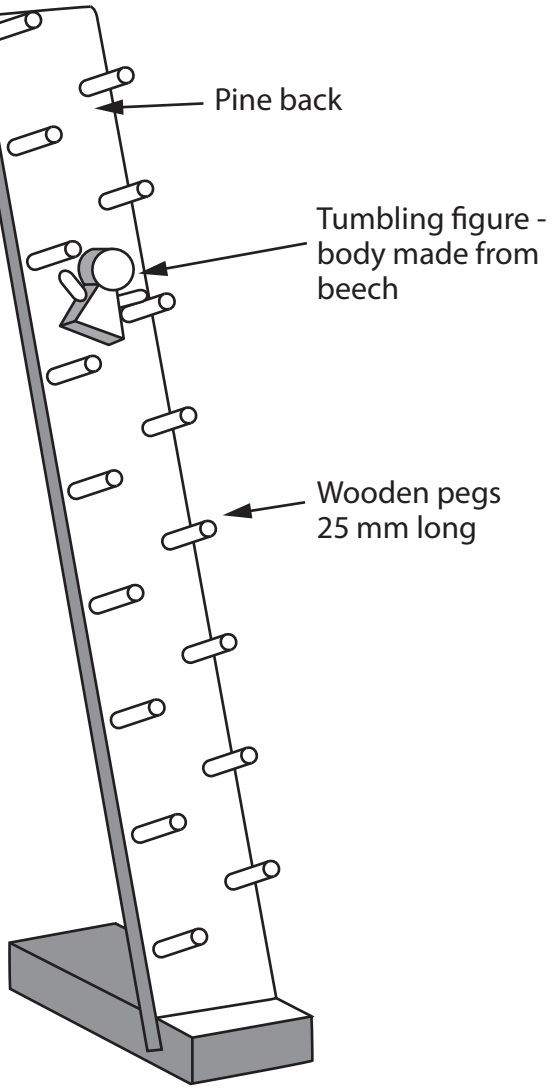

Figure 14

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

(1)

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(b) The wooden pegs have been cut from 600 mm lengths of stock material.

The stock material is 6 mm diameter wooden dowel.

Explain **two** reasons for using a stock-sized wooden dowel.

(4)

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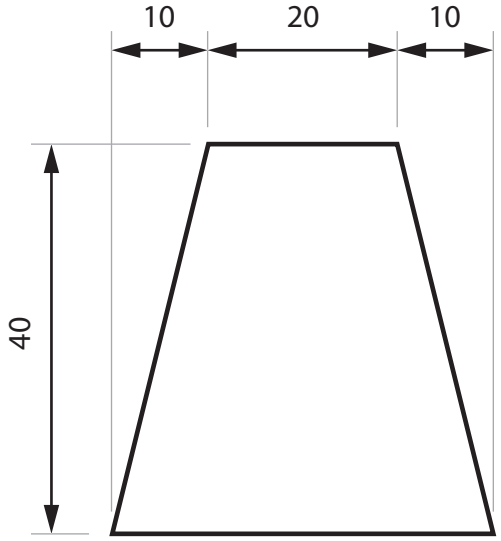
(c) Figure 15 shows the dimensions for the body of the tumbling figure.



All dimensions in mm

Diagram not to scale

Figure 15

Calculate the maximum number of whole bodies that could be cut from a length of timber measuring 181 cm long by 4 cm wide.

Ignore the width of any cuts.

(5)

Answer ..... whole bodies

(d) Explain **two** working properties of beech that make it an appropriate choice of material for the body of the tumbling figure.

(6)

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(Total for Question 7 = 16 marks)

8 Figure 16 shows a pine roof truss for a house.

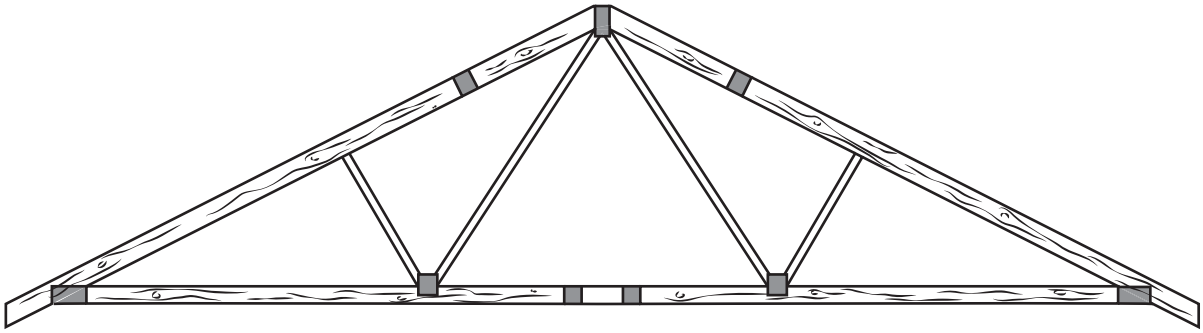

Figure 16

(a) (i) Explain **one** reason for applying a fireproof treatment to the roof truss.

(2)

(ii) Explain **one** working property of pine that makes it suitable for the roof truss.

(3)

(b) Explain **two** advantages of genetically engineering timber for use in the house building industry.

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(c) The roof trusses are manufactured in Europe and transported worldwide.

Figure 17 shows a table with information about the roof truss.

Scale of production	Mass
Material	Pine
Material source	Alpine forests
Size	6 m long 3 m high
Surface finish	Fireproof coating

Figure 17

Analyse the information in Figure 17.

Evaluate the roof trusses with reference to their social footprint including:

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

(9)

(Total for Question 8 = 18 marks)

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

Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Friday 22 May 2020

Afternoon (Time: 1 hour 45 minutes) | Paper Reference **1DT0/1F**

Design and Technology

Component 1: Timbers

You must have:
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Total Marks

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Turn over ▶

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P 6 2 7 4 4 A 0 1 2 8

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.

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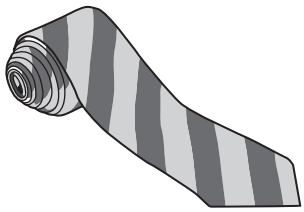
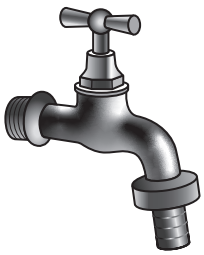
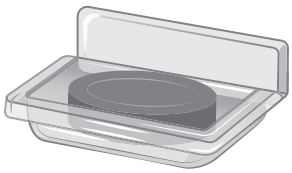
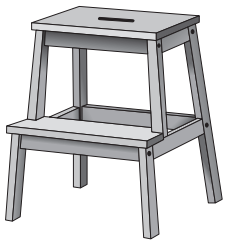
Picture of product	Material and product	Property
	Polyester school tie	Crease resistant
	Brass garden tap	**(1)** (i) .....
	Acrylic soap tray	**(1)** (ii) .....
	Folding box board breakfast cereal box	**(1)** (iii) .....
	Beech kitchen steps	**(1)** (iv) .....

Figure 1

(b) The school tie is made from a piece of fabric measuring 135 cm long by 9 cm wide.

The fabric is supplied in a roll that is 90 mm wide and costs £3.55 per metre.

The fabric can be bought to the nearest cm.

Calculate the cost of fabric required to make one tie giving your answer in pounds (£) to 2 decimal places (dp).

(2)

Cost £ .....

(c) An advantage of using polyester for the school tie is that it is crease resistant.

Explain **one** other advantage of using polyester for the school tie.

(2)

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(Total for Question 1 = 8 marks)

2 Figure 2 shows a bending jig that is used to make three separate, different-sized wire flowers for some jewellery.

The flowers are formed by wrapping copper wire around the different-sized circles.

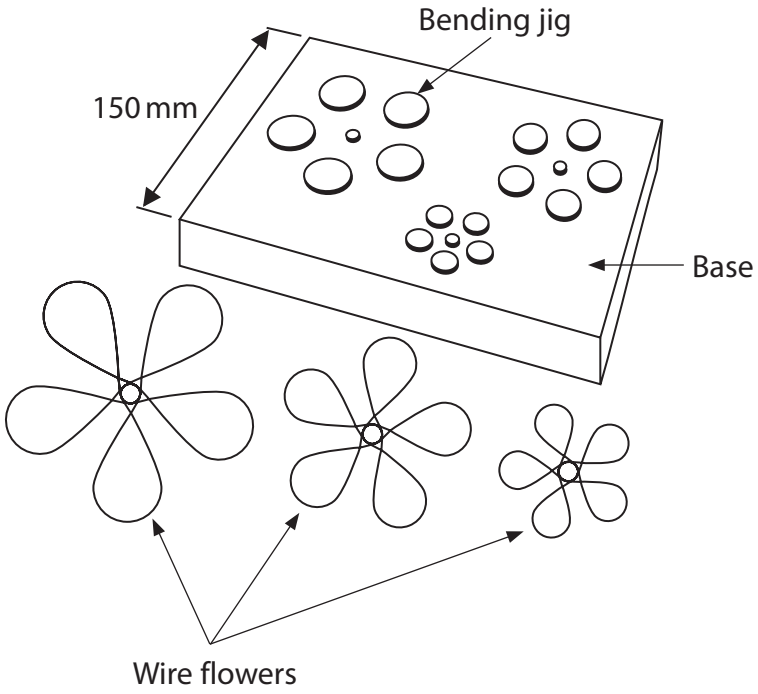

Figure 2

(a) Name **one** manufactured timber that could be used to make the base of the bending jig.

(1)

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(b) Prototype wire flowers were made using shape memory alloys (SMAs) to test the design before producing the final product from copper wire.

Explain **one** reason for using SMAs to make the prototype wire flowers.

(2)

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Figure 3 shows two of the circles used on the bending jig.

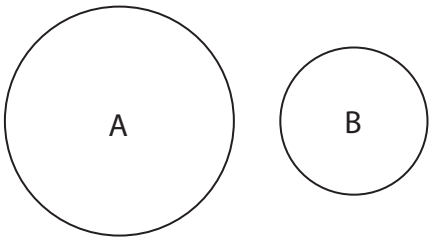

Figure 3

Diagram not to scale

The two circles have different diameters in the ratio of 5:3.

(c) (i) Calculate the radius of circle B if circle A has a radius of 35 mm.

(2)

Radius of circle B ..... mm

(ii) Calculate the area of circle A giving your answer to the nearest cm^2.

(2)

Use $\pi = 3.142$

Area of circle A ..... cm^2

(d) Explain **one** reason why copper wire was used to make the flowers.

(2)

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(Total for Question 2 = 9 marks)

3 Figure 4 shows a games controller.

The case is made from high impact polystyrene (HIPS).

Figure 4

(a) Other than impact resistance, give **one** property of HIPS that makes it an appropriate material from which to make the case.

(1)

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(b) The games controller is only sold online and is sent through the post in a corrugated board package.

Explain **one** reason for using corrugated board to make the package.

(2)

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(c) The manufacturer is developing a new games controller that uses robotic materials.

Explain **one** way that robotic materials can be used in the new games controller.

(2)

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(d) The original games controller cost £12.50 and the new games controller costs £19.00.

Calculate the percentage increase in the cost of the new games controller.

(2)

Percentage increase ..... %

(e) Explain **two** environmental issues related to the development and release of the new games controller.

(4)

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(Total for Question 3 = 11 marks)

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4 Figure 5 shows a picture of a firefighter.

(Source: © John Kasawa/Shutterstock)

Figure 5

The firefighter's uniform has electronic sensors built into it to detect heat.

(a) Name an electronic sensor that is used to sense heat.

(1)

.....

(b) The firefighter's uniform is made from protective textiles.

Explain **one** disadvantage for the firefighter of wearing a uniform made from protective textiles.

(2)

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(c) The firefighter's uniform contains an electronic system which is powered by a small 9V battery.

(i) Draw the circuit symbol for a battery in the space below.

(1)

Figure 6 shows some information about the battery and the consumption rate for the electronic system used in the firefighter's uniform.

Analyse the information.

Battery capacity (mAh)	1000
Load current (mA)	350
Consumption rate	0.7

Figure 6

(ii) Calculate the battery life for the electronic system used by the firefighter's uniform.

Use the formula below to calculate the answer.

Give your answer in minutes.

(2)

$$\text{Load current (mA)} = \frac{\text{Battery capacity (mAh)} \times \text{Consumption rate}}{\text{Battery life (hours)}}$$

Battery life ..... minutes

(d) Discuss the use of video conference meetings by companies around the world to develop new technologies for firefighters.

(6)

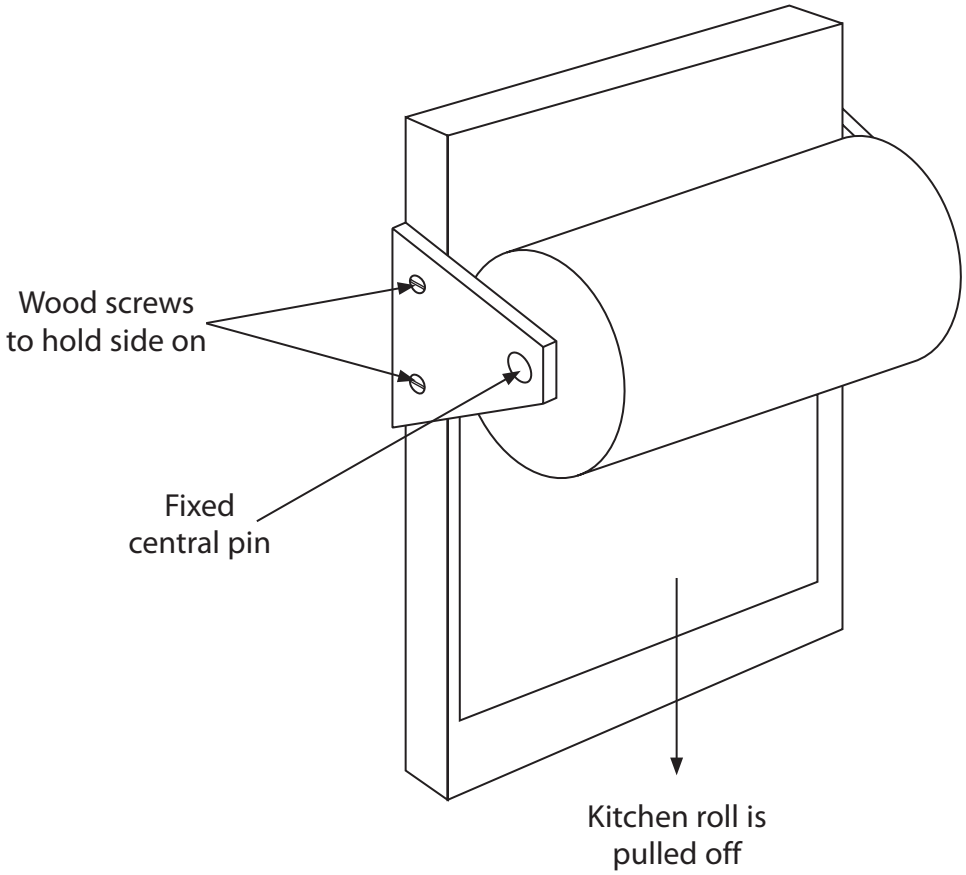
(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS

SECTION B – TIMBERS

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

5 Figure 7 shows a design solution for a kitchen roll holder together with some additional information.



Additional information

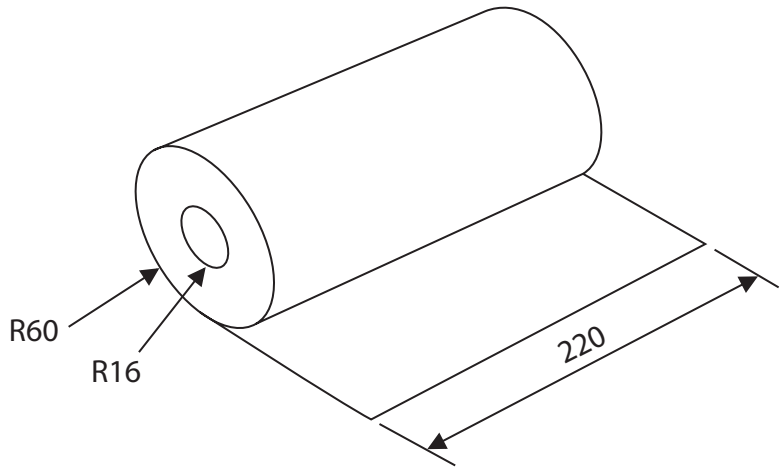


Figure 7

All dimensions in mm

(a) The kitchen roll holder needs to be improved to include the following specification points.

