

Candidate Name	Centre Number	Candidate Number
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New GCSE

4111/01

DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Resistant Materials

Technology

P.M. WEDNESDAY, 26 May 2010

2 hours

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Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
Question 6	
Question 7	
Question 8	
TOTAL MARK	

ADDITIONAL MATERIALS

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

INSTRUCTIONS TO CANDIDATES

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 the answer at the back of the book, taking care to number the continuation correctly.

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.

The photograph shows a child’s toy box. The box costs £50 and is made from pine with MDF painted panels.



- (a) State **three** safety features customers would look for when buying a toy box for a small child. [3]

Safety feature 1:

Safety feature 2:

Safety feature 3:

- (b) A design specification was produced before designing the toy box.

Write a detailed specification point for each of the following headings.

One has been done for you.

- (i) Cost

The toy box must be able to be sold for a maximum of £50 in order to attract a high number of customers.

- (ii) Function [2]

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- (iii) Target audience [2]

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(iv) Aesthetics

[2]

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(c) The toy box is sold flat packed. Explain what you understand by the term flat packed.

[2]

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(d) The cost of making parts goes down when more parts are made; this is known as economics of scale.

Number of parts made	1000	2000	10 000
Fixed costs	£2000	£2000	£2000
Variable cost @ 50p per part	£500	£1000	£5000
Total cost	£2500	£3000	£7000
Cost per part	£2.50		

Study the table and calculate the cost per part for 2000 and 10 000 parts. Show *all* your workings.

(i) Cost per part for 2000.

[2]

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(ii) Cost per part for 10 000.

[2]

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

(a) Study the list of energy sources below and underline the **two** renewable sources. [2]

Wind Coal Oil Solar Gas

(b) Explain why it is becoming increasingly important to develop the use of renewable energy sources. [2]

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(c) Name any **two** of the six R's and explain what each means.

Name:

Explanation:

..... [3]



Name:

Explanation:

..... [3]

3. This question is about the designers that you have studied. It is worth a total of 10 marks.
During your course you have studied the work of James Dyson and Ross Lovegrove.

(i) Name the designer responsible for each of the products shown below. [2]

	
Name:	Name:

(ii) Select **one** of these designers and write a short essay describing their range of work and the impact it has had on product design. [8]

Marks will be awarded for the content of the answer and the quality of written communication.

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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) Study the key terms listed below and use lines to connect them with the correct definition. [3]

Key terms	Definition
Evaluation	How well the design has met the specification.
Analysis	A list of features the design must have.
Specification	Carefully consider the design problem.

(b) Explain the purpose of the design development. [2]

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(c) Explain how ICT / CAD can be used in the development of a design idea. [2]

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- (d) You have been asked by a local football club to design a portable drinks holder for four water bottles. The water bottles must be securely and easily transported.



The height of the water bottle is 250mm.

The diameter of the water bottle is 80mm.

Specification

The design must:

- be easy to carry to and from the football pitch;
- securely hold four water bottles;
- allow the bottles to be easily removed and replaced in the holder;
- be water / weather resistant.

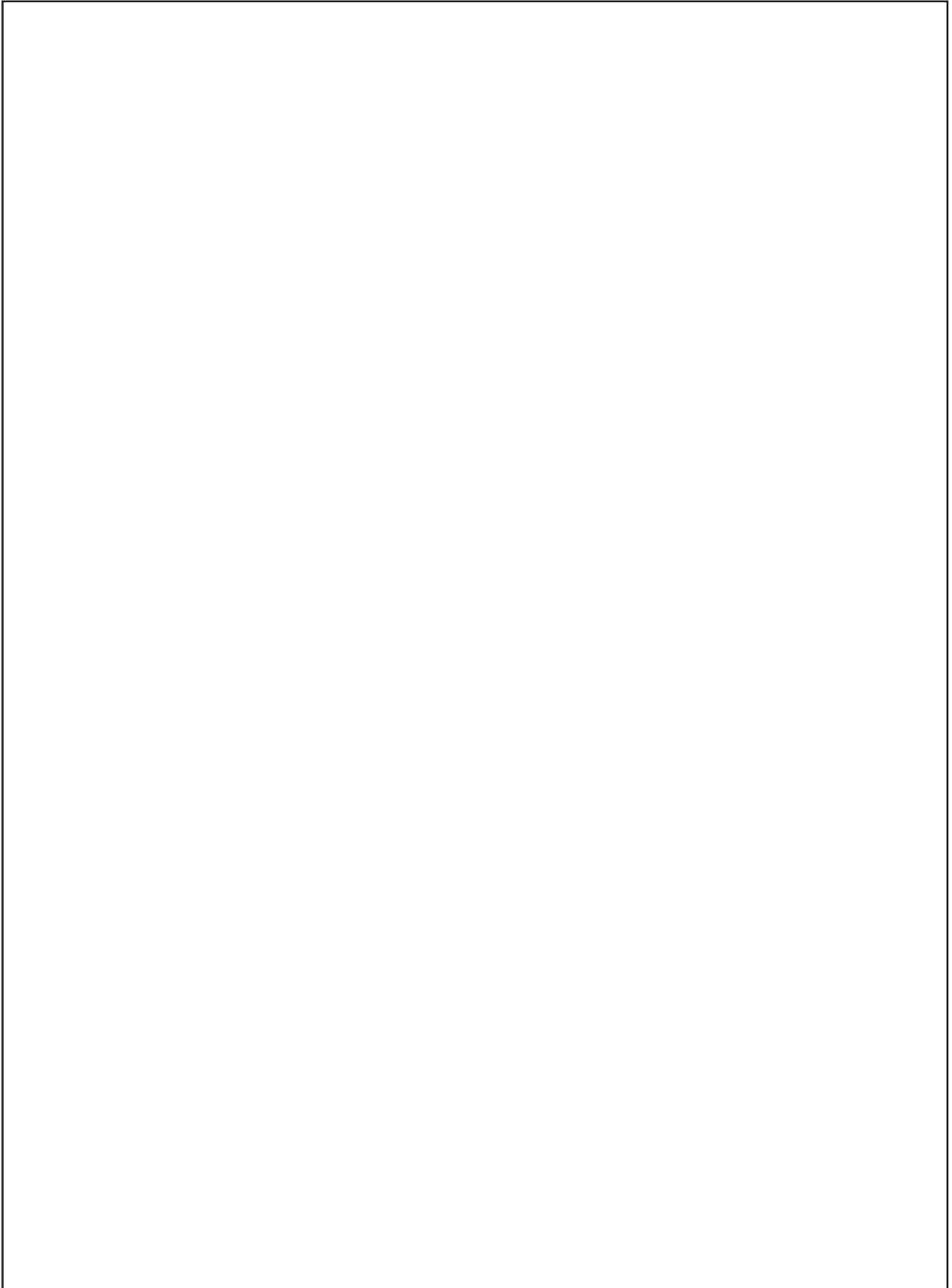
Draw **one** design for the water bottle holder. Use notes to explain your idea.

