

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
TOTAL	



General Certificate of Secondary Education
June 2012

Design and Technology: 45601 Resistant Materials Technology

Unit 1 Written Paper

Wednesday 27 June 2012 9.00 am to 11.00 am

For this paper you must have:

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

Time allowed

- 2 hours

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 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.
- The questions in Section A relate to the context referred to in the Preliminary Material that was previously issued.
- All dimensions are given in millimetres unless otherwise stated.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in Question 11.



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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
- evaluate your chosen idea.

Design Brief

A local manufacturer has asked you to produce a range of ideas for a jewellery storage device that will complement their new range of Charles Rennie Mackintosh inspired jewellery.

Two of your designs should be in the style of Charles Rennie Mackintosh.



Question 1 is about the Design Specification.

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

1 Give **three** design requirements of the jewellery storage device.

Explain each of your answers.

An example has been completed for you.

Requirement: The storage device should protect the jewellery being stored.

Explanation: This will prevent the jewellery from being damaged.

1 (a) Requirement 1

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Explanation

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(2 marks)

1 (b) Requirement 2

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Explanation

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(2 marks)

1 (c) Requirement 3

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Explanation

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(2 marks)

6

Turn over ►



Question 2 is about creative design.

You are advised to spend about 18 minutes on this question.

2 Study the information given in the **Design Brief** (page 2) and your **Design Specification** (page 3).

Use this information to help you sketch **five** different ideas for a jewellery storage device. **Two** of your designs should be in the style of Charles Rennie Mackintosh.

Marks will be awarded for creativity.

(5 x 3 marks)

15



Question 3 is about developing the design.

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

3 Choose your best idea from Question 2.

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

Marks will be awarded for:

- details of materials and finishes (3 marks)
- method of construction (3 marks)
- design features and sizes. (3 marks)

Turn over for the next question

9

Turn over ►



Question 4 is about evaluation.

You are advised to spend about 3 minutes on this question.

4 Explain why you have chosen the idea that you developed in Question 3.

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(3 marks)

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3



Section B

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

Question 5 is about sustainability.

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

5 (a) Use straight lines to connect the words below with the correct description.

Reduce

We must mend broken products instead of throwing them away.

Reuse

We should decrease the amount of finite materials that we use.

Recycle

We should decide whether we need products before we buy them.

Refuse

We should think of another use for a product before we throw it away.

Repair

We should decide not to buy products that harm the environment.

Rethink

We should make sure that products are converted back to their basic materials and then remade into new products.

(5 marks)

Question 5 continues on the next page

Turn over ►



5 (b) The figures below show two types of orange juice bottle.

Glass bottle



© Thinkstock

Plastic bottle



Discuss the sustainability of each orange juice bottle.

Glass bottle

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(4 marks)

Plastic bottle

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(4 marks)

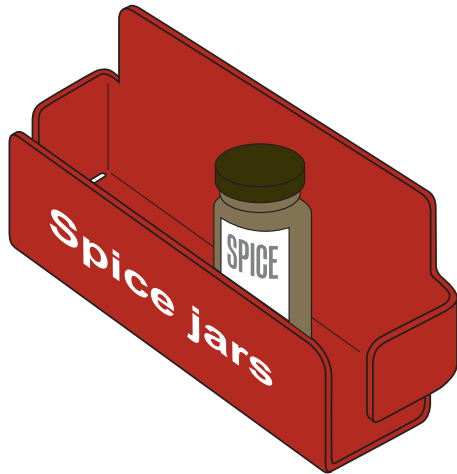


Question 6 is about making.

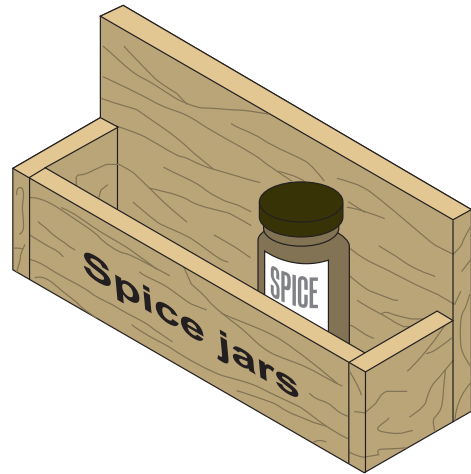
You are advised to spend about 18 minutes on this question.