The kitchen roll holder must:

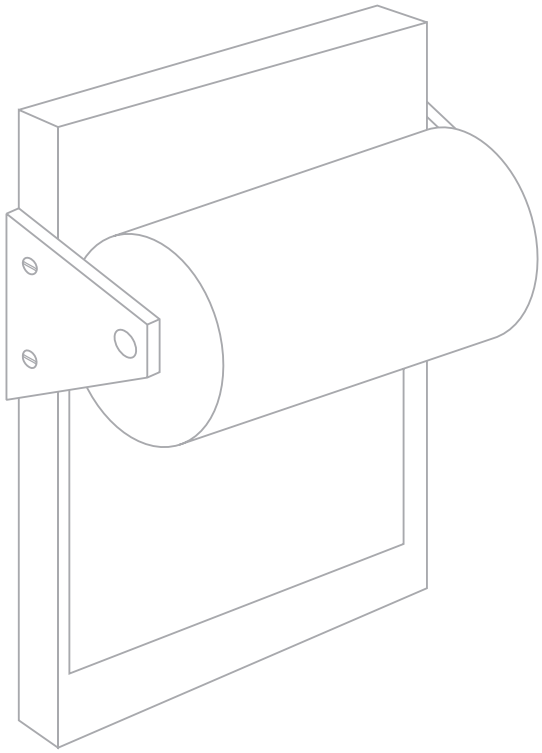
- allow an empty kitchen roll to be removed easily and replaced securely
- be held vertically on a wall and not move when the kitchen roll is pulled off
- provide easily accessible storage space for a spare kitchen roll

Use notes and sketches to show how the kitchen roll holder 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.

Use the outline of the original design solution to show your modifications.

(6)



(b) Figure 8 shows some examples of laser cut vegetable markers that are used by gardeners to show where they have planted specific vegetables in the garden.

They are manufactured from 3 mm thick pine and are 150 mm long.

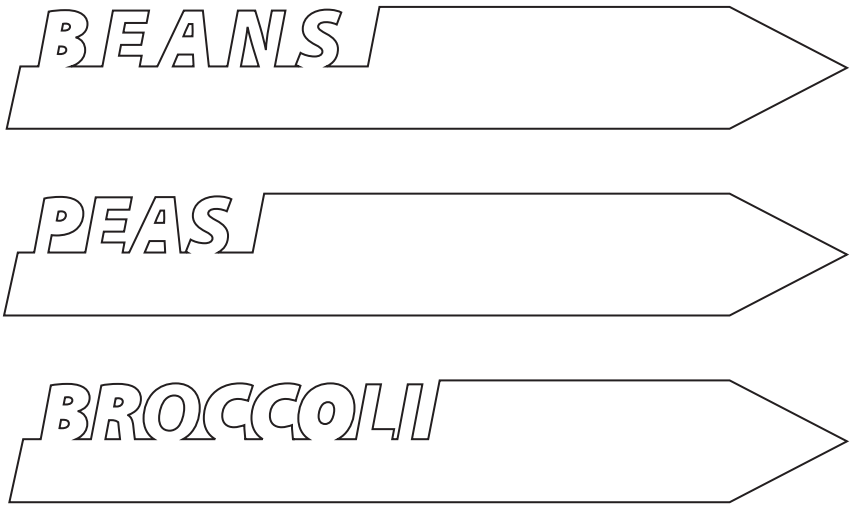


Figure 8

Explain **two** ways that the vegetable markers meet or fail to meet the criteria of providing a method to show where specific vegetables are planted in the garden.

(4)

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(Total for Question 5 = 10 marks)

6 Figure 9 shows a hammer. The hammer handle is made from ash.

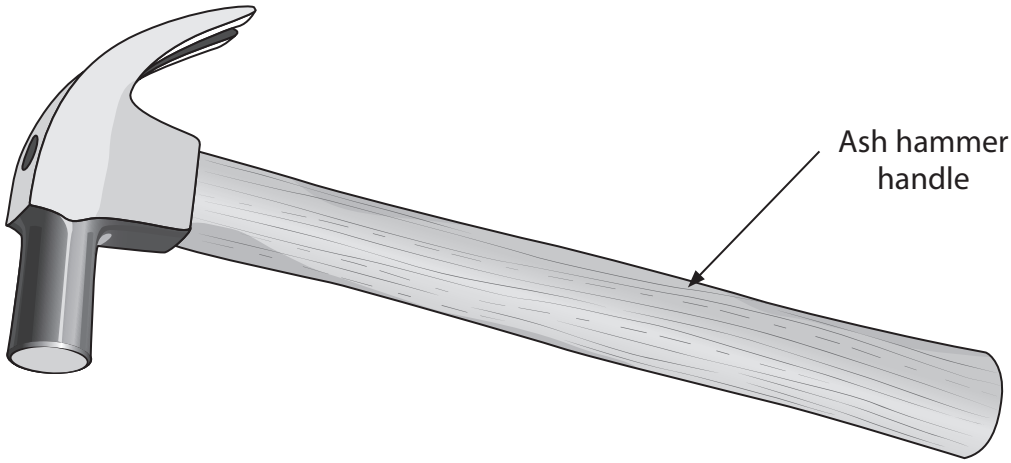

Figure 9

(a) Explain **two** availability factors that could result in ash becoming a difficult timber to source.

(4)

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(b) The hammer handle has been varnished.

Use notes and sketches to show how the surface of the hammer handle should be prepared and varnished.

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

(4)

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(c) Timber for the hammer handle is supplied to the manufacturer as PSE.

Explain **one** reason why the manufacturer would buy PSE timber to make the hammer handle.

(2)

(d) Give **two** different properties of ash that make it an appropriate choice of material for the hammer handle.

For each property, explain **one** advantage of using ash for the hammer handle.

(6)

Property 1

Explanation

Property 2

Explanation

(Total for Question 6 = 16 marks)

7 Figure 10 shows a table top game and one of the nails used to assemble it.

The shapes are formed using nails.

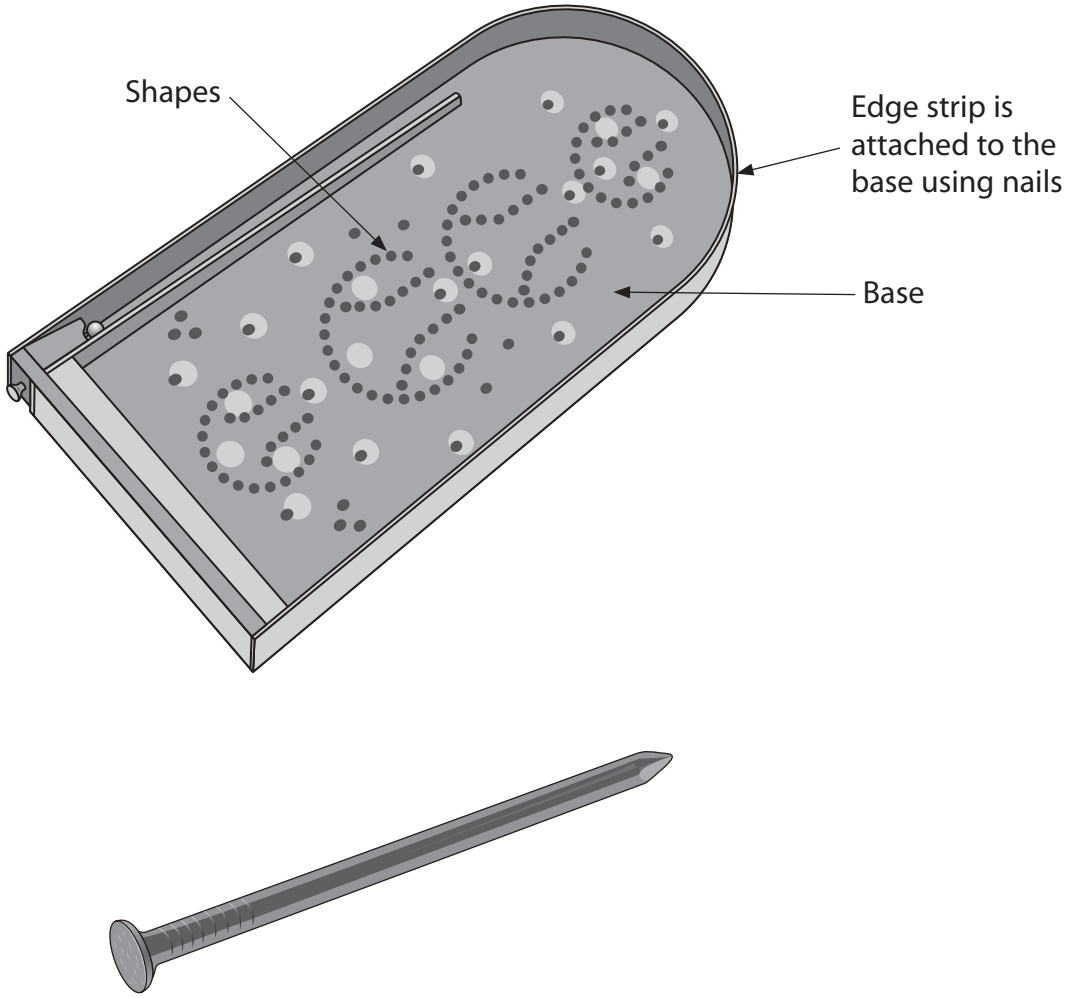

Figure 10

(a) Name the specific type of nail shown in Figure 10.

(1)

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Figure 11 shows a template that is used when marking out the base of the table top game.

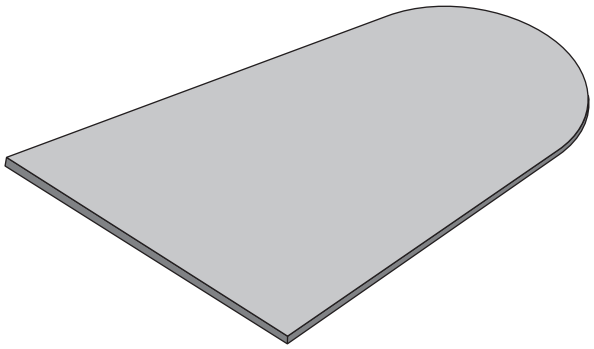

Figure 11

(b) Explain **two** advantages of using a template to mark out the game base when manufacturing in large quantities.

(4)

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2 .....

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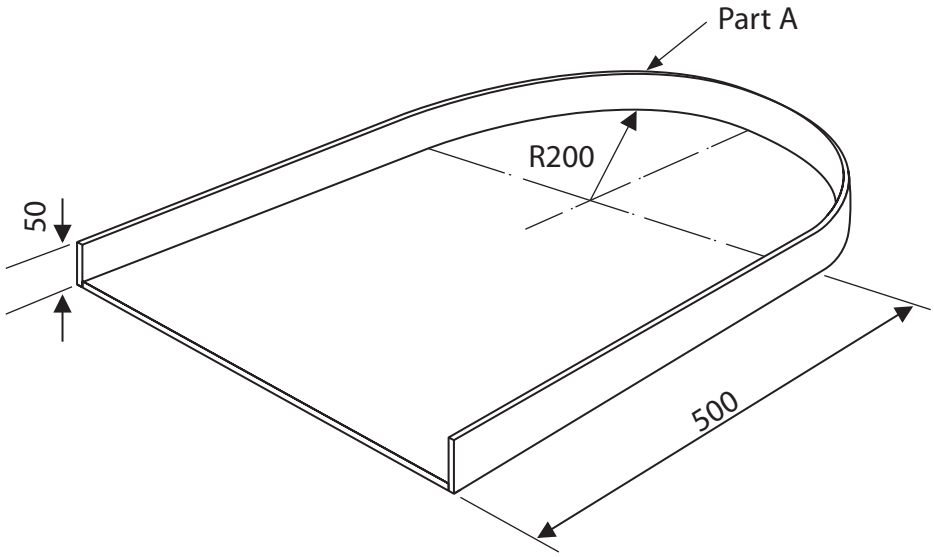
Figure 12 shows the dimensions for the base of the table top game.



All dimensions in mm

Figure 12

Use $\pi = 3.142$

Curved surface area of an open cylinder = $2\pi rh$

(c) Calculate the whole internal surface area of Part A, the edge strip, that goes around the base as shown.

Give your answer to the nearest whole cm^2.

(5)

Answer ..... cm^2

Figure 13 shows a laminated curved shape.

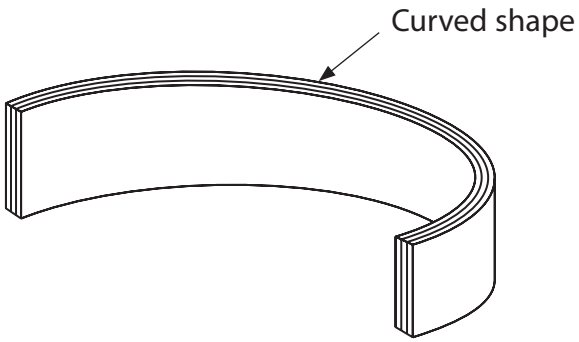


Figure 13

(d) The curved shape is formed from three identical pieces of wood.

Explain **two** reasons for using a bag press to form the curved shape.

(6)

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(Total for Question 7 = 16 marks)

8 Figure 14 shows a wooden toy kit used to make a ship.

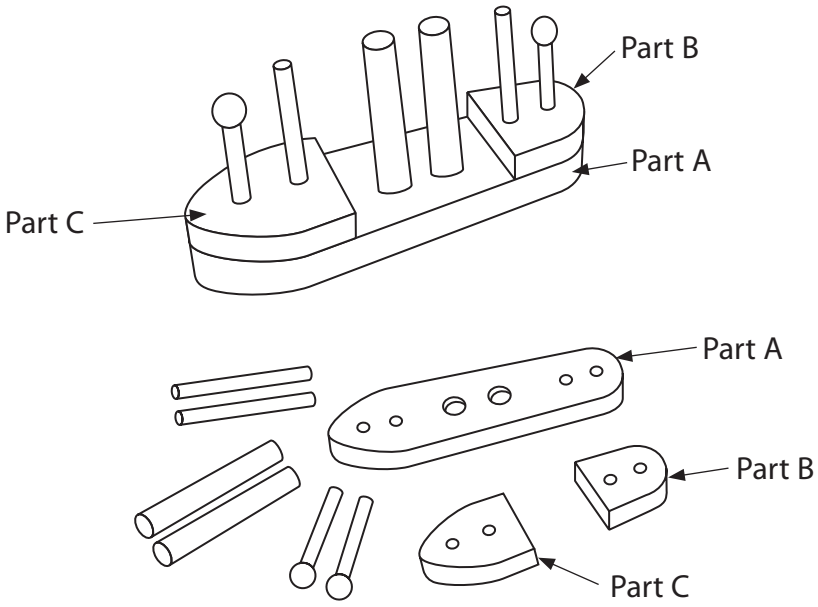

Figure 14

(a) Explain **one** reason for using different coloured stains for the different parts of the toy kit.

(2)

(b) Parts A, B and C have been manufactured from a regular section of timber.

Explain **one** reason for using a regular section of timber to make parts A, B and C.

(3)

(c) Explain **two** reasons why the timber must be seasoned before it can be used to manufacture the toy kit.

(4)

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(d) The wooden toy kits are manufactured in Europe and transported all around the world.

Figure 15 shows information about the toy kits.

Scale of production	Mass
Potential market	World wide
Life span	50 years
Intended market	Parents with children under 5 years old
Surface finish	Coloured stains

Figure 15

Analyse the information in Figure 15.

Evaluate the toy kits with reference to cultural and ethical factors including:

- suitability for intended market
- the consumer society
- built-in product obsolescence.

(9)

(Total for Question 8 = 18 marks)

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

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Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number	Candidate Number

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.
- Good luck with your examination.

Turn over ▶

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P 6 5 5 0 1 A 0 1 2 8

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.

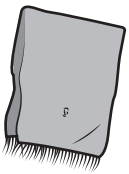
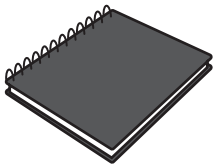
Picture of product	Material and product	Property
	Stainless steel spoon	Corrosion resistant
	Mahogany dining room chair	(1) (i) .....
	High Impact Polystyrene (HIPS) drinking cup	(1) (ii) .....
	Wool scarf	(1) (iii) .....
	Cartridge paper sketch book	(1) (iv) .....