Sketch your solution on the opposite page.

Marks will be awarded for:

- | | |
|---|-----|
| (i) clear details showing the design and construction of a suitable holder; | [8] |
| (ii) specifying suitable materials and components; | [3] |
| (iii) details needed to satisfy the specification; | [3] |
| (iv) quality of communication. | [4] |

Draw your design in the box below.



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) From the list below, select the correct production method for each of the products shown. [3]

Vacuum Forming Die Casting Injection Moulding Laminating Extrusion

Product	Production method
 <p data-bbox="368 1151 585 1184">Steam iron base</p>	<p data-bbox="740 999 1390 1010">.....</p>
 <p data-bbox="397 1554 557 1588">Phone body</p>	<p data-bbox="740 1411 1390 1422">.....</p>
 <p data-bbox="397 1957 557 1991">Plastic tube</p>	<p data-bbox="740 1814 1390 1825">.....</p>

(b) Insert the missing words to complete the following sentences. [2]

(i) The method of producing identical products in very large quantities is called
..... production.

(ii) The method of producing a single item made to order is called
..... production.

(c) Explain why producing a single item made to order is often a lot more expensive. [2]

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(d) The manufacturing industry uses the concept of Just In Time (JIT). Explain what you understand by the term Just in Time (JIT). [3]

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

(a) Complete the table below by inserting the correct materials from the list. [3]

