

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4111/01



DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Resistant Materials Technology

WEDNESDAY, 23 MAY 2018 – MORNING

2 hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
Section A	1.	15
	2.	10
	3.	10
	4.	25
Section B	5.	10
	6.	15
	7.	20
	8.	15
Total	120	

ADDITIONAL MATERIALS

You will need basic drawing equipment, coloured pencils and a calculator for this examination.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue at the back of the booklet, taking care to number the continuation correctly.

You are reminded of the necessity for good English and orderly presentation in your answers.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Section A

Marked out of 60 60 minutes

1. This question is about Product Analysis. It is worth a total of 15 marks.

Study the images of the folding desk and chair unit shown below and answer the questions that follow.



Product features:

- materials: ABS and Stainless Steel;
- folds easily;
- weight: 6.5 kg;
- price: £44.99.

(a) A specification has been written for the folding desk and chair unit. Study the headings listed below and match the correct heading to the most appropriate specification point. 3 x [1]

Safety considerations

Sustainability

Scale of manufacture

Target market

(i) Heading:

An initial batch of 250 products will be produced.

(ii) Heading:

The folding desk and chair unit is designed to be suitable for adults.

(iii) Heading:

The folding desk and chair unit should support the weight of the user without breaking.

(b) Complete the table by explaining the reasons for the choice of materials used to make the parts of the folding desk and chair unit.

<i>Parts</i>	<i>Material</i>	<i>Reason for choice</i>
Frames of desk and chair	Stainless steel	<p>.....</p> <p>.....</p> <p>.....</p> <p>..... [2]</p>
<ul style="list-style-type: none"> • Desk top • Chair seat • Shelf 	ABS	<p>.....</p> <p>.....</p> <p>.....</p> <p>..... [2]</p>

(c) Folding is one of the product's most important design features. Discuss the advantages that folding could give to the customer. [2]

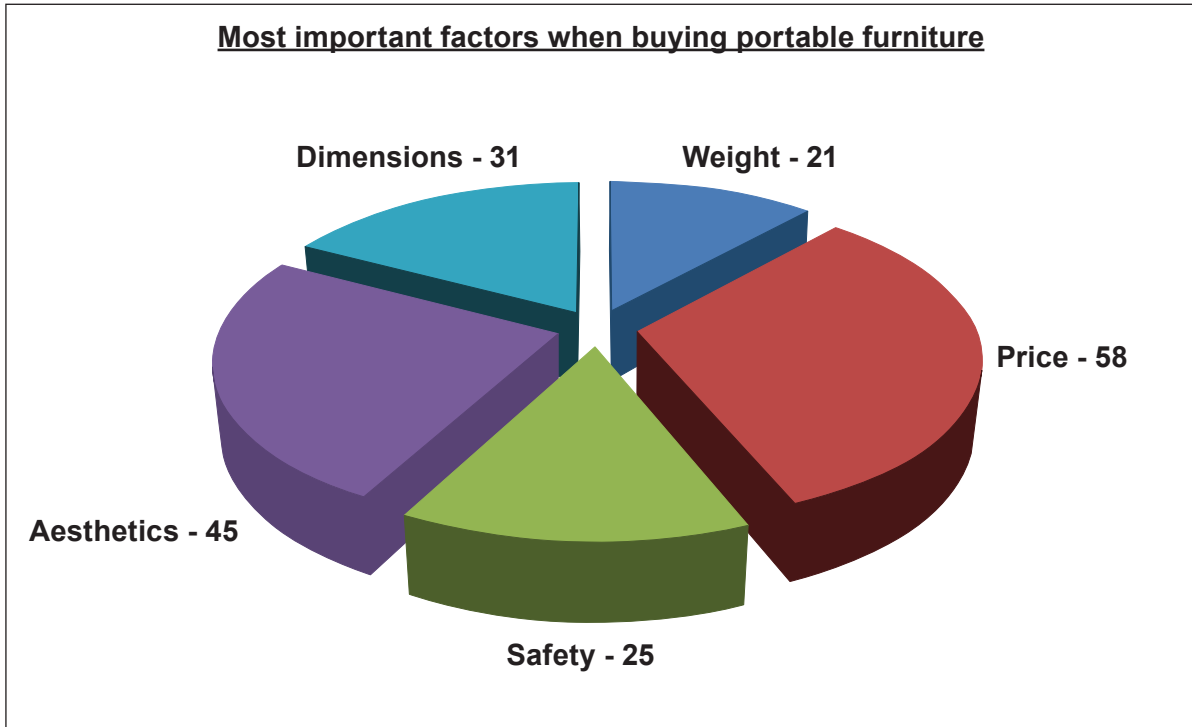
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- (d) Before designing the product a large number of people were asked to choose the most important factors when buying portable furniture.