Figure 1

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(b) Explain **one** advantage of using wind to generate energy.

(2)

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As wind turbines get bigger and taller they produce more power.

(c) Figure 2 shows a table of information about two different wind turbines.

	Wind Turbine A	**Wind Turbine B**
Power (kW)	500	800

Figure 2

Calculate how much more power wind turbine B produces in comparison to wind turbine A as a percentage.

(2)

Answer ..... %

(Total for Question 1 = 8 marks)

2 Figure 3 shows a game.

The two sets of cubes are made from contrasting coloured non-ferrous metals.

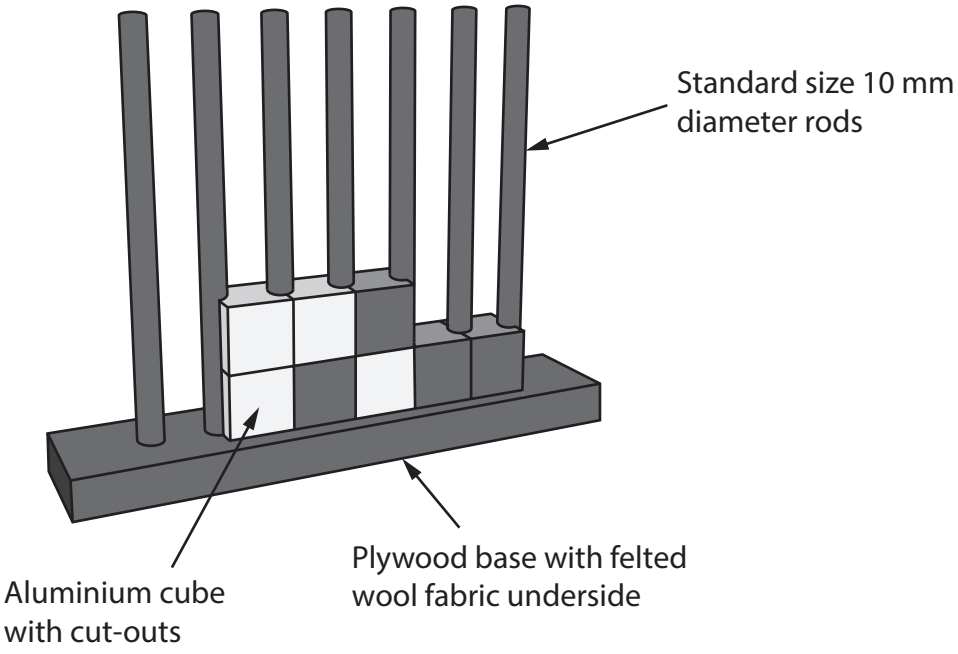

Figure 3

Aluminium is used to manufacture one set of the coloured cubes.

(a) Name **one** other appropriate non-ferrous metal that could be used to make the other set of coloured cubes.

(1)

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(b) Explain **one** reason for using standard sized 10 mm diameter rods.

(2)

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(c) Explain **one** property of felted wool fabric that makes it an appropriate choice of material for gluing to the underside of the plywood base.

(2)

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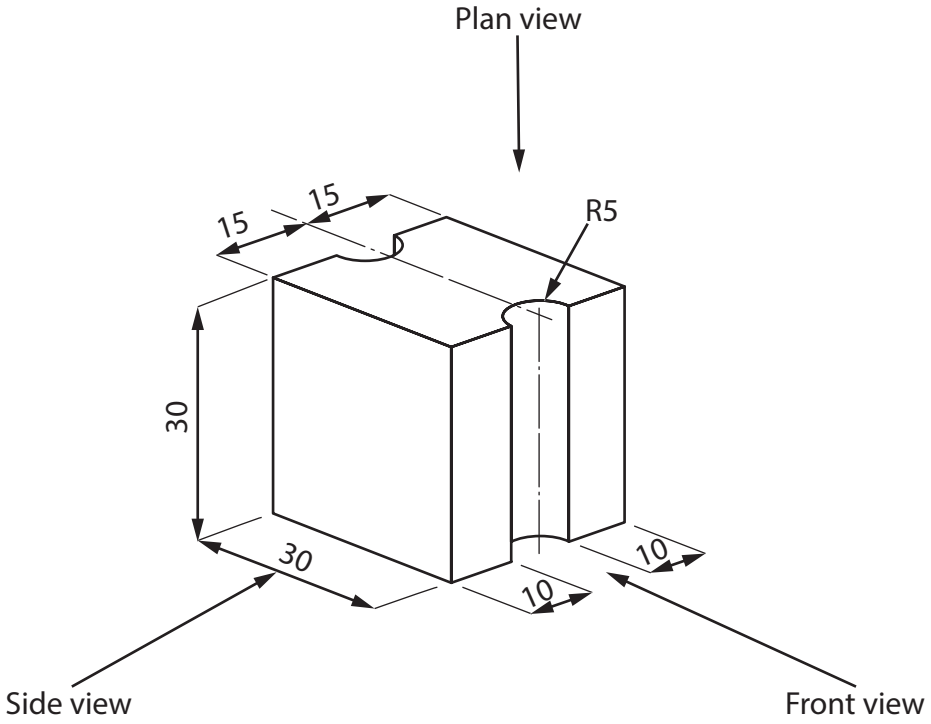
Figure 4 shows a dimensioned isometric drawing of one of the metal cubes with cut-outs.



All dimensions in mm

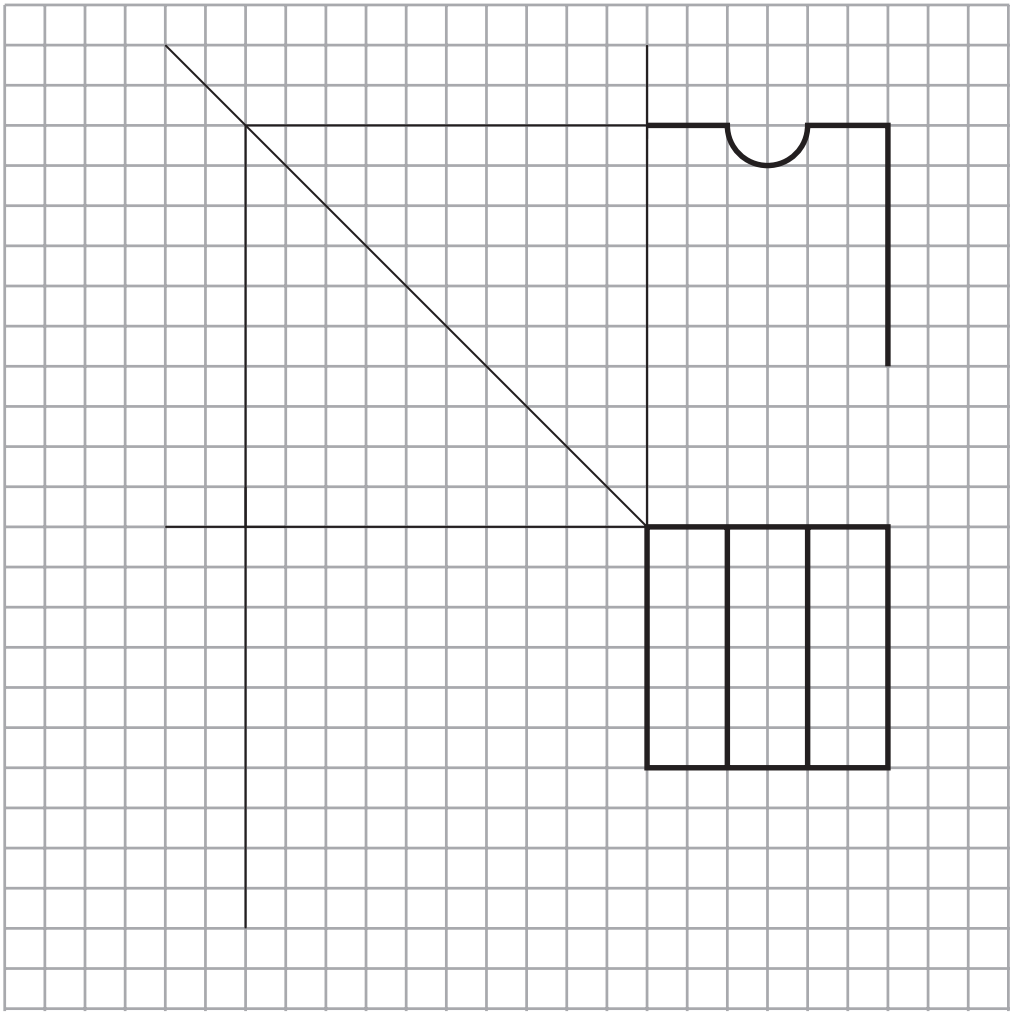
Diagram not to scale

Figure 4

(d) Complete a full-sized orthographic drawing of the metal cube shown in Figure 4 on the 5 mm orthographic grid on the opposite page.

The front view and part of the plan view have already been done for you.

(4)



5mm orthographic grid

(Total for Question 2 = 9 marks)

3 Figure 5 shows a sports rowing boat manufactured from fibreglass, which is a composite material.

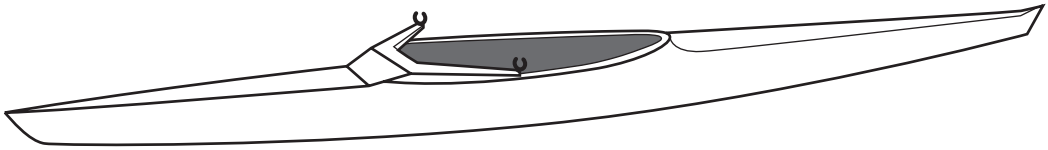


Figure 5

(a) Name **one** composite material other than fibreglass.

(1)

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(b) Explain **one** reason for manufacturing the sports rowing boat from fibreglass.

(2)

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(c) When manufacturing fibreglass, the glass fibre matting is coated with a mixture of resin and a catalyst.

The resin and catalyst are mixed in the ratio of 100 g resin to 2 ml of catalyst.

Calculate how much catalyst would be added to 650 g of resin.

(2)

Answer ..... ml

(d) The sports rowing boat oar shown in Figure 6 is a lever.

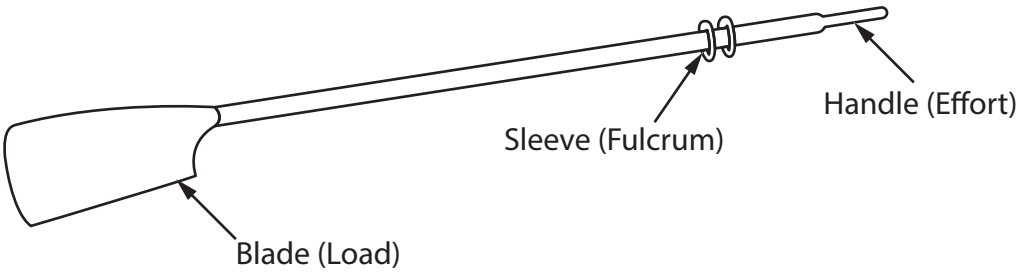

Figure 6

Analyse the boat oar.

(i) Name the lever classification for the sports rowing boat oar.

(1)

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(ii) State the type of movement shown by the sports rowing boat oar handle when in use.

(1)

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(e) Explain **two** benefits of sports textiles for athletes.

(4)

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(Total for Question 3 = 11 marks)

4 Figure 7 shows a one piece corrugated board package for a smart lightbulb.

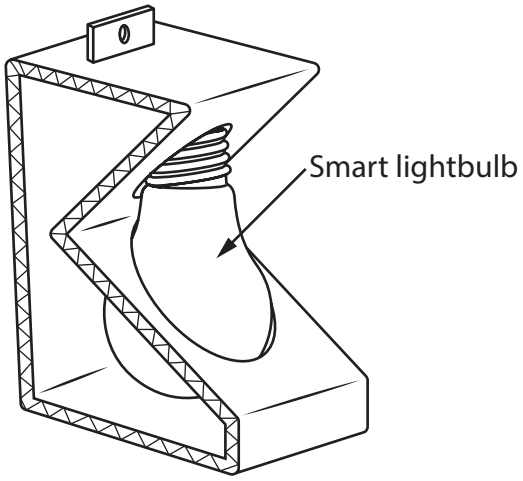

Figure 7

(a) Explain **one** working property of corrugated board that makes it an appropriate choice of material to make the lightbulb package.

(2)

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(b) Explain **one** way that the cost of materials has been kept to a minimum for the lightbulb package.

(2)

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(c) The net for the package measures 40 cm long by 8 cm wide.

The designer needs to increase the surface area of the package by 1/8th for greater protection of the lightbulb.

Calculate the new surface area of material required for the package.

(2)

Answer ..... cm^2

The smart lightbulb can be connected to the internet.

(d) Discuss how the Internet of Things (IoT) has led to greater independence for older people living on their own in their homes.

(6)

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(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS

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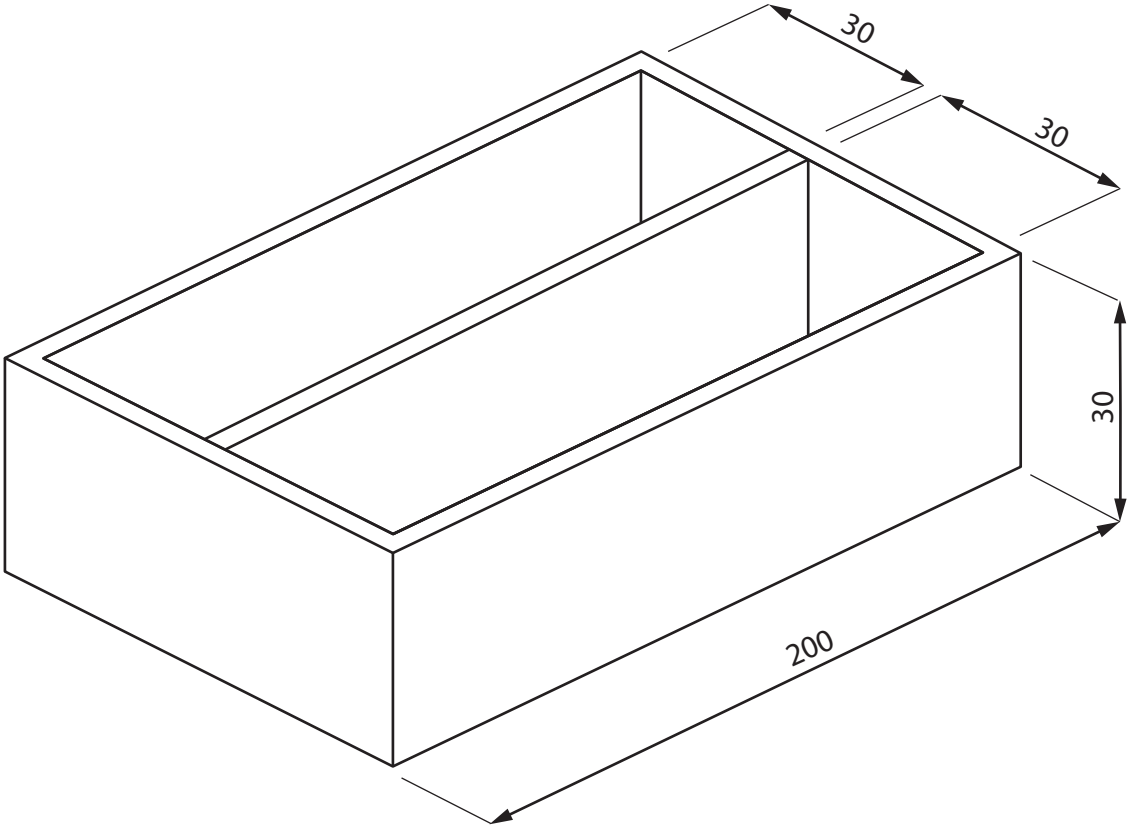
SECTION B BEGINS ON THE NEXT PAGE.