Pine MDF Brass Polystyrene Oak Steel

Hardwoods	Softwoods	Manufactured boards

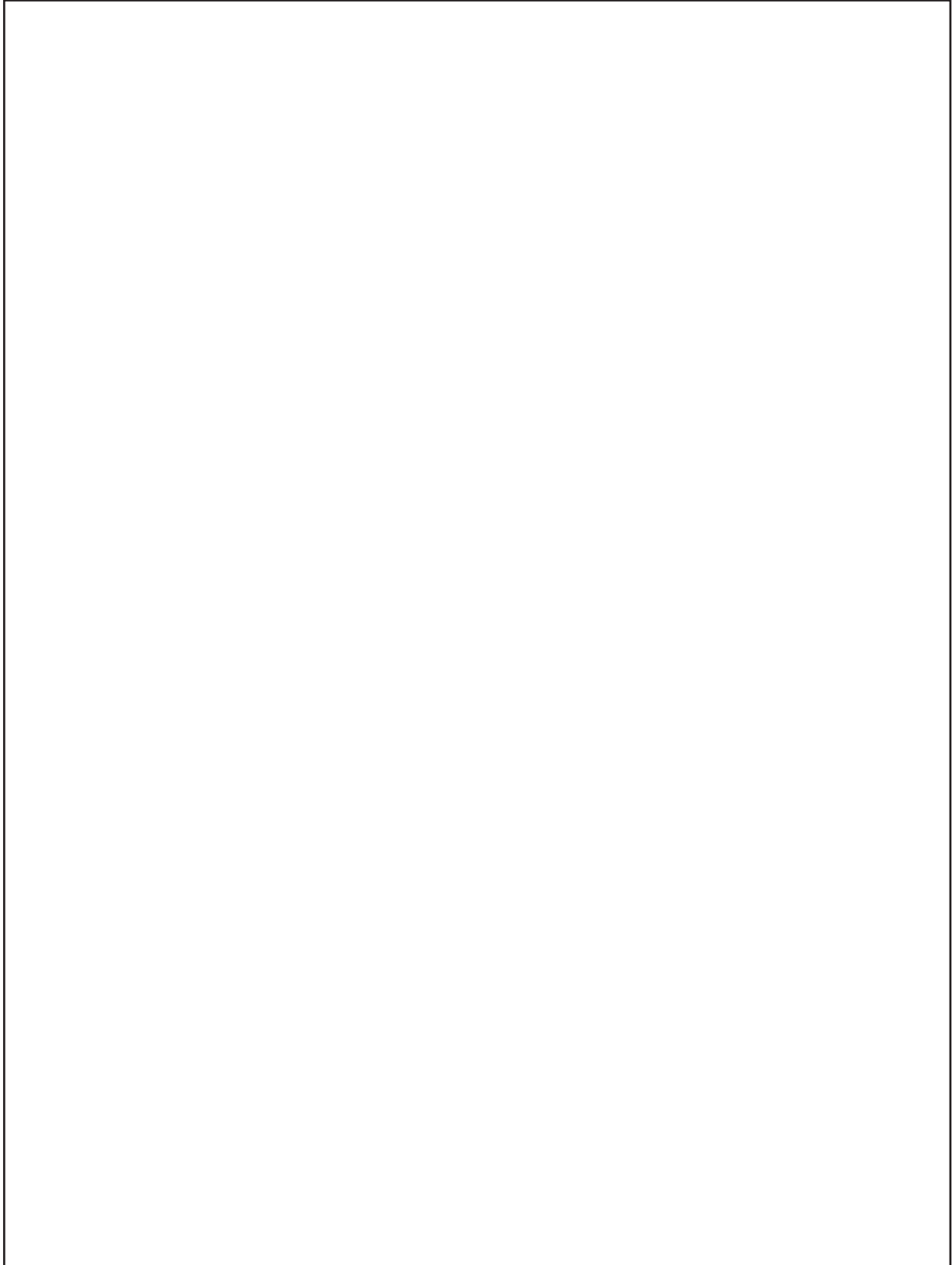
(b) Complete the table by stating **two** specific properties for the materials named that make them suitable for the product. [6]

Material	Product	Specific properties
Acrylic	 Shop signs	1. 2.
Ash	 Tool handle	1. 2.
Aluminium	 Garden chair	1. 2.

(c) Underline the **two** composite materials in the list below. [2]




Aluminium PVC Tungsten Carbide High Speed Steel GRP

(d) Use notes and sketches to explain in detail the construction of plywood. [4]



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

(a) Complete the table by giving the correct name for each of the tools shown and give a specific use for each. [6]

Tool	Name	Use
	<p>.....</p>	<p>.....</p> <p>.....</p>
	<p>.....</p>	<p>.....</p> <p>.....</p>
	<p>.....</p>	<p>.....</p> <p>.....</p>

(b) Name **two** tools used to hold, secure or clamp your work when making a product. [2]

Tool 1:

Tool 2:

(c) Safety is very important in Design and Technology. Explain the purpose of the **two** warning signs below. [4]



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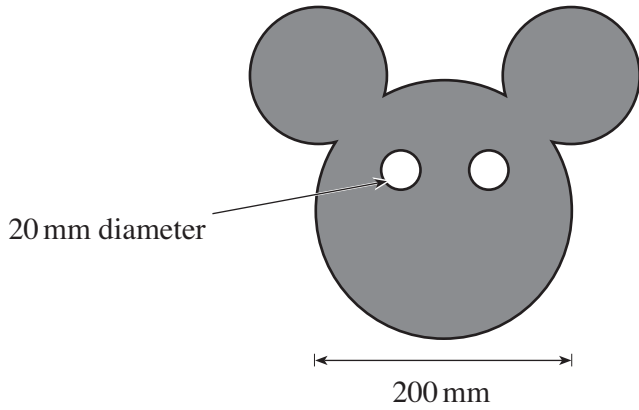
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- (d) The diagram below shows a design cut from a 5mm thick piece of plywood. Using notes and sketches show how you would accurately cut out and drill the shape using hand tools. [5]



- (e) Discuss the benefits of using jigs and formers when making products. [3]

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

(a) Joints can be permanent or temporary. Complete the table by stating whether the following joining methods are permanent or temporary. [4]

Joining method	Permanent or temporary
Mortise and tenon joint	
Riveting	
Nut and bolt	
Nailing	

(b) State **two** reasons why a finish is often applied to products made from resistant materials. [2]

Reason 1:

Reason 2:

(c) (i) CAM machines are often referred to as CNC machines. State what the initials CNC stand for. [2]

Computer N C

(ii) Other than speed explain **two** advantages of using CNC machines. [4]

Advantage 1:

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Advantage 2:

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(d) Rapid prototyping is increasingly used in industry. Discuss the benefits of rapid prototyping to the designer and manufacturer. [3]

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