The chart below shows the number of people who chose each factor.



- (i) Calculate the total number of people who were asked for their opinion.

Total: [1]

- (ii) Calculate the percentage (%) of the total number that identified price as the most important factor (*Show all workings*). [2]

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- (e) The manufacturer of the folding desk and chair unit has made an initial batch of 250 to sell at the launch of the product. Describe the reasons why no more than 250 have been made. [3]

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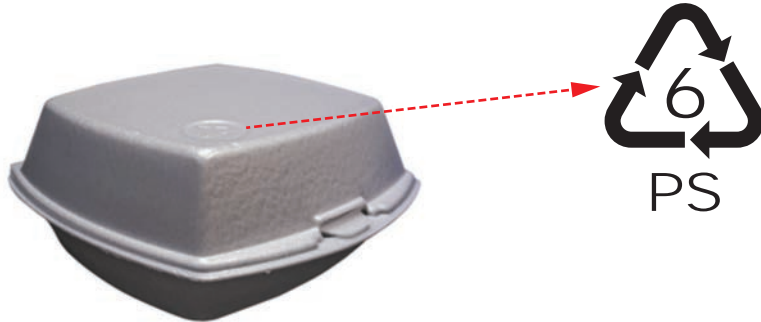
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2. This question is about the general issues of Design & Technology. It is worth a total of 10 marks.

(a) The plastic carton in the photograph displays the symbol highlighted.



State the **two** pieces of information that this symbol tells you about the material used.

- (i) [1]
- (ii) [1]
- (iii) Explain why manufacturers are expected to put these types of symbols on products. [2]

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(b) Complete the five step Risk Assessment below. [1]

1. Identify the hazards.
2. Identify who could be harmed.
3.
4. Record the findings.
5. Review the results of the Risk Assessment.

(c) Explain the role of the British Standards Institution (BSI).

[2]

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(d) Explain what is meant by the term 'sustainable design'.

[3]

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4. This question is about the Design Process and how it is used. It is worth a total of 25 marks.

(a) (i) A questionnaire is a common research strategy.

State **two** other research strategies that could be used to gather information.

2 x [1]

Strategy 1:

Strategy 2:

(ii) Freehand sketching is often used to communicate design ideas.

State **two** other possible methods of communicating design ideas.

2 x [1]

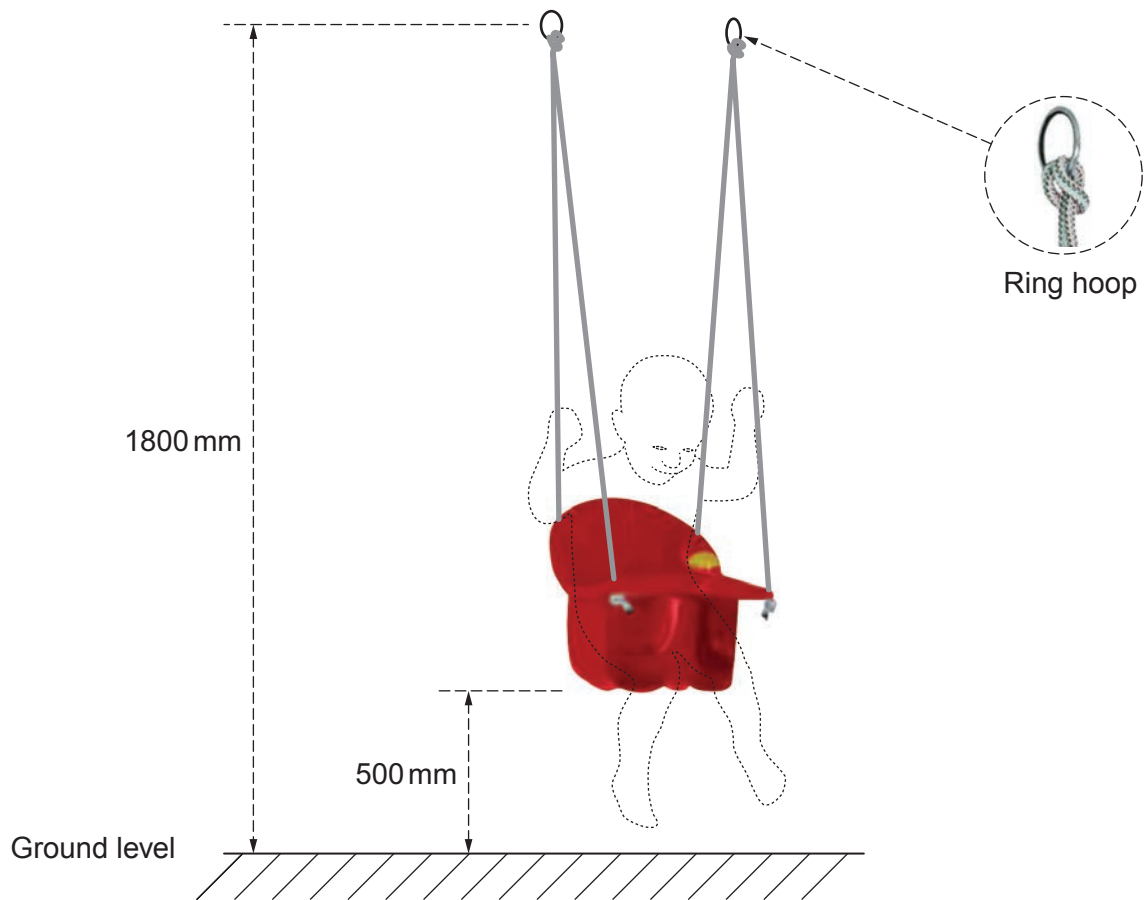
Method 1:

Method 2:

(b) Discuss how using an accurate design specification can aid the development of a successful product. [3]

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- (c) You have been asked to design a freestanding frame to support the children's 'bucket' swing seat shown below.



Specification

The support frame must:

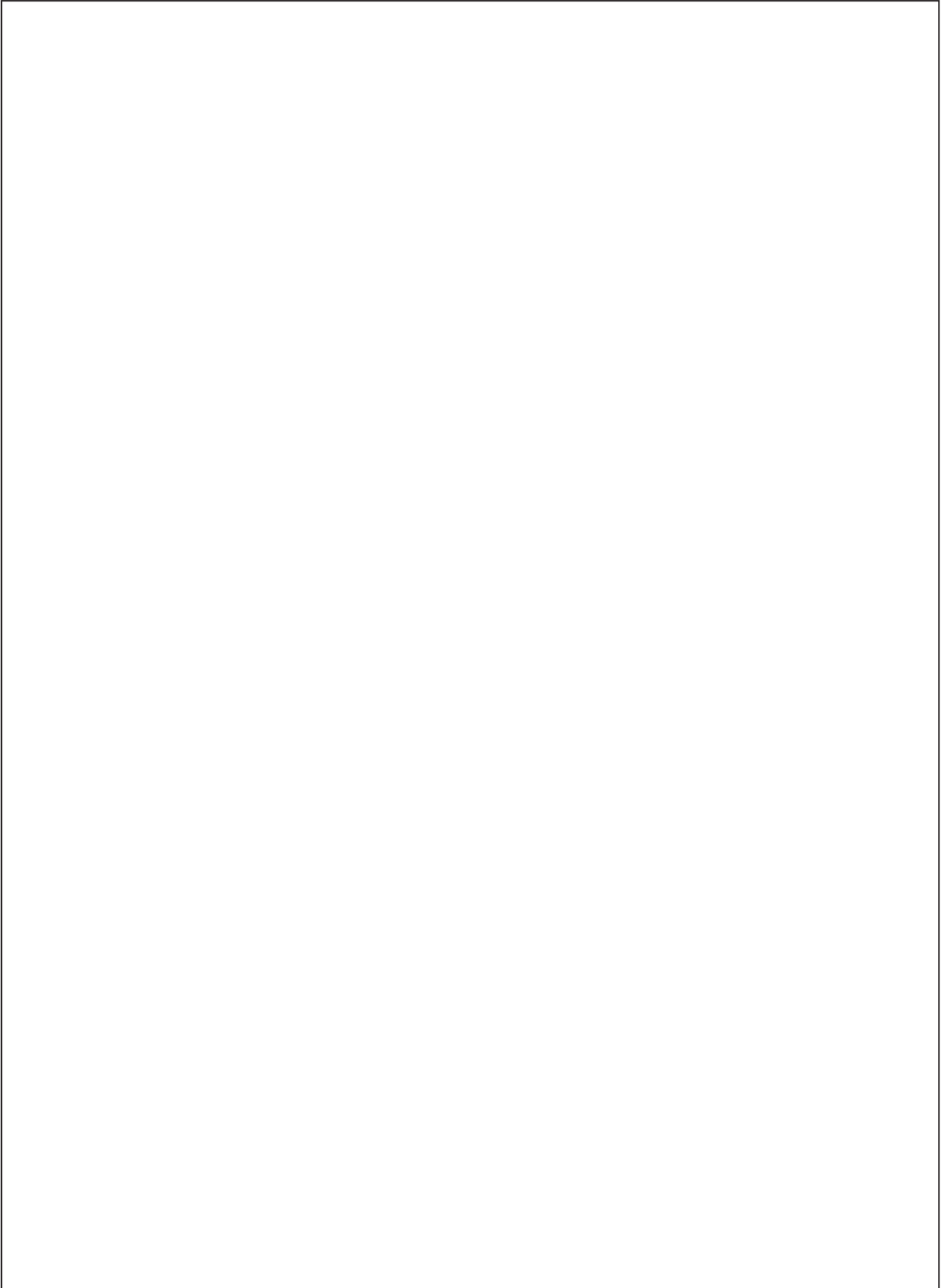
- be strong, stable and freestanding;
- include a means of securely suspending the seat from the ring hoops shown;
- suspend the bottom of the seat 500 mm from the ground.