SECTION B

Timbers

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

5 Figure 8 shows a design solution for a screw tidy case together with some additional information.



Additional information

Maximum dimensions of the boxes of screws

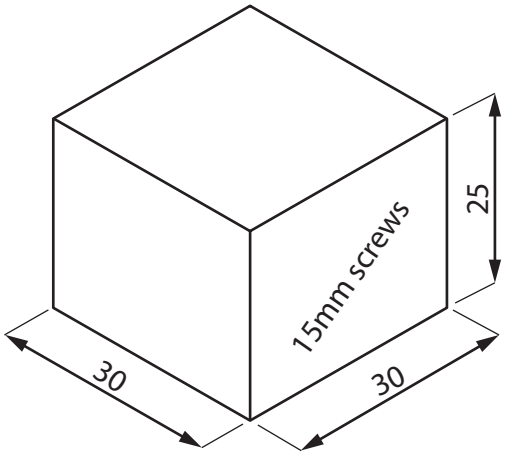


Figure 8

All dimensions in mm

(a) The screw tidy case needs to be improved to include the following specification points.

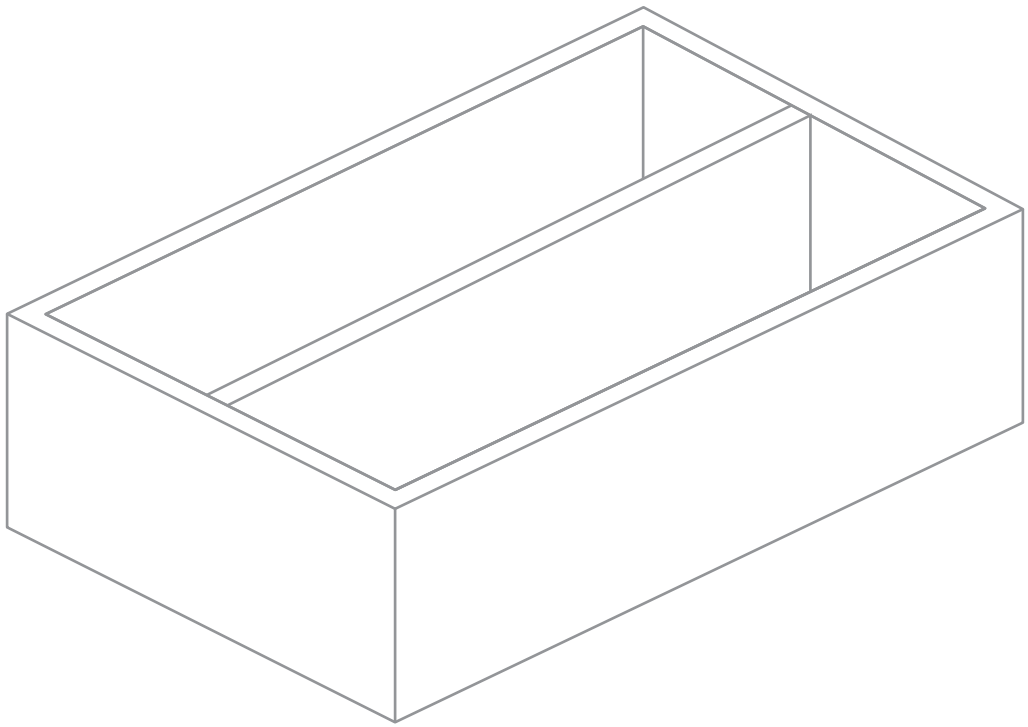
The screw tidy case must:

- provide separate storage spaces for different sized boxes of screws and allow the size of the screws to be seen
- be portable when two screw tidy cases are securely fixed on top of each other
- include a lockable method that will stop the screw boxes from falling out.

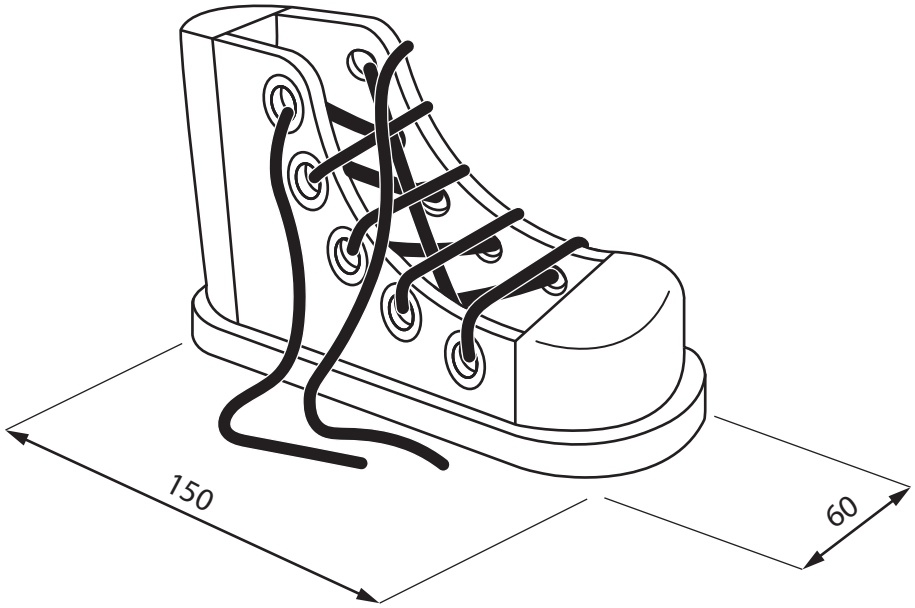
Use notes and sketches, on the outline below, to show how the screw tidy case could be modified to include these three specification points.

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

(6)



(b) Figure 9 shows a wooden boot that is used to help young children learn how to tie their own shoelaces.



All dimensions in mm

Figure 9

Explain **two** ways that the wooden boot meets, or fails to meet, the criteria of providing a method to help young children learn how to tie their own shoelaces.

(4)

1 .....

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2 .....

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(Total for Question 5 = 10 marks)

6 Figure 10 shows a teaching aid for use in schools.

The teaching aid is manufactured from beech.

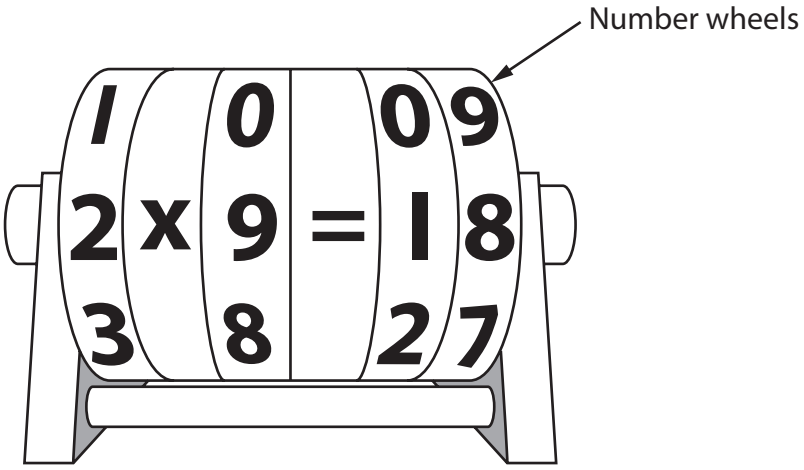

Figure 10

(a) Explain **two** physical characteristics of beech that make it an ideal material from which to make the teaching aid.

(4)

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(b) The number wheels have a 10 mm hole through the centre.

They are made from a square piece of beech measuring 100 mm x 100mm x 15 mm.

Use notes and sketches, in the space below, to show how a 10 mm hole would be drilled through the centre of one of the wheels using a pillar drilling machine.

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

(4)

(c) Explain **one** reason why the number wheels must be manufactured to a tolerance.

(2)

(d) Give **two** different surface finishes or treatments that could be applied to the beech number wheels.

Explain **one** advantage of using each surface finish or treatment.

(6)

Surface finish or treatment 1

Explanation

Surface finish or treatment 2

Explanation

(Total for Question 6 = 16 marks)

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7 Figure 11 shows a television stand that was delivered in a flat pack and a component that was used during the assembly of it.

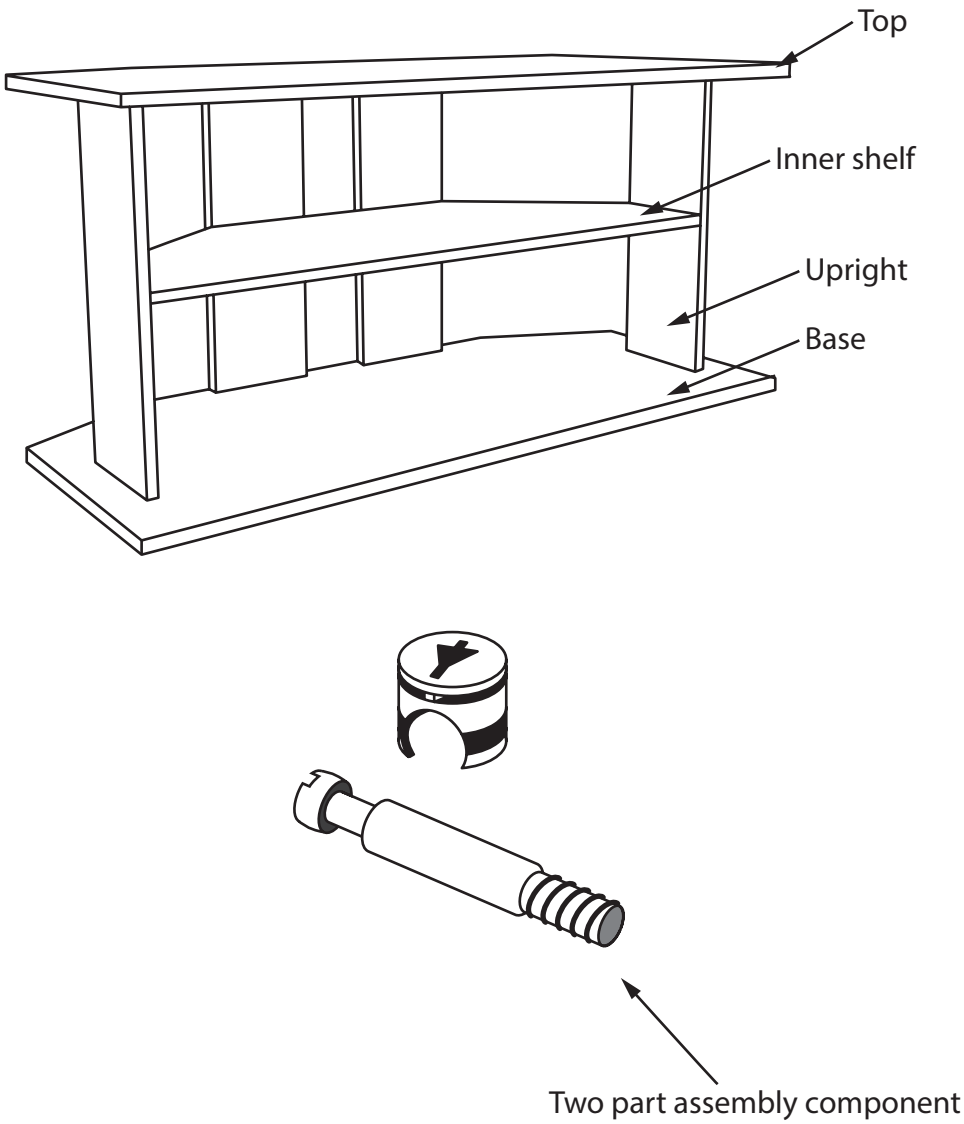

Figure 11

(a) Name the type of two part assembly component shown in Figure 11.

(1)

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Figure 12 shows a panel for the base of the flat-packed television stand which has been designed using computer-aided design (CAD).

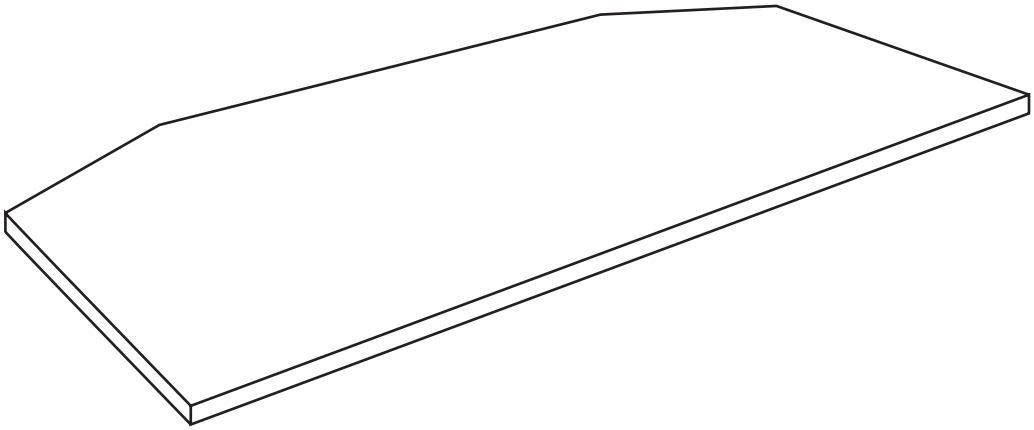

Figure 12

(b) Explain **two** advantages of using CAD when designing the flat-packed television stand.

(4)

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(c) Figure 13 shows a cutting list for the flat-packed television stand.

The material is 12 mm oak veneered MDF which costs £15 m^2.

Complete the cutting list by calculating the missing information for each of the five empty boxes, including the total cost.

All dimensions are in metres.

(5)

Part	Length (m)	Width (m)	Area (m^2)	Number required	Cost (£)
Top / base	1.0	0.45	0.45	2	.....
Inner shelf	0.8	0.3	0.24	1	.....
Uprights	0.4	0.15	.....	4	.....
				Total cost (£)	.....

Figure 13

Working out space

Products are manufactured using different scales of production.

(d) Explain **two** reasons for manufacturing the flat-packed television stand in batches.

(6)

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(Total for Question 7 = 16 marks)

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8 Figure 14 shows a desk lamp manufactured from mahogany.

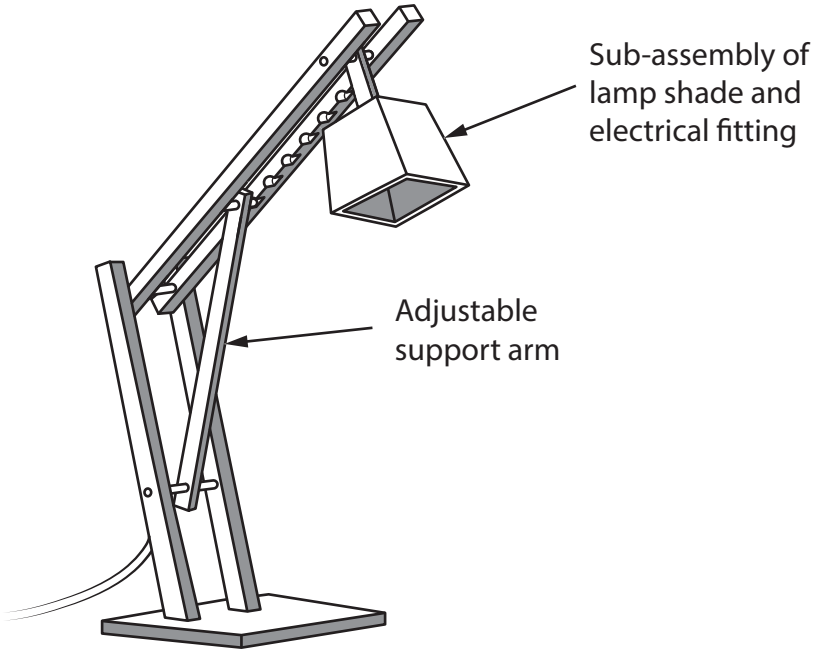

Figure 14

The adjustable support arm is in compression.

(a) Explain **one** possible effect of the compressive force acting upon the adjustable support arm.

(2)

The lamp shade and electrical fitting are manufactured as a sub-assembly for the desk lamp.

(b) Explain **one** advantage of manufacturing the lamp shade and electrical fitting as a sub-assembly.

(3)

The mahogany for the desk lamp is sourced from Amazonian forests.

(c) Explain **two** effects of deforestation on the ecological footprint of the forest.

(4)

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(d) The desk lamp is manufactured from mahogany, a natural timber.

Figure 15 shows information about the desk lamp.

Material	Mahogany
Source of material	Amazonian forests
Material size	Standard stock sized materials
Power source	Mains electric

Figure 15

Analyse the information in Figure 15.

Evaluate the desk lamp with reference to aesthetic and availability factors including:

- form
- colour
- sustainability.

