



Please write clearly in block capitals.

Centre number

Candidate number

Surname \_\_\_\_\_

Forename(s) \_\_\_\_\_

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# GCSE DESIGN AND TECHNOLOGY: RESISTANT MATERIALS TECHNOLOGY

Unit 1 Written Paper

Friday 16 June 2017

Afternoon

Time allowed: 2 hours

## Materials

### For this paper you must have:

- a black pen
- a pencil
- a ruler
- an eraser
- a pencil sharpener
- coloured pencils.

## Instructions

- Use black ink or black ball-point pen.
- Use pencil and coloured pencils only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this answer book. Cross through any work you do not want to be marked.

## Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 120.
- Section A relates to the context referred to in the Preliminary Material that was previously issued.
- You are reminded of the need for good English and clear presentation in your answer. Quality of Written Communication will be assessed in Question 5 (b).

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>TOTAL</b>	



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## Section A

Answer **all** questions in the spaces provided.

In this section you will be asked to:

- produce a Design Specification.
- produce a range of ideas.
- develop one of your ideas.

### Design Brief

A manufacturer of indoor public seating has asked you to produce a range of designs for seating suitable for use in a new shopping centre.

You should produce **five** designs for seating suitable for use in a shopping centre.

**Two** of your seating designs **must** meet the needs of young children.

**Figure 1** shows a typical scene from a modern shopping centre.

**Figure 1**



**Question 1** is about the Design Specification.

You are advised to spend about 5 minutes on this question.

Give **three** design requirements for public seating.

Explain **each** of your answers.

An example has been completed for you below.

Requirement: The seating should be easy to clean.

Explanation: The seating may be used by people when they are eating and they may spill their food.

**1 (a)** Requirement 1 \_\_\_\_\_  
Explanation \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ **[3 marks]**

**1 (b)** Requirement 2 \_\_\_\_\_  
Explanation \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ **[3 marks]**

**1 (c)** Requirement 3 \_\_\_\_\_  
Explanation \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ **[3 marks]**



**2 (a)** **Question 2** is about creative design.

You are advised to spend about 20 minutes on this question.

Use the information in the Design Brief on page 2, and your answers in Question 1, to help you sketch **three different** designs for public seating suitable for use in an indoor shopping centre.

Marks will be awarded for creativity.

**[3 x 3 marks]**



**2 (b)**

Use the information in the Design Brief on page 2, and your answers in Question 1, to help you sketch **two** different designs for public seating in an indoor shopping centre. This seating should be designed for use by **young children**.

Marks will be awarded for creativity.

**[2 x 3 marks]****Turn over ►**

**3** **Question 3** is about developing **your** design.

You are advised to spend about 12 minutes on this question.

Choose **one** of your designs from Question 2.

Use notes and sketches to show how you would develop your design.

Marks will be awarded for details of:

- how you developed your design to meet the needs of the user **[3 marks]**
- construction **[3 marks]**
- design features and sizes **[3 marks]**
- materials and finishes (explain your choices). **[2 marks]**





Turn over for the next question

11

Turn over ►



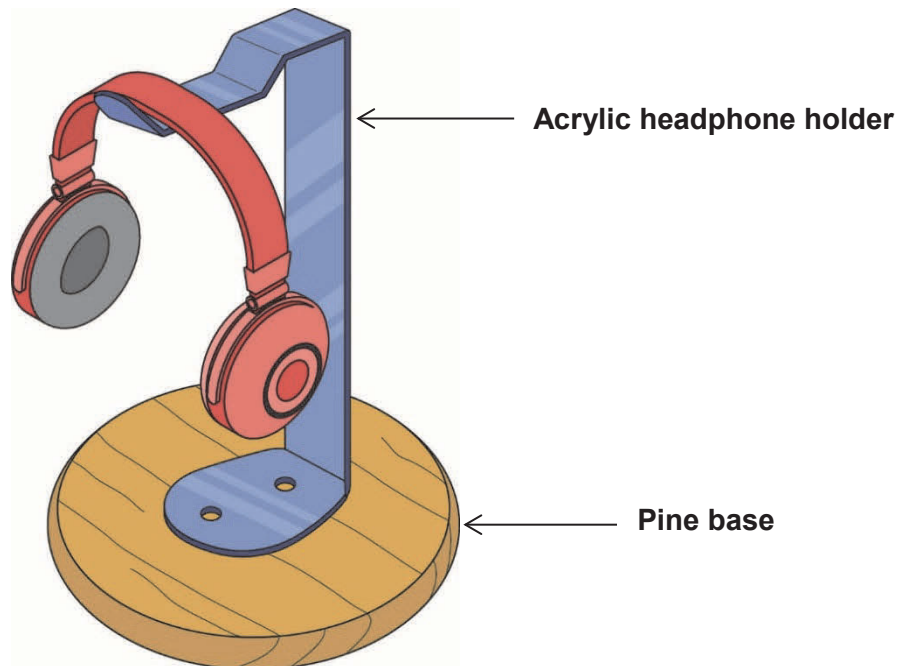
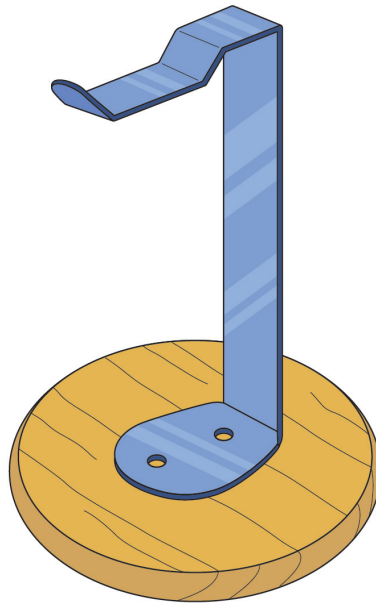
**Section B**