6 Study the two designs for a spice jar holder shown below.

A plastic or metal spice jar holder



A wooden spice jar holder



Each of these spice jar holders could be made in a school workshop.

Choose **one** of the spice jar holders and tick the appropriate box.

You will be asked to show how you would make a batch of **ten** of your chosen spice jar holder in a school workshop.

Plastic spice jar holder

Metal spice jar holder

Wooden spice jar holder

Question 6 continues on the next page

Turn over ►



Use notes and sketches to clearly show how you would make a batch of **ten** of your chosen spice jar holder (from page 9) in a school workshop.

At each stage, name **all** the tools, equipment or software you would use.

Stage 1: Marking out **or** CAD (Computer-Aided Design)

(4 marks)

Stage 2: Cutting and shaping **or** CAM (Computer-Aided Manufacture)

(4 marks)



Stage 3: Bending **or** joining

(4 marks)

Stage 4: Applying the surface finish

(2 marks)

Stage 5: Producing the 'spice jar' text

(2 marks)



Question 7 is about product analysis.

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

7 Study the two saws shown below.

Saw A



Saw B



7 (a) Correctly name the two saws.

Saw A (1 mark)

Saw B (1 mark)

7 (b) Use notes and sketches to describe **one** process that you could carry out with both of these saws.

(3 marks)



7 (c) Both saws have blades that can be replaced.

Explain why this is important.

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(4 marks)

7 (d) Compare the effectiveness of using each saw.

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(6 marks)

15

Turn over ►



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



Question 8 is about smart and modern materials.

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

8 Complete the table below. The first one has been done for you.

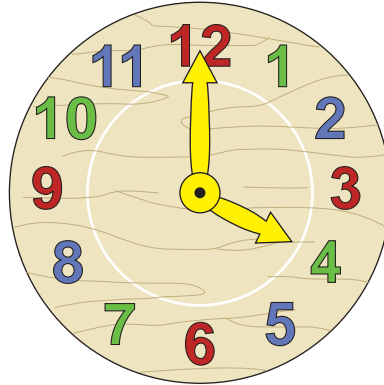
Material	Property	Use
<i>Shape memory alloys (SMA) 'Nitinol'</i>	<i>This metal will return to its original shape when heat is applied to it.</i>	<i>Spectacle frames</i>
Thermochromatic plastic (2 marks) (1 mark)
Carbon fibre (2 marks) (1 mark)
'Polymorph' (2 marks) (1 mark)
Motion control gel 'Smart grease' (2 marks) (1 mark)



Question 9 is about adhesives.

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

9 On the clock shown below, the acrylic numbers have been glued to the wooden clock face.



9 (a) Name the adhesive you would use to glue the acrylic numbers on to the wooden clock face.

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(1 mark)

9 (b) Explain why you have chosen this adhesive.