(9)

(Total for Question 8 = 18 marks)

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

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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)

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

P 7 1 3 4 4 A 0 1 2 8

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.

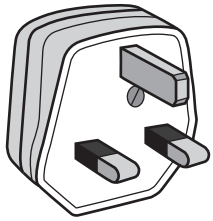
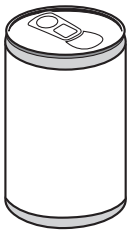
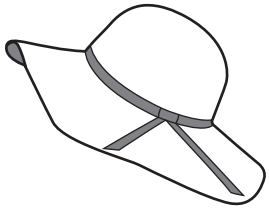
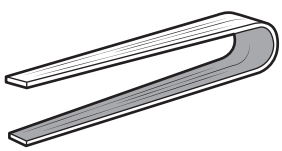
Picture of product	Material and product	Property
	Urea formaldehyde 3-pin plug	Insulator of electricity
	Aluminium drinks can	**(1)** (i) .....
	Felted wool fabric hat	**(1)** (ii) .....
	Tracing paper	**(1)** (iii) .....
	Laminated plywood salad servers	**(1)** (iv) .....

Figure 1

(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.

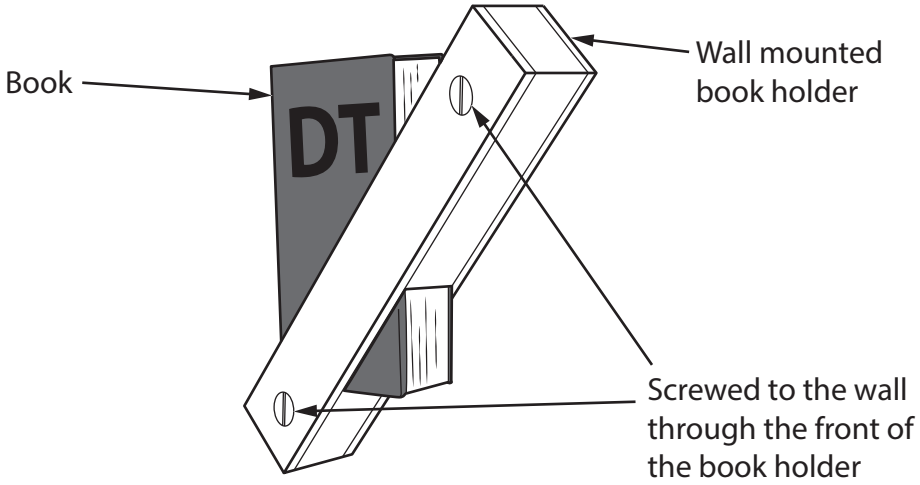

Figure 2

(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.

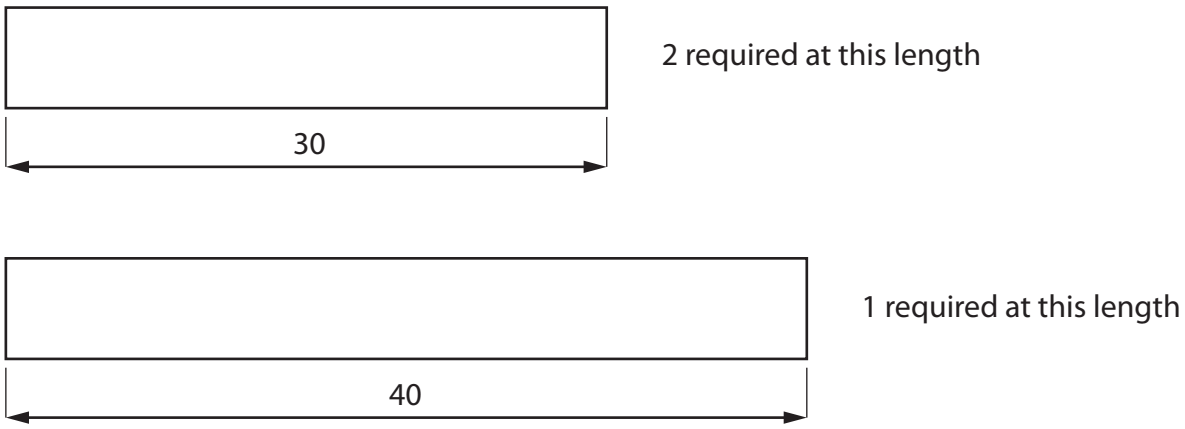


Figure 3

The mahogany has a cross sectional area of 5 cm^2

All dimensions in cm

Diagram not to scale

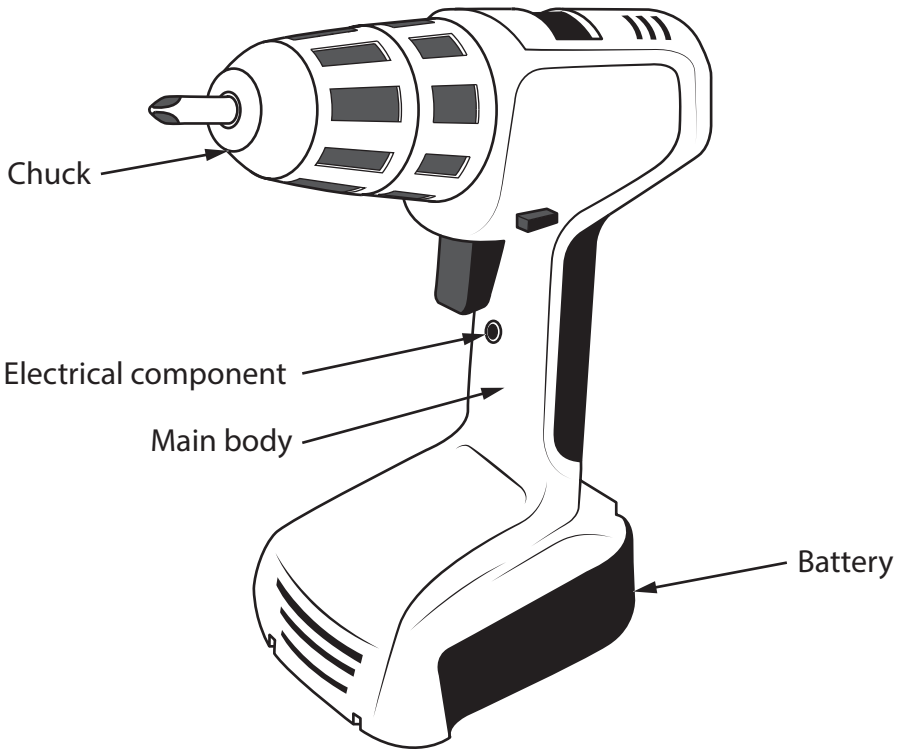
(d) Calculate the cost of the mahogany required to make one wall mounted book holder if the mahogany costs £1,200 m^3.

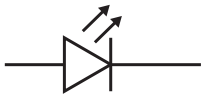
(4)

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)

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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)

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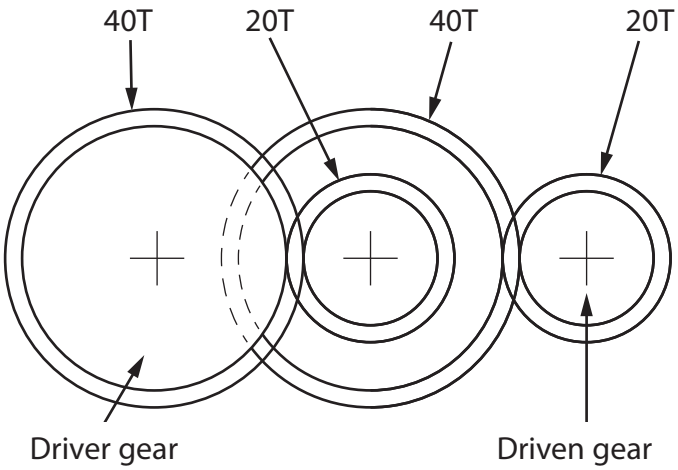
(c) The electrically powered hand drill also has a compound gear train inside.

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)

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(b) A farmer requires 420 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 .....

(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)

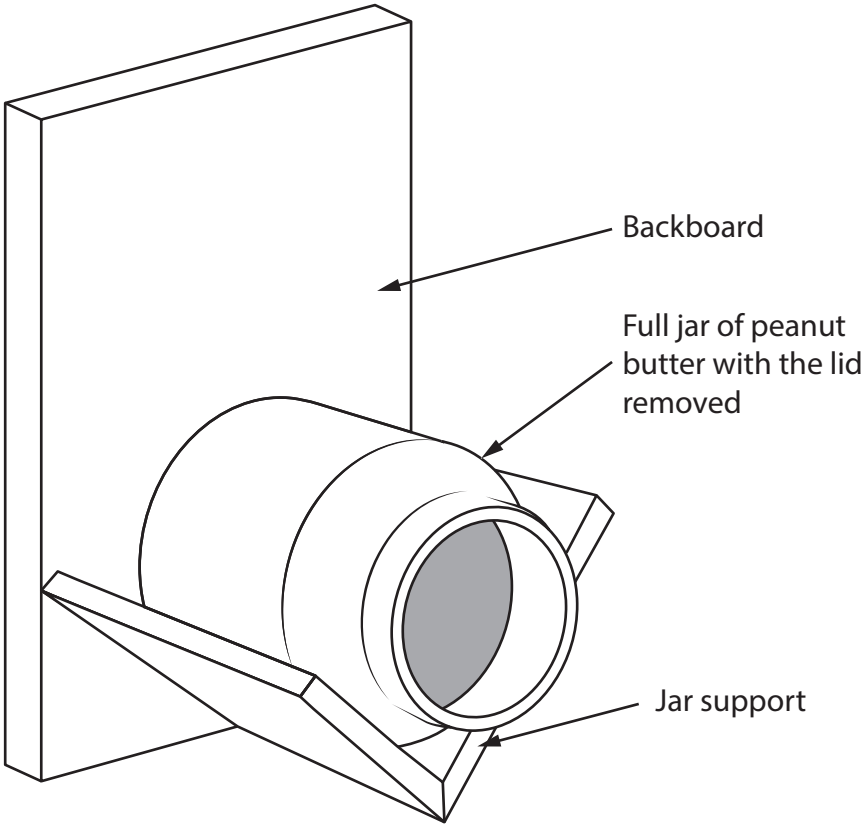
TOTAL FOR SECTION A = 40 MARKS

SECTION B

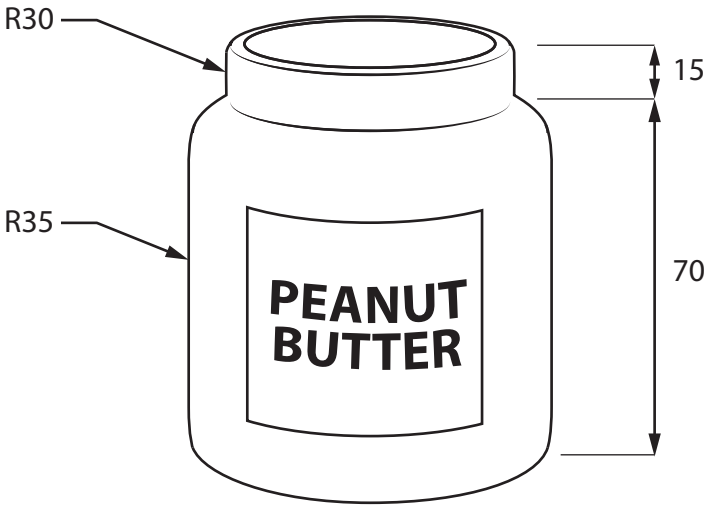
Timbers

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

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

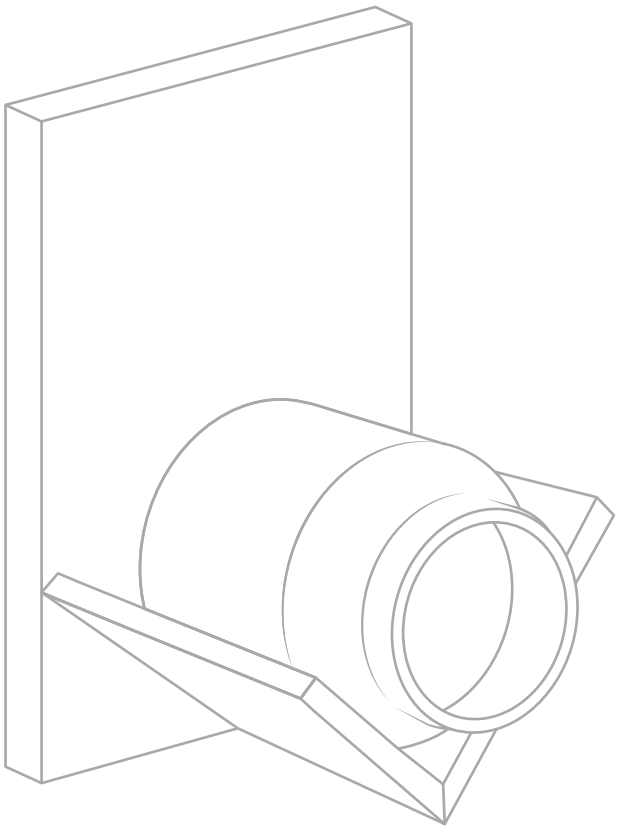
The bird feeder must:

- 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.

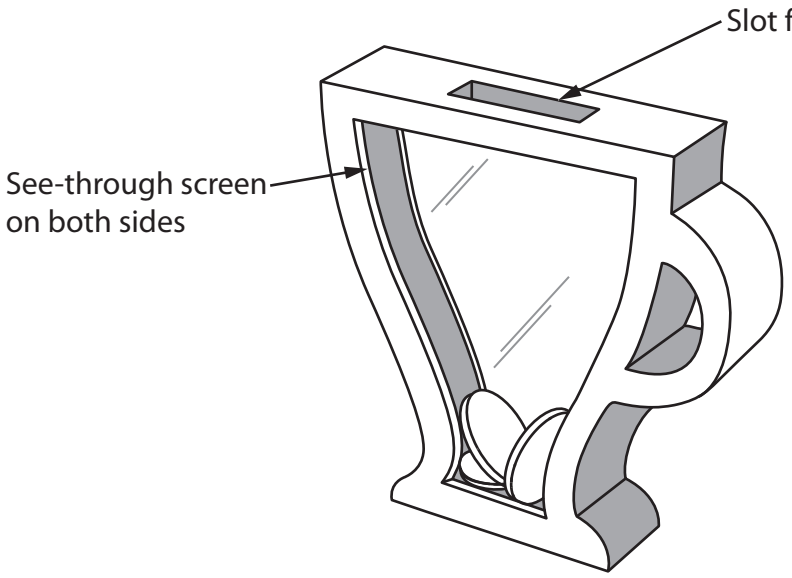


Figure 7

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)

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(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.