Answer **all** questions in the spaces provided.

**4** **Question 4** is about making.

You are advised to spend about 22 minutes on this question.

Study the drawings of the headphone stand shown below.





**4 (a)** Use notes and sketches to clearly show how you would make a batch of **ten** acrylic headphone holders in a school workshop.

The headphone holder is to be designed and cut using Computer Aided Design (CAD)/ Manufacturing (CAM) techniques and then bent into shape.

Your answer must include details of how you would:

- draw the net/development using CAD
- cut the shape using CAM
- produce **one** bend.

**[3 marks]**

**[3 marks]**

**[3 marks]**

Name all the equipment and software that you would use.

**Turn over ►**



**4 (b)** Use notes and sketches to clearly show how you would make a batch of **ten** pine bases.

The bases should be made by **traditional methods (not using CAD/CAM)**, in a school workshop.

You should include details of:

- marking out **[3 marks]**
- cutting/shaping **[3 marks]**
- finishing. **[3 marks]**

Name all the tools and equipment you would use.



**4 (c)** Use notes and sketches to clearly show how you would fix the acrylic headphone holders to the pine bases.

Name all the tools and equipment you would use.

**[3 marks]**



**5** Question 5 is about materials.

You are advised to spend about 10 minutes on this question.

- 5 (a)** Complete the table by placing a tick in the correct box to show whether the material is a thermoplastic or a thermosetting plastic.

For each material you should only tick **one** box.

**[5 marks]**

Material	Use	Thermoplastic	Thermosetting plastic
Acrylic (PMMA)	Car indicator lens		
Polyethylene terephthalate (PET)	Fizzy drink bottle		
Melamine formaldehyde (MF)	Kitchen worktop		
Low-density polyethylene (LDPE)	Plastic carrier bag		
Urea formaldehyde (UF)	Electric socket		



5 (b)

**Manufactured boards**



**Solid wood**



Discuss the **advantages** and **disadvantages** of using manufactured boards, rather than solid wood, to make furniture.

Quality of Written Communication will be assessed in this question.

**[8 marks]**

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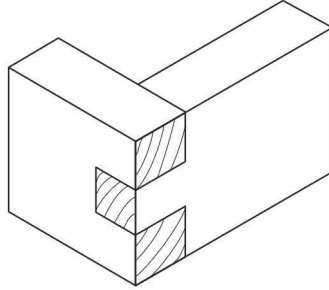
**Turn over ►**



**6** **Question 6** is about planning for making.

You are advised to spend about 10 minutes on this question.

Study the image of the wood joint.

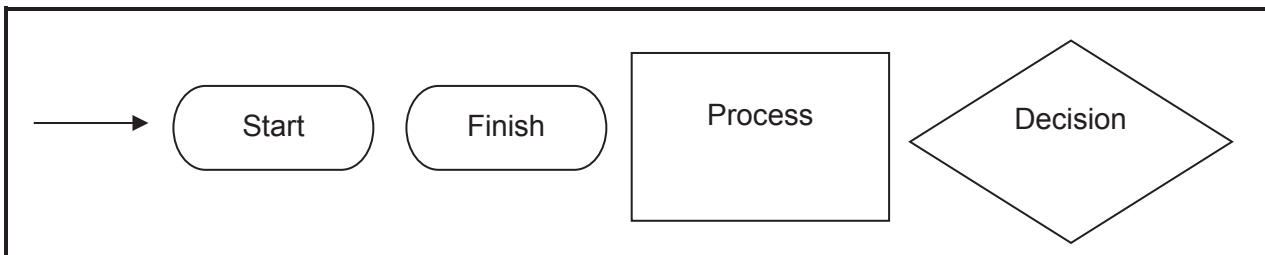


Produce a flow chart to clearly describe the stages in producing the wood joint.