Draw **one** design for the support frame. Use notes to explain your ideas.

Marks will be awarded for:

- | | |
|--|-----|
| (i) a fully functional design that satisfies the specification; | [3] |
| (ii) clear details showing the construction of a suitable support frame; | [6] |
| (iii) labelling suitable materials and components; | [3] |
| (iv) stating two important dimensions for the support frame; | [2] |
| (v) quality of communication. | [4] |

Draw your design in the box below.



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Section B

Marked out of 60 60 minutes

5. This question is about Commercial Manufacturing Processes. It is worth a total of 10 marks.

(a) Draw a line to connect the scales of production below with their correct description. (One has been done for you.) 2 x [1]

One-off production	Large numbers of products are made.
Mass production	A single product is made.
Batch production	A specific number of products are made.

(b) A vacuum-forming machine is shown below. State the purpose of the labelled parts.



Heater: [1]

Platen: [1]

Lever: [1]

(c) Manufactured boards such as chipboard and medium density fibreboard (MDF) are often covered with a wood or plastic veneer.

Explain **two** advantages of veneering manufactured boards. 2 x [1]

Advantage 1:

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Advantage 2:

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(d) Explain why quality control is important in the manufacture of products. [3]

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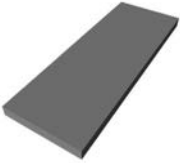


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6. This question is about Materials and Components. It is worth a total of 15 marks.

(a) Metals are sold in a number of common forms. Study the images below and select the correct metal form from the list. 3 x [1]

Rod	Strip	Channel	Tube
 (i)	 (ii)	 (iii)	

(b) Acrylic is classified as a thermoplastic. Explain what you understand by the term thermoplastic. [2]

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(c) State the correct names of **two** temporary joining methods used in the manufacture of products. 2 x [1]

Temporary joining method 1:

Temporary joining method 2:

(d) Complete the material descriptions below. 2 x [1]

(i) is a wood-based composite material made by mixing wood pulp and resin under heat and pressure.

(ii) is a lightweight hardwood often used in model making.

- (e) Modern canoes such as the example shown below are often made from glass reinforced plastic (GRP).



Discuss the benefits of making the canoe out of GRP.

[3]

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- (f) The picture below shows a high speed steel (HSS) drill bit which has a high carbon content.



Discuss how the carbon content of steel affects its properties.

[3]

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7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.

(a) State the correct name of **each** of the marking out tools shown below.

4 x [1]



(b) State the meaning of the **two** safety symbols shown below.

(i)



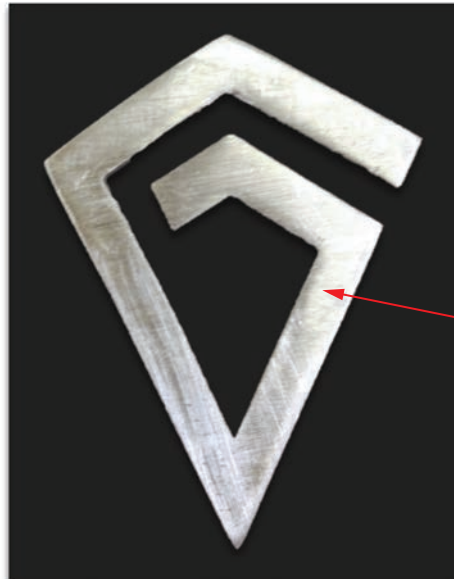
(ii)



(i) [1]

(ii) [1]

(c) The pewter brooch shown below has been made by the casting process.