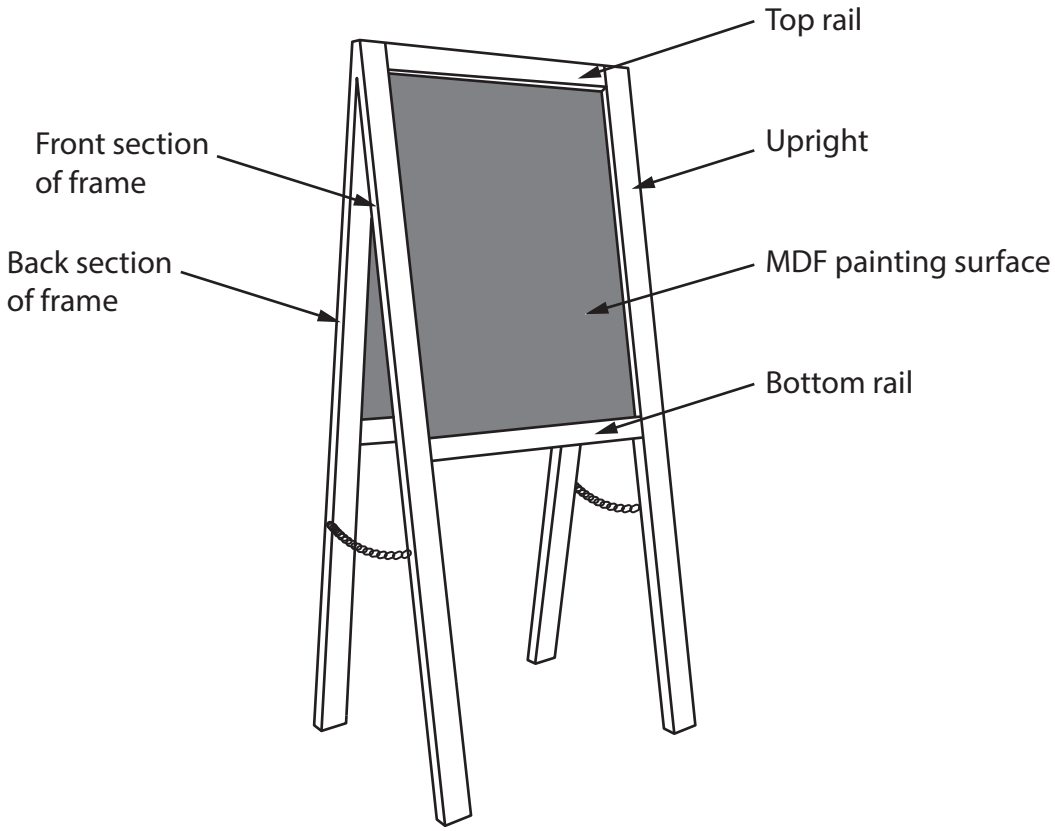

Figure 8

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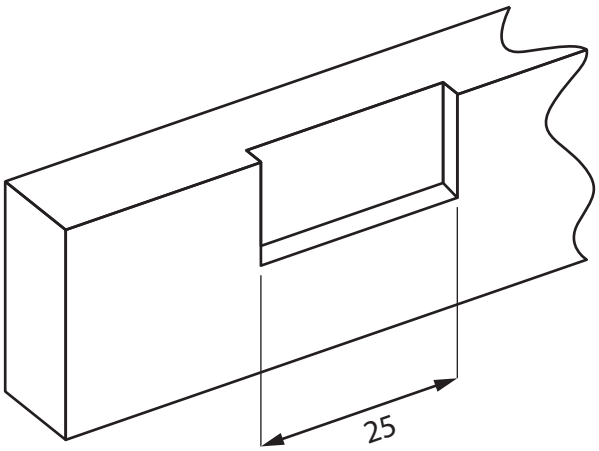
(b) Figure 9 shows a rebate on the inside of the top rail of the frame where a 25 mm butt hinge is fixed.



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)

(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

Explanation

Joint 2

Explanation

(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.

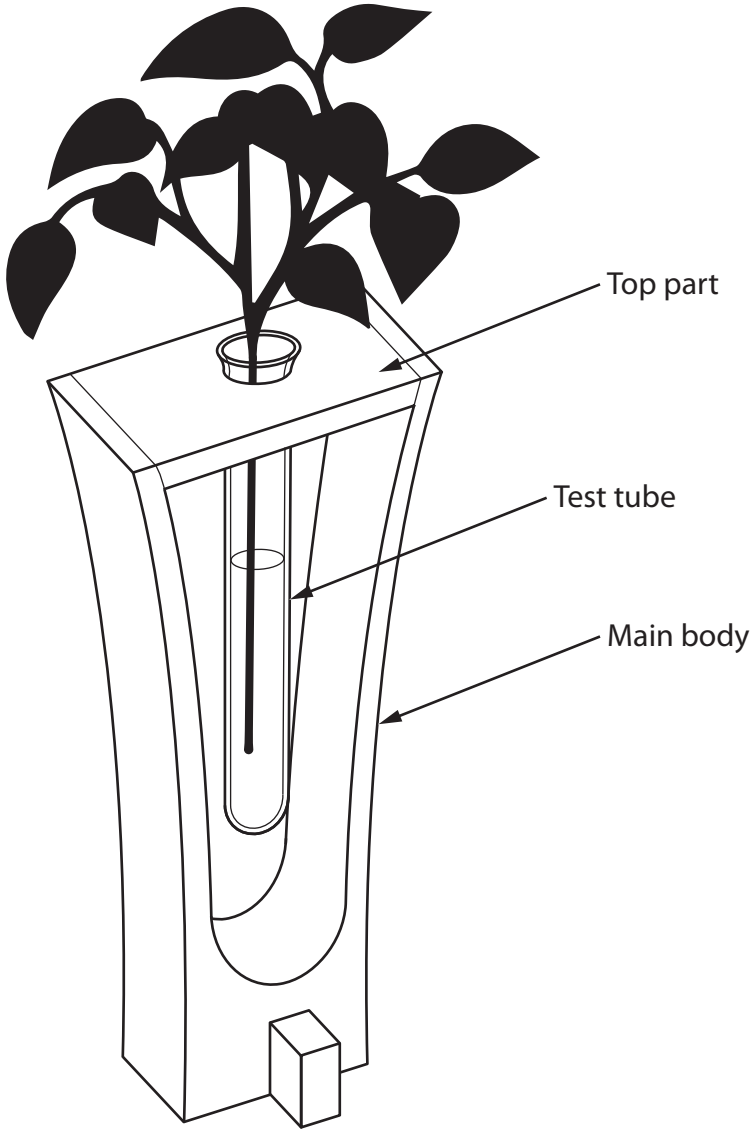


Figure 10

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

(1)

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

(4)

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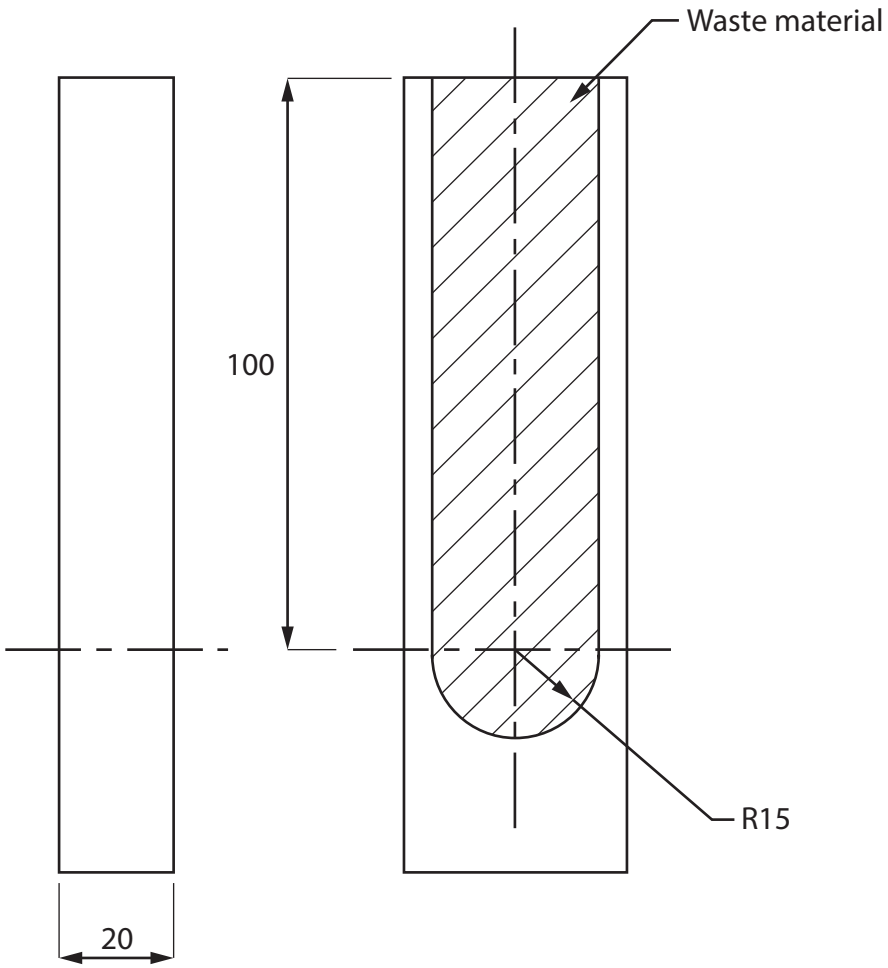
Figure 11 shows a dimensioned drawing of the main body of the flower vase before the sides are bent.

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



All dimensions are in mm

Diagram not to scale

Figure 11

(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

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.

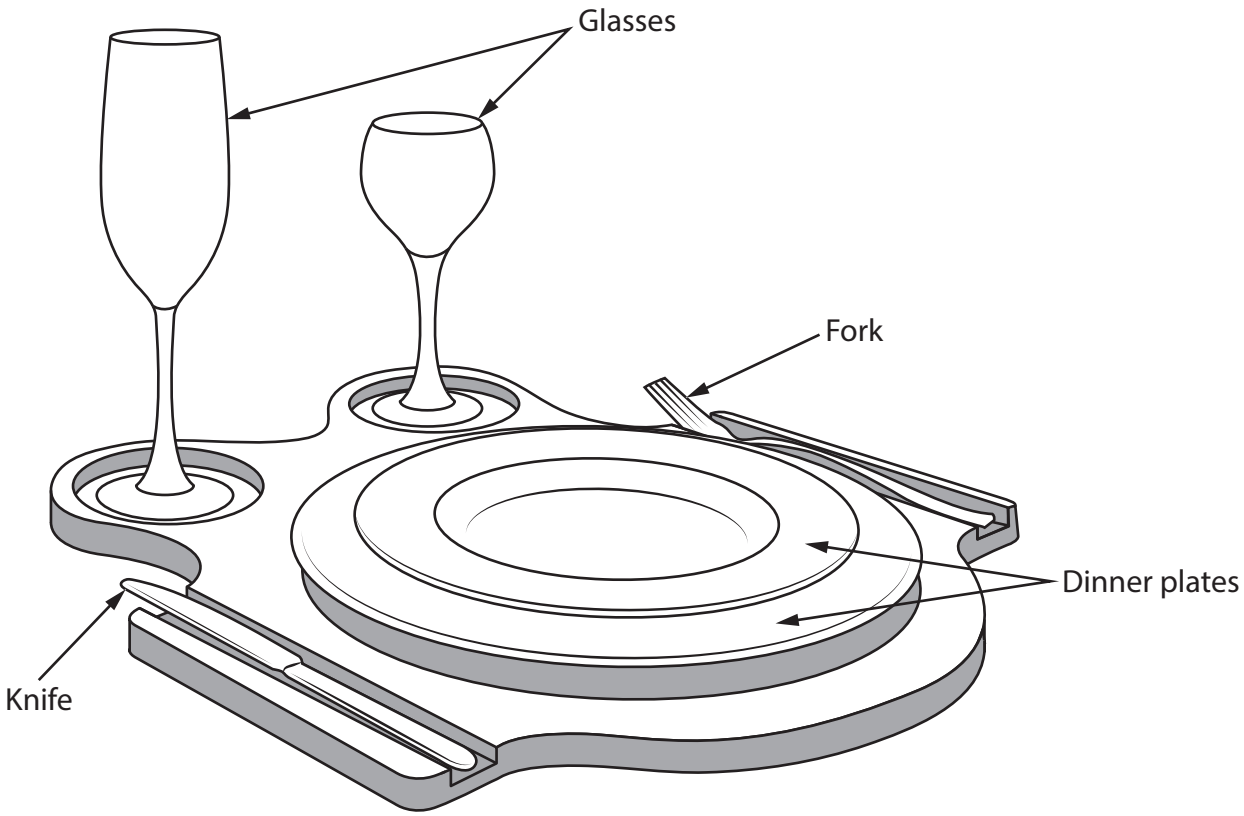

Figure 12

(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)

(Total for Question 8 = 18 marks)

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

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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)

Monday 19 June 2023

Morning (Time: 1 hour 45 minutes)

Paper reference **1DT0/1F**

Design and Technology

COMPONENT 1: Timbers

You must have:
calculator, ruler, HB pencil, protractor, pair of compasses

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 ▶

P71596A

N:1/1/1/1/1

P 7 1 5 9 6 A 0 1 2 8

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.

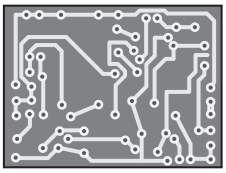
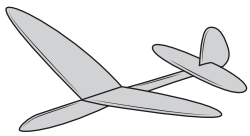
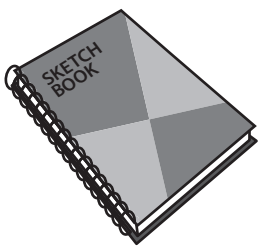
Picture of product	Material and product	Property
	Cotton T-shirt	Soft
	Polyester resin printed circuit board (PCB)	**(1)** (i) .....
	Balsa wood toy plane	**(1)** (ii) .....
	Stainless steel kitchen scissors	**(1)** (iii) .....
	Solid white board hardback book cover	**(1)** (iv) .....

Figure 1

A printing company wants to use a new and emerging technology. It operates as a privately-owned business.

(b) (i) Explain **one** advantage for the company of operating as a privately-owned business.

(2)

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.....

The printing company has invested £150,000 of its own money to buy new and emerging technology but wants to raise an additional 30% by crowdfunding.

(ii) Calculate how much additional money it will raise by crowdfunding.

(2)

Answer £ .....

(Total for Question 1 = 8 marks)

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2 Figure 2 shows a concrete candle holder.

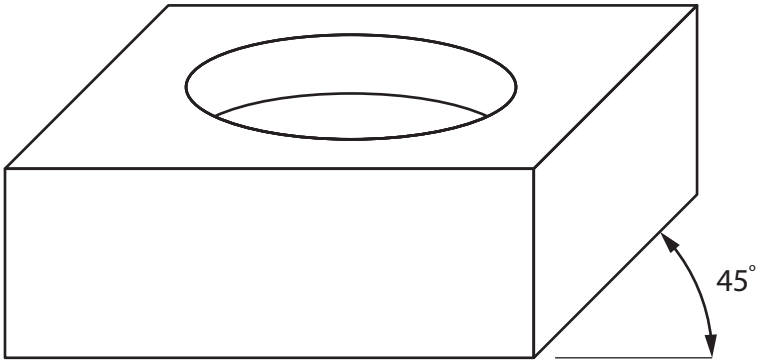

Figure 2

(a) Name the drawing method that has been used to show the concrete candle holder in Figure 2.

(1)

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(b) Explain **one** reason for using concrete for the candle holder.

(2)

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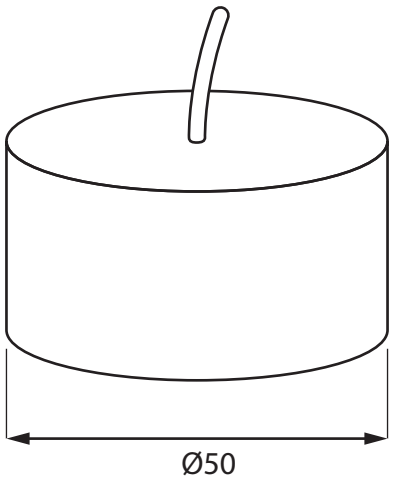
Figure 3 shows a standardised size of candle.



All dimensions in mm

Ø – diameter

Figure 3

(c) Explain **one** reason for manufacturing the concrete candle holder to hold a standardised size of candle.