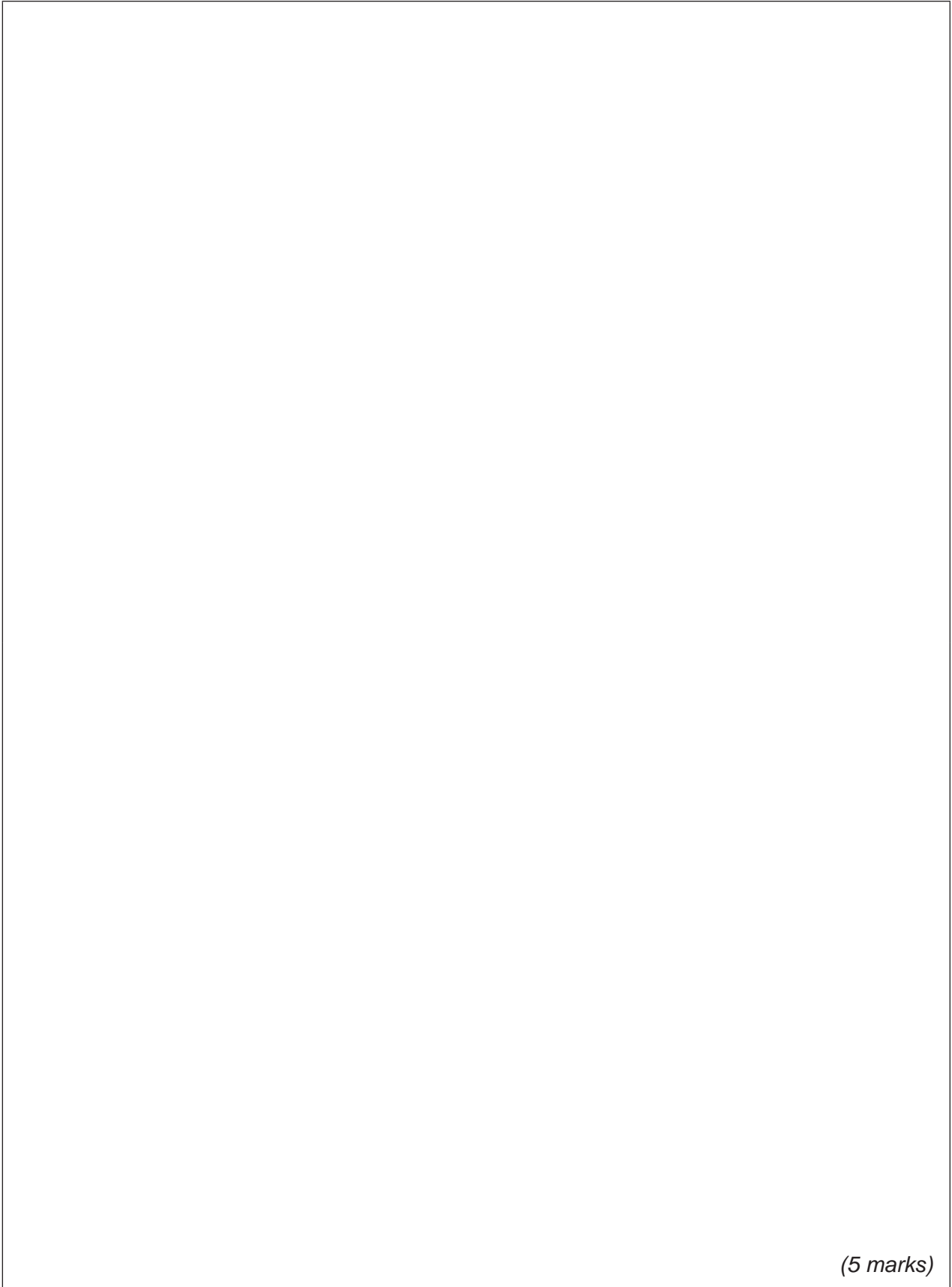
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(1 mark)

9 (c) Give details of any safety precautions that you would need to take when using the adhesive you have named in part (a).

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(2 marks)



- 9 (d)** Use notes and sketches to describe the process of gluing the acrylic numbers to the wooden clock face with the adhesive you have named in part (a).



(5 marks)

9

Turn over ►



Question 10 is about the work of the client, the designer, the manufacturer and the consumer.
You are advised to spend about 10 minutes on this question.

10 A client requires a new design for a computer workstation.



© LEVV Home Products

10 (a) Suggest **two** different types of research that the designer will need to carry out when designing the computer workstation.

In each case explain why it is necessary to carry out this type of research.

Research 1

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Explanation

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Research 2

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Explanation

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(4 marks)



10 (b)

Explain why it is important for designers to protect their ideas.

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(4 marks)

10 (c)

Describe the various methods that a manufacturer would use to ensure that the consumer receives a high quality product.

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(4 marks)

12

Turn over ►