Pewter brooch

Complete the table below by describing all the stages necessary to make the pewter brooch using common workshop tools and equipment. 5 x [1]

Stage	Description
1
2
3
4
5

(d) Study the picture of the children’s plastic building block shown below.



(i) Name the process used to manufacture the building block. [1]

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(ii) Describe the advantages of using this process to manufacture the building block. [3]

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- (e) The picture below shows a section of a steel frame that has been joined using the brazing process.



Using notes and sketches, describe how you would use the brazing process to successfully join the parts as shown. [5]

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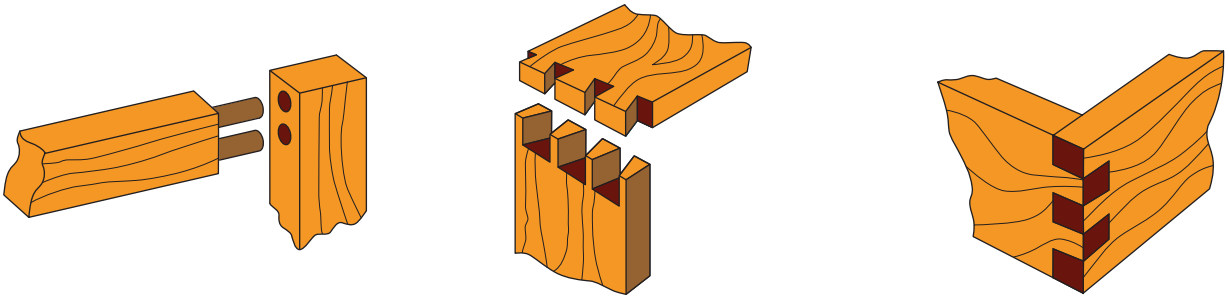
8. This question is about ICT, CAD/CAM, Systems and Processes. It is worth a total of 15 marks.

(a) Add the missing words to complete the terms below.

(i) ICT: Information Technology [1]

(ii) CAM: Computer Aided [1]

(b) State the correct names for the following wood joints. 3 x [1]



Name:

Name:

Name:

(c) Explain how you would achieve a high quality finish on the edges of the 5 mm thick piece of acrylic shown below. [3]



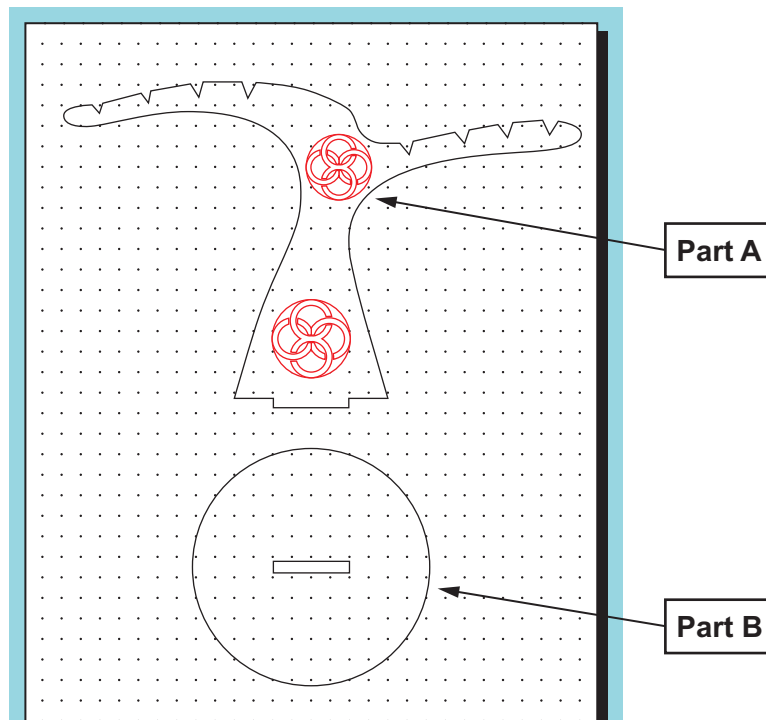
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- (d) The display stand shown below is to be manufactured in two parts from 4 mm Plywood on a laser cutter. Part A is designed to slot into Part B.



- (i) Describe the purpose of the **two** different coloured lines. [2]

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- (ii) When assembled the two parts should fit together securely. [2]

Discuss how a tight fit can be achieved.

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- (e) Discuss the reasons why the copper used to make the bowl shown below was annealed before being formed into its finished shape. [3]



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END OF PAPER

