Candidate Name	Centre Number	Candidate Number
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WJEC CBAC

GCSE

4111/01

DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Resistant Materials Technology

P.M. WEDNESDAY, 25 May 2011

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

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 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.

Examiner only

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 image of the desk lamp and the information shown below and answer the questions that follow.

Halogen bulb with transformer

Shade: Polycarbonate

Reflector and arm: Aluminium

Base: Steel - Spray Painted finish

Price: £34.99

Made in the UK

(a) Complete the table by explaining the choice of material used to make the parts of the lamp. [4]

Part	Material	Reason for choice
Shade	Polycarbonate plastic	....
Base	Steel	....

(b) A design specification was produced before designing the lamp.

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

(i) Safety: .....

.....

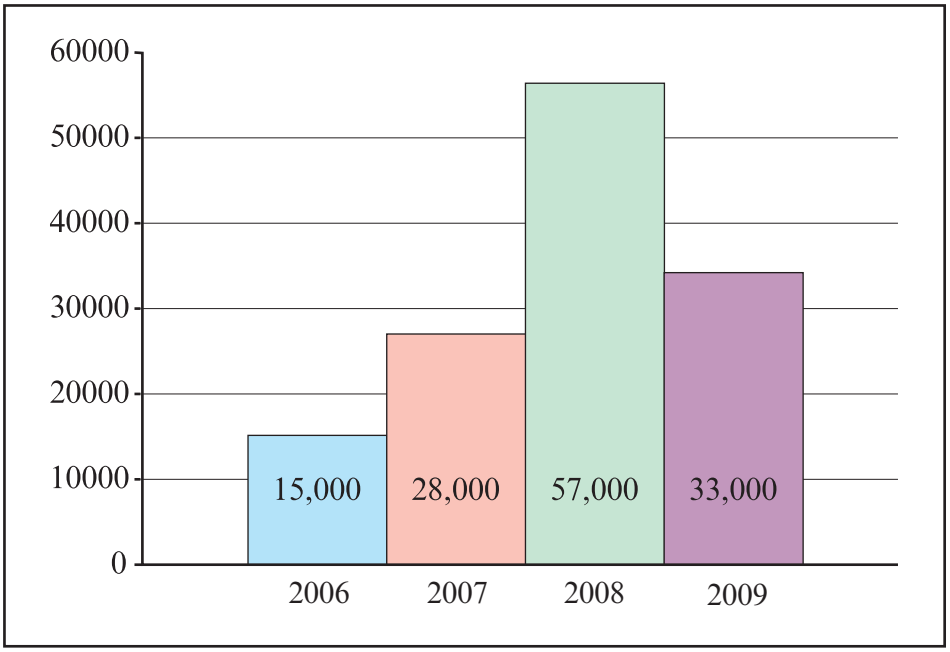
[2]

(ii) Function: .....

.....

[2]

(c) The graph shows annual sales of the lamp for four years.



Study the graph above and answer the questions that follow, showing **all** your workings.

(i) Calculate total sales from 2006 to 2009. [1]

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(ii) Calculate the percentage increase in sales between 2006 and 2008. [3]

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(d) Consider how the designer could modify the design or manufacture of the lamp to appeal to a larger target audience. [3]

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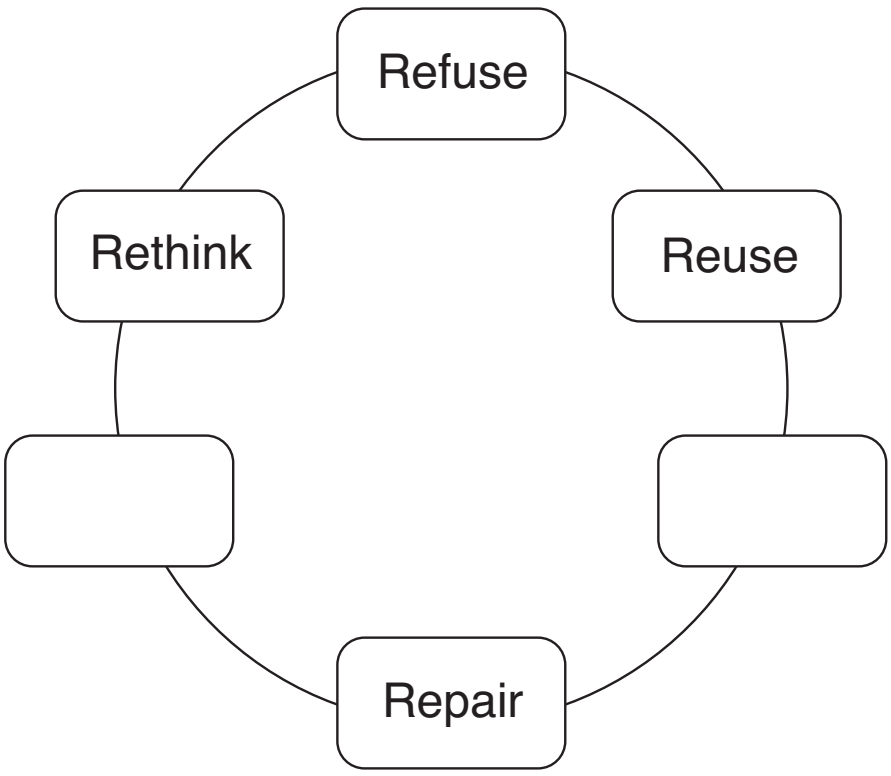
2. This question is about the general issues of Design and Technology. It is worth a total of 10 marks.