(2)

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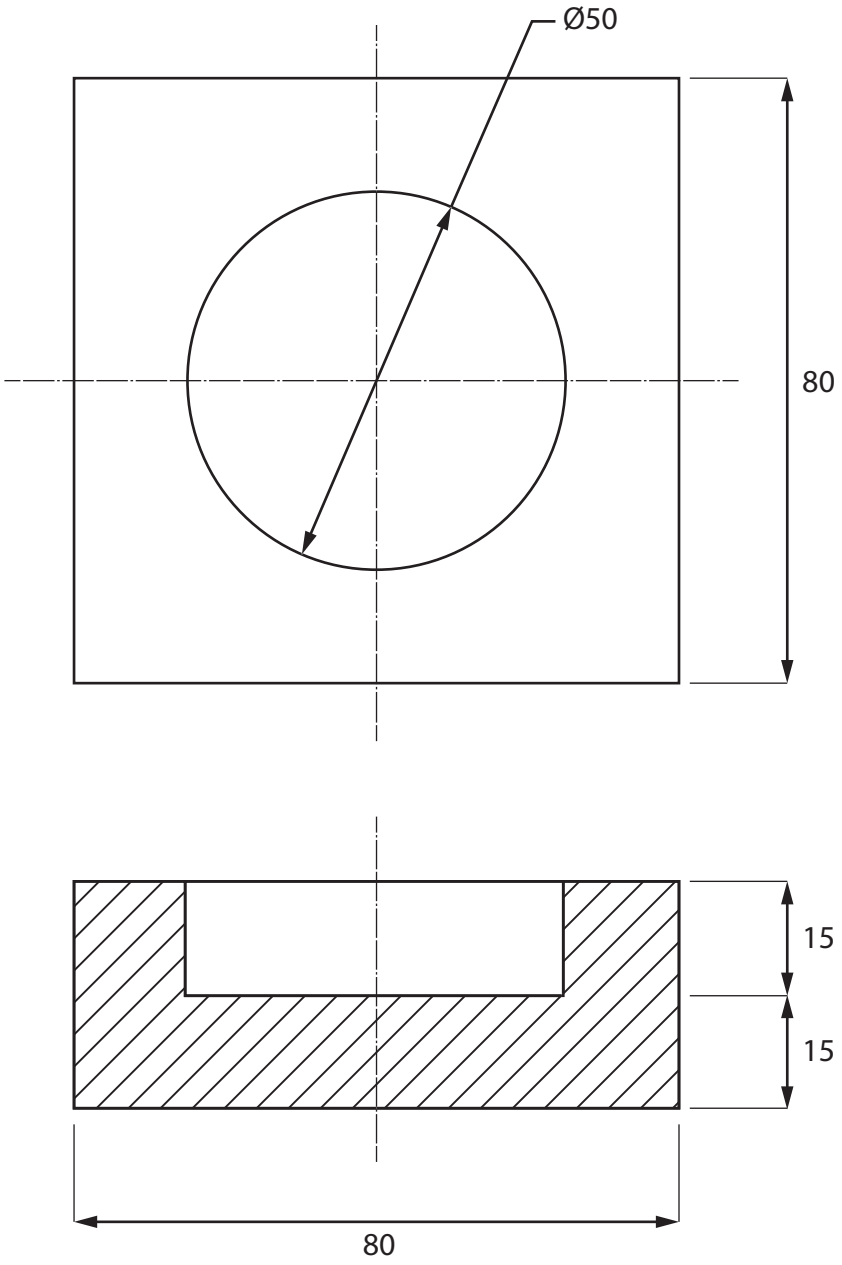
Figure 4 shows a dimensioned drawing of the concrete candle holder.



All dimensions in mm

Volume of cylinder = $\pi \times r^2 \times h$

Use $\pi = 3.142$

Figure 4

(d) Calculate the volume of concrete required to make the candle holder.

Give your answer in cm^3 to the nearest whole cm^3.

(4)

Answer ..... cm^3

(Total for Question 2 = 9 marks)

3 Figure 5 shows a vegetable growing frame that is manufactured from a softwood.

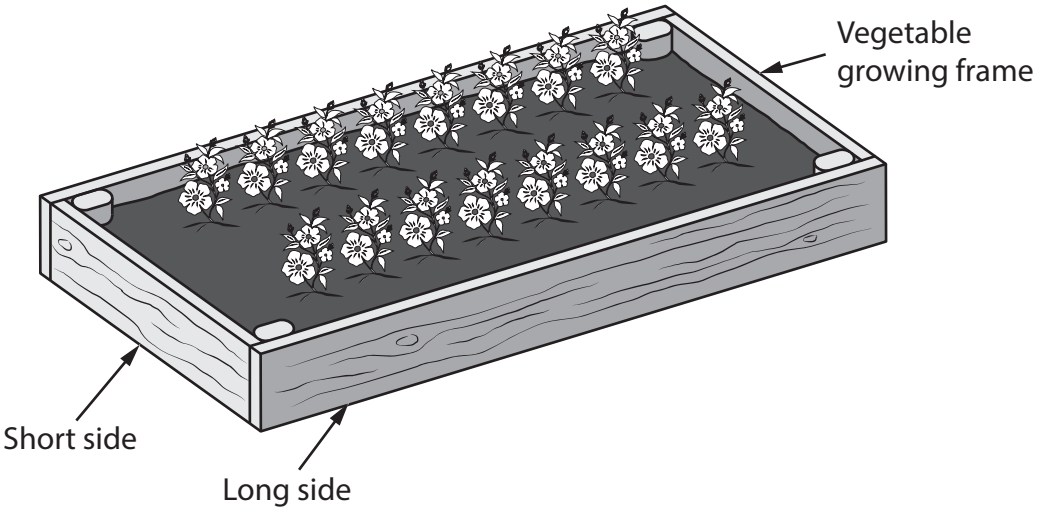


Figure 5

(a) Name **one** softwood that can be used to manufacture the vegetable growing frame.

(1)

.....

(b) Explain **one** reason for manufacturing the vegetable growing frame from a softwood rather than a hardwood.

(2)

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.....

The original length of timber that is used to make the frame is 300 cm.

The combined length of one short side and one long side of the frame is 270 cm.

(c) Calculate how much timber is left when a short side and a long side have been cut to size, giving your answer as a fraction of the original length of timber.

Ignore the width of any saw cuts.

(2)

Answer .....

Figure 6 shows a mild steel fixing that has been used to join the vegetable growing frame together at the corners.

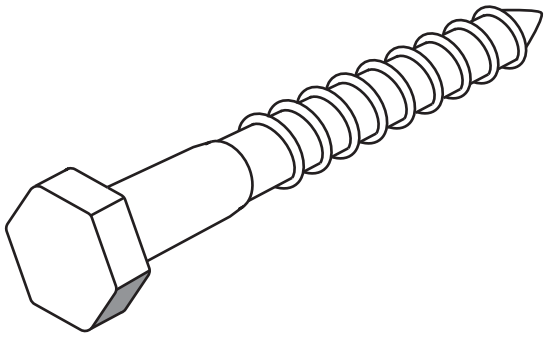

Figure 6

(d) Explain **one** disadvantage of using mild steel for the fixing.

(2)

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The vegetable growing frame is delivered in a box manufactured from corrugated board.

(e) Explain **two** benefits of using corrugated board to manufacture the box.

(4)

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(Total for Question 3 = 11 marks)

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4 Figure 7 shows a polyester laptop bag.

Figure 7

(a) Explain **one** working property of polyester that makes it an appropriate choice of material to make the laptop bag.

(2)

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(b) The material for the laptop bag is 60% new polyester and the rest is recycled polyester.

The laptop bag requires 320 grams of polyester in total.

Calculate how many grams of recycled polyester are required for the laptop bag.

(2)

Answer ..... grams

The manufacturer carries out a life cycle analysis (LCA) to help reduce the environmental impact of the laptop bag.

(c) Explain **one** outcome of an LCA that can help to reduce the environmental impact of the laptop bag.

(2)

(d) Discuss how the features of modern laptops have contributed to remote working.

(6)

(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS

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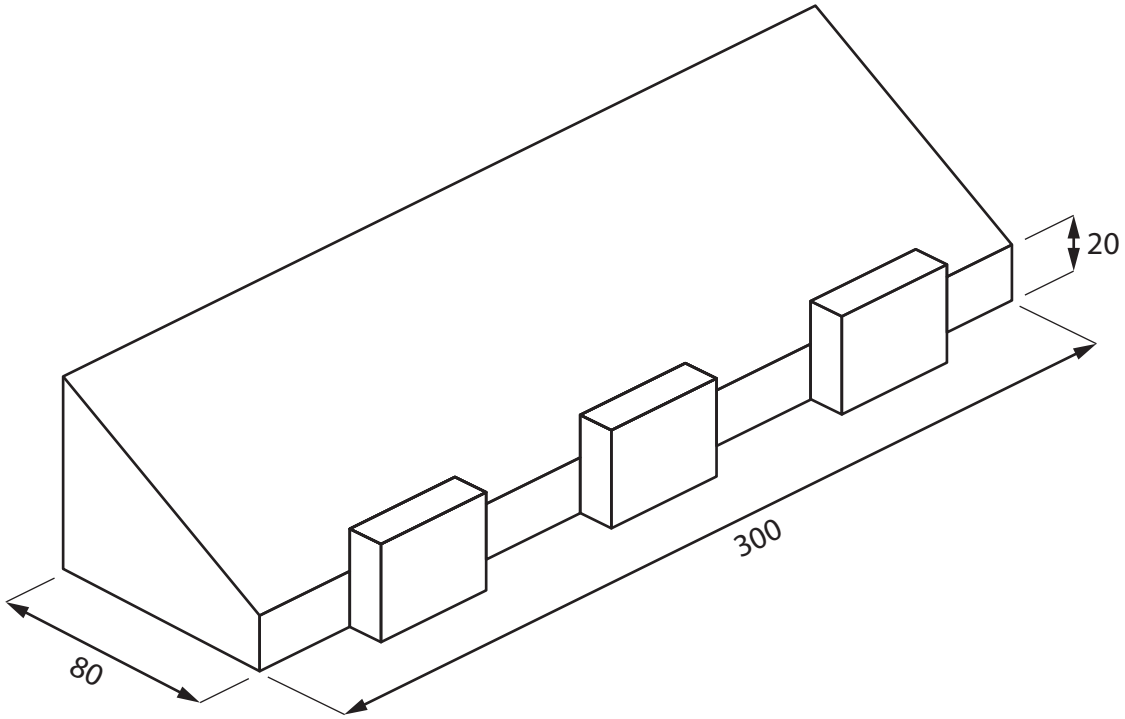
SECTION B BEGINS ON THE NEXT PAGE.

SECTION B

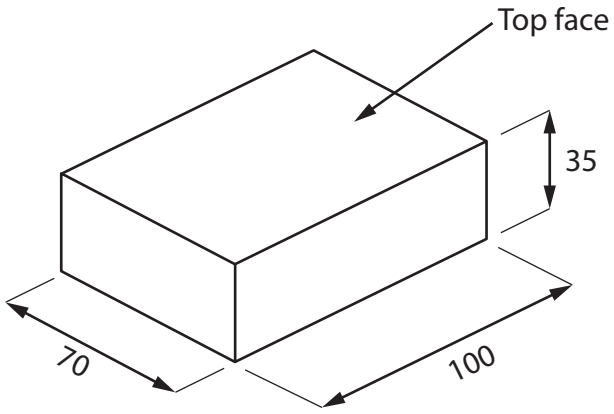
Timbers

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

5 Figure 8 shows a design solution for a display stand to hold three boxes of chocolates together with some additional information.



Additional information – dimensions of box of chocolates



All dimensions in mm

Figure 8

(a) The display stand holds three boxes of chocolates and needs to be improved to include the following specification points.

The display stand must:

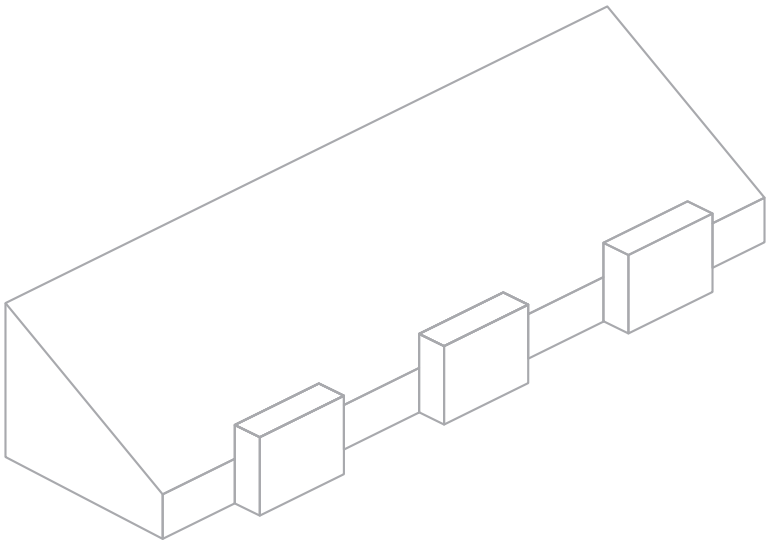
- be able to hold an additional three boxes of chocolates and allow the top face of each individual chocolate box to be seen
- include a method to show the price of a box of chocolates that allows the price to be changed
- be portable so that it can be moved to another place without the chocolate boxes falling off.

Use notes and sketches to show how the display stand 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.

Use the outline of the original design solution to show your modifications.

(6)



(b) Figure 9 shows a wooden puzzle that is used to help develop hand–eye coordination in young children.

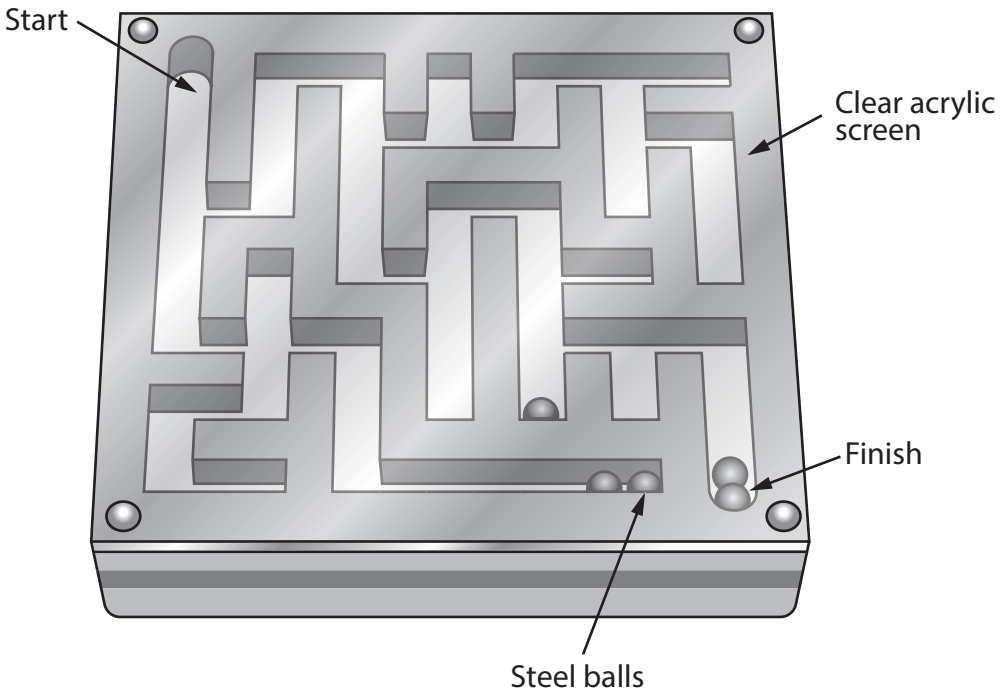


Figure 9

Explain **two** ways that the wooden puzzle meets, or fails to meet, the criterion of providing a method to help develop hand–eye coordination in young children.

(4)

1 .....

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2 .....

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(Total for Question 5 = 10 marks)

6 Figure 10 shows a child's play fishing set. The set is sold with written instructions explaining how to use it.

The fishing rod handle is manufactured from jelutong.

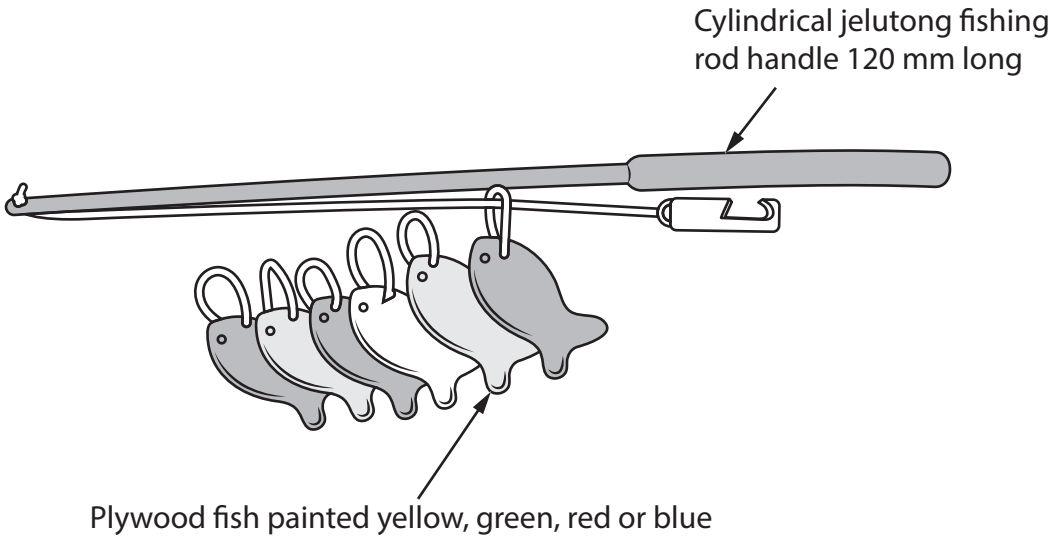

Figure 10

(a) Explain **two** characteristics of jelutong that make it an ideal material from which to make the fishing rod handle.