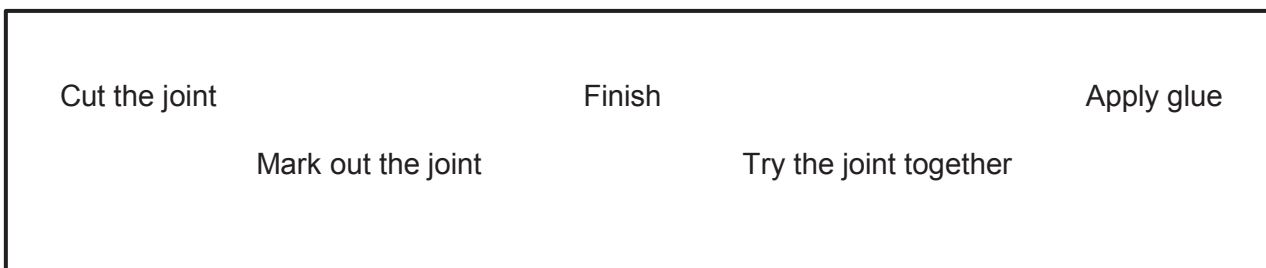
**[8 marks]**

Use the following **flow chart symbols** to place the **stages of producing a wood joint** in the correct order.

#### Flow chart symbols



#### Stages in producing a wood joint



Start

8

Turn over ►



7 **Question 7** is about materials and sustainability.

You are advised to spend about 9 minutes on this question.

7 (a) Study the products shown below.

Name **one** suitable, specific material which has been used to make each product.

Give **one** reason for **each** choice.

Give the original source of the material.

**Metal table**



Material \_\_\_\_\_ [1 mark]

Reason \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [1 mark]

Original source of the material

\_\_\_\_\_ [1 mark]

**Wooden table**



Material \_\_\_\_\_ [1 mark]

Reason \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ [1 mark]

Original source of the material

\_\_\_\_\_ [1 mark]







8 **Question 8** is about scales of production

You are advised to spend about 12 minutes on this question.

**Engagement ring**

**Mountain bike**

**Soft drink can**



8 (a) An engagement ring is an example of a product that can be made as a **one-off**.

Explain why an engagement ring would be made by **one-off production**.

[4 marks]

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**8 (b)** A mountain bike is an example of a product made in batches.

Explain why a mountain bike would be made by **batch production**.

**[4 marks]**

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**8 (c)** A soft drink can is an example of a product made continuously.

Explain why soft drink cans would be made by **continuous production**.

**[4 marks]**

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12

**Turn over for the next question**

**Turn over ►**




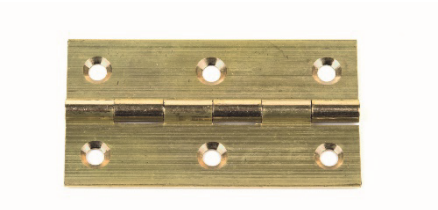


9 **Question 9** is about Pre-manufactured components.

You should spend about 8 minutes on this question.

9 (a) Complete the table shown below by correctly naming each component.

**[4 marks]**

Component	Name
	<hr/>
	<hr/>
	<hr/>
	<hr/>



9 (b)

Explain why a furniture manufacturer would buy pre-manufactured components rather than make them.

[4 marks]

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8

Turn over for the next question

Turn over ►



**10****Question 10** is about ergonomics and anthropometric data.

You are advised to spend about 12 minutes on this question.

Study the kettle shown below.



**10 (a)** Identify and describe **three** ergonomic features of the kettle.

**[9 marks]**

Ergonomic feature 1 \_\_\_\_\_

Description \_\_\_\_\_

\_\_\_\_\_

Ergonomic feature 2 \_\_\_\_\_

Description \_\_\_\_\_

\_\_\_\_\_

Ergonomic feature 3 \_\_\_\_\_

Description \_\_\_\_\_

\_\_\_\_\_

**10 (b)** Explain what is meant by the term **anthropometric data**.

Give examples of how anthropometric data has been used in the design of the kettle.

**[4 marks]**

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\_\_\_\_\_

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**END OF QUESTIONS**



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