(a) State the name of the material that each of the recycling symbols shown below refers to. [3]

Symbol	Material
	.....
	.....
	.....

(b) Complete the *6 Rs of Sustainability* by adding the missing words. [2]



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(c) Explain **one** advantage of reusing products in terms of sustainability. [2]

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(d) Explain what you understand by the term **Life Cycle Analysis**. [3]

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Examiner only

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.

(a) Study the two photographs and name each designer. [2]

	
Name:	Name: .....

(b) Select **one** of these designers and write a short essay in the space below to:

- describe the designer's work identifying the main features;
- discuss the influence your chosen designer has had on Design and Technology. [8]

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

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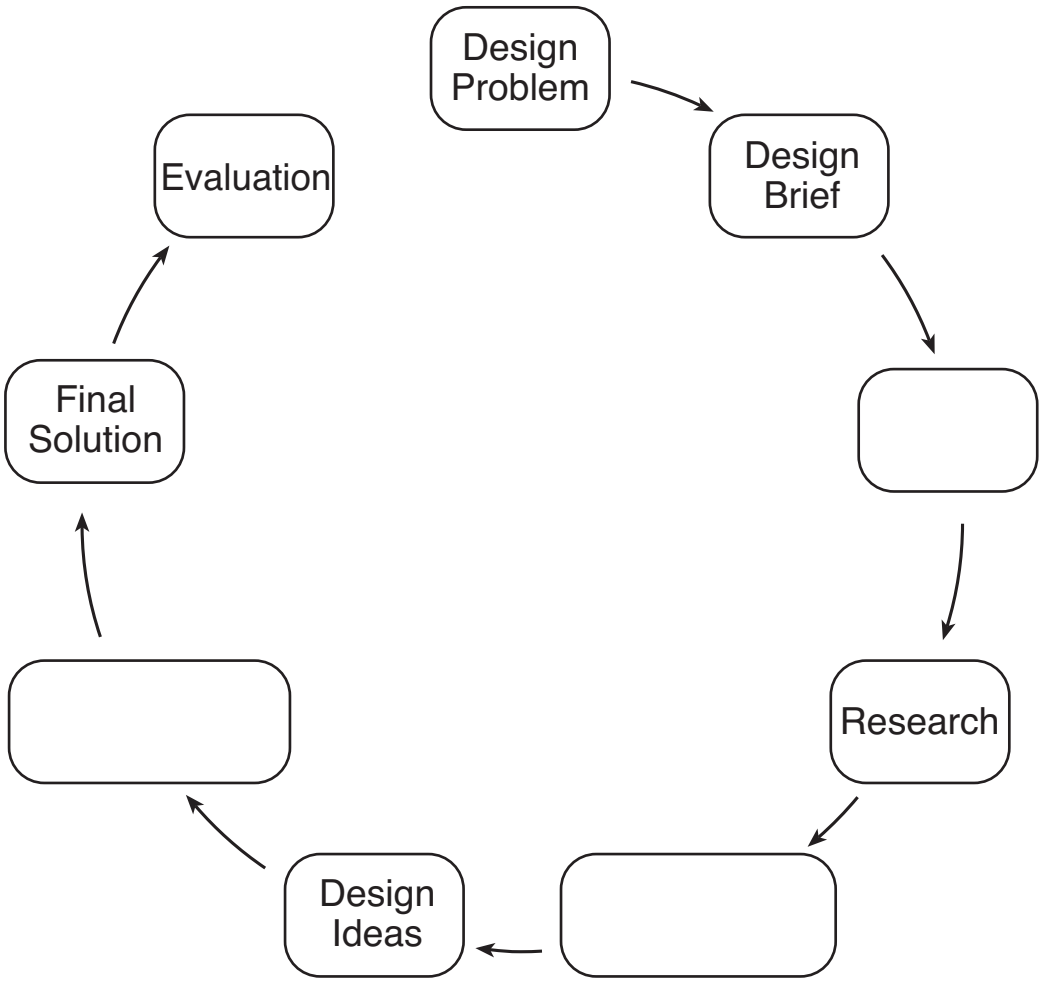
Examiner only

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

(a) Complete the design process below by adding the **three** missing stages. [3]



(b) Explain **two** important activities you should use when completing a final evaluation. [4]

Activity 1: .....

.....

.....

Activity 2: .....

.....

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(c) You have been asked by a local cafe to design a free-standing paper menu holder. The holder is to be placed on tables in the cafe and will display the daily specials.

A4 Size paper menu.
(210 × 297 mm)

Specification

The design must:

- allow the menus to be easily changed daily;
- support and protect the A4 size paper menu;
- allow the paper menu to be viewed from both sides;
- be free-standing on the table.

Draw **one** design for the paper menu holder. Use notes to explain your ideas.

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) specifying details needed to satisfy the specification; [3]
(iv) quality of communication. [4]

Draw your design in the box below.

Examiner only

Section B