(4)

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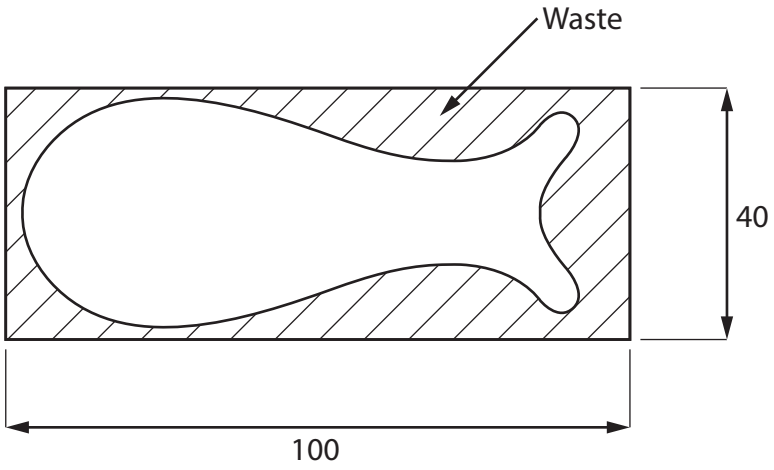
(b) Figure 11 shows the outline of a fish marked out on a piece of 6 mm plywood.



All dimensions in mm

Figure 11

Use notes and sketches, in the space below, to show how the fish would be 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) Explain **one** way that the manufacturer can avoid causing offence to potential buyers of the play fishing set in different countries.

(2)

(d) Give **two** different methods that could be used to manufacture the cylindrical jelutong fishing rod handle from a length of square section material.

Explain **one** reason for using each manufacturing method.

(6)

Method 1

Explanation

Method 2

Explanation

(Total for Question 6 = 16 marks)

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7 Figure 12 shows a wooden toy that is manufactured in a batch of 100 and a screw that is used in the assembly of the toy.

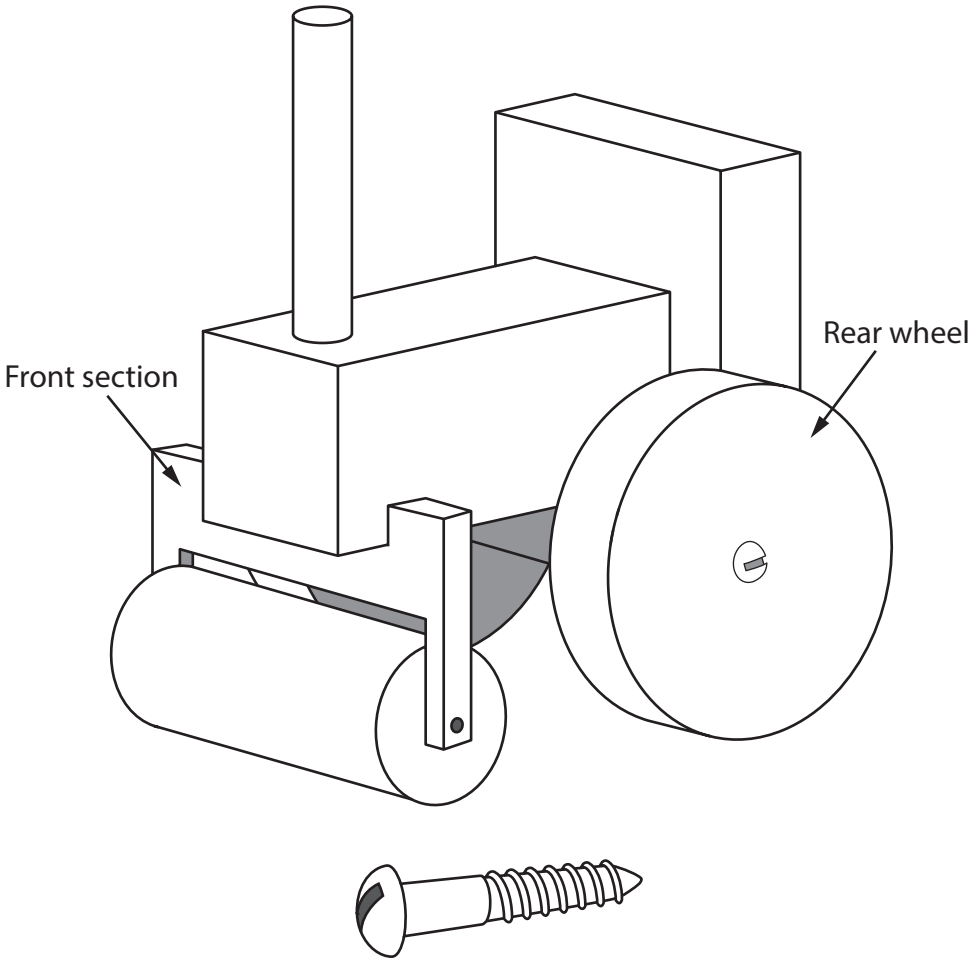


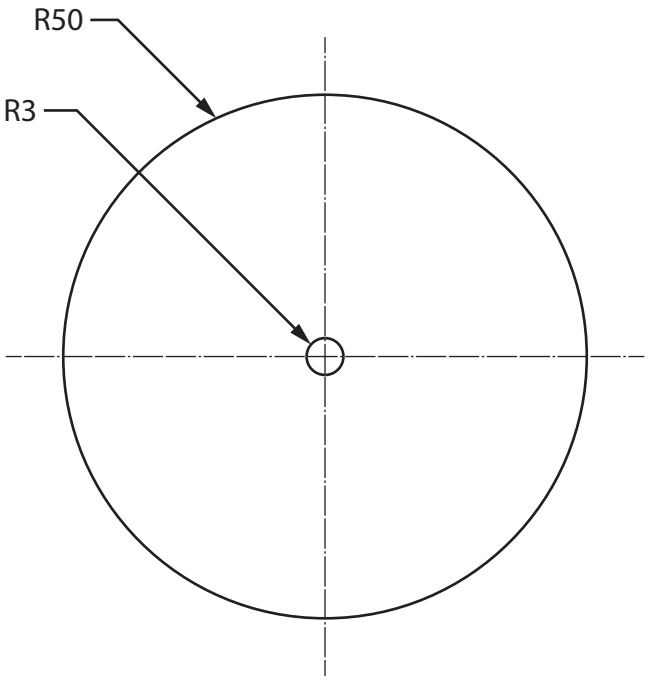
Figure 12

(a) Name the specific type of screw head shown in Figure 12.

(1)

.....

Figure 13 shows the rear wheel of the toy which has been made from 12 mm thick plywood using computer-aided manufacturing (CAM).



All dimensions in mm

Figure 13

(b) Explain **two** advantages of using CAM to manufacture the rear wheels of the toy.

(4)

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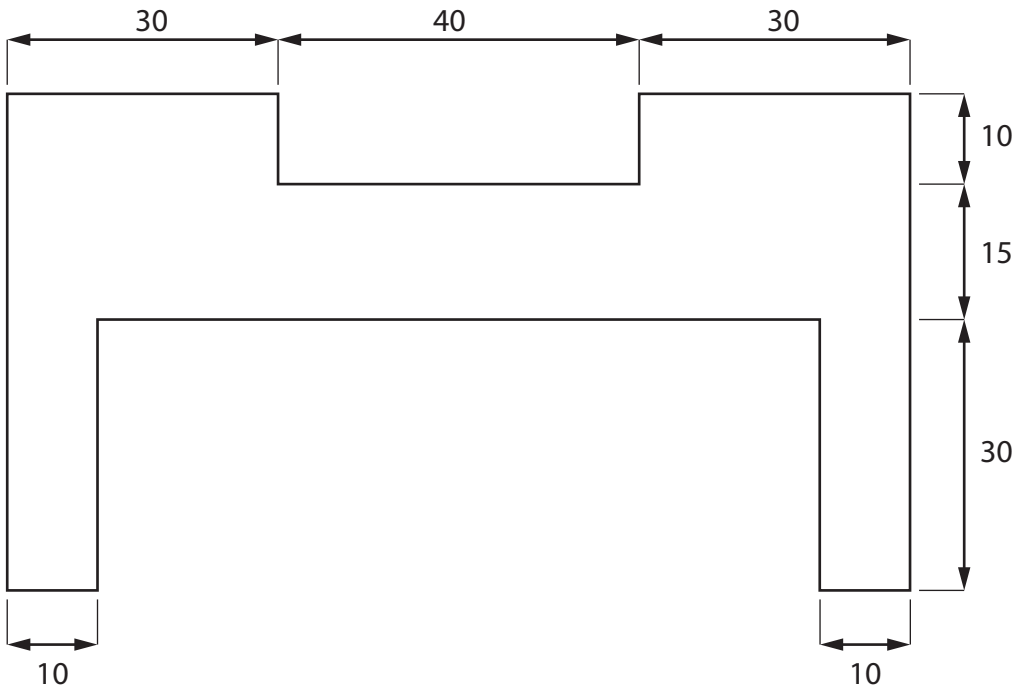
(c) Figure 14 shows a dimensioned drawing of a template for the front section of the toy.

The template will be used to mark out the front section of the toy and will be made from 5 mm thick material.

Produce an isometric drawing of the template on the grid provided.

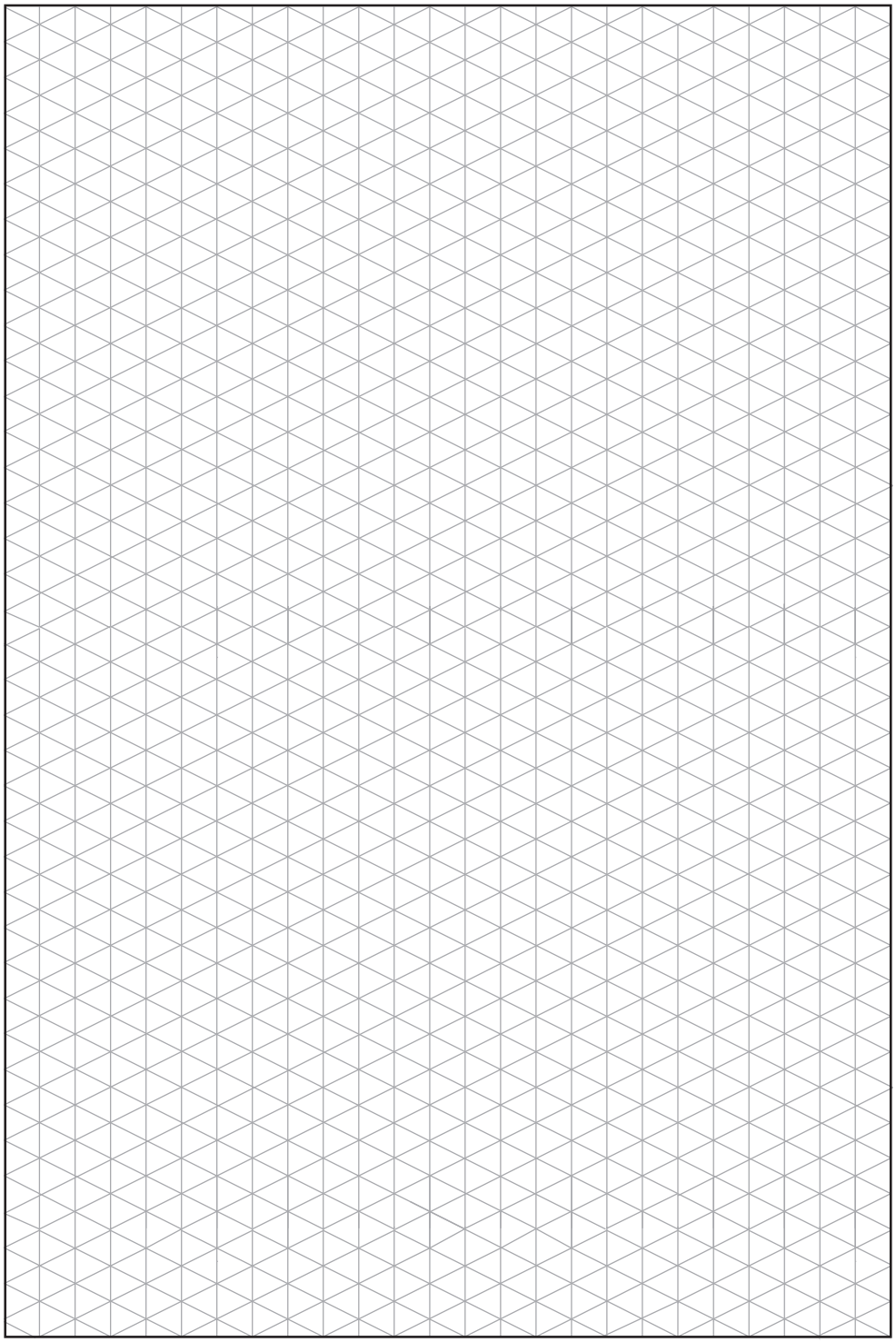
(5)



All dimensions in mm

Diagram not to scale

Figure 14



5 mm isometric grid

(d) Explain **two** disadvantages of using a template to mark out the front section of the toy.

(6)

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(Total for Question 7 = 16 marks)

8 Figure 15 shows a pair of chopsticks manufactured from birch.

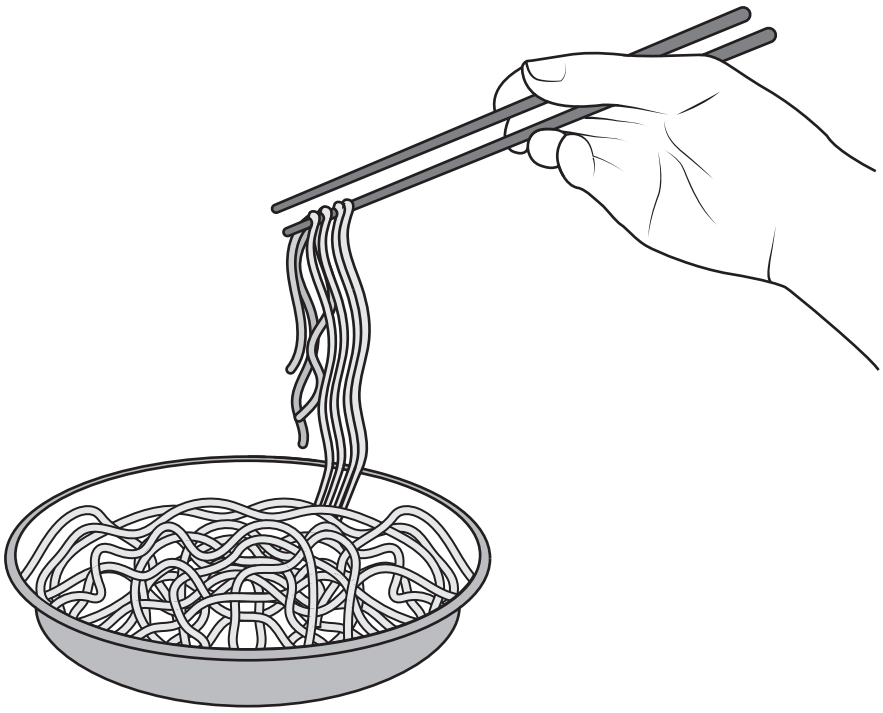

Figure 15

Manufacturing chopsticks from birch is cost effective.

(a) Explain **one other** benefit of manufacturing the chopsticks from birch.

(2)

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(b) Explain **one** cost factor that will have been considered when selecting birch as the material from which to manufacture the chopsticks.

(3)

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(c) Explain **two** quality control checks that would be carried out on the chopsticks before they are allowed to leave the factory.

(4)

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(d) The chopsticks are manufactured in China and sold around the world.

Figure 16 shows some additional information about the chopsticks.

Source of birch	European forests
Country of manufacture	China
Potential market	Restaurants, takeaway restaurants and homes
Scale of production	Continuous

Figure 16

Analyse the information in Figure 16.

Evaluate the chopsticks with reference to social factors including:

- use for different social groups
- trends / fashion
- popularity.

(9)

(Total for Question 8 = 18 marks)

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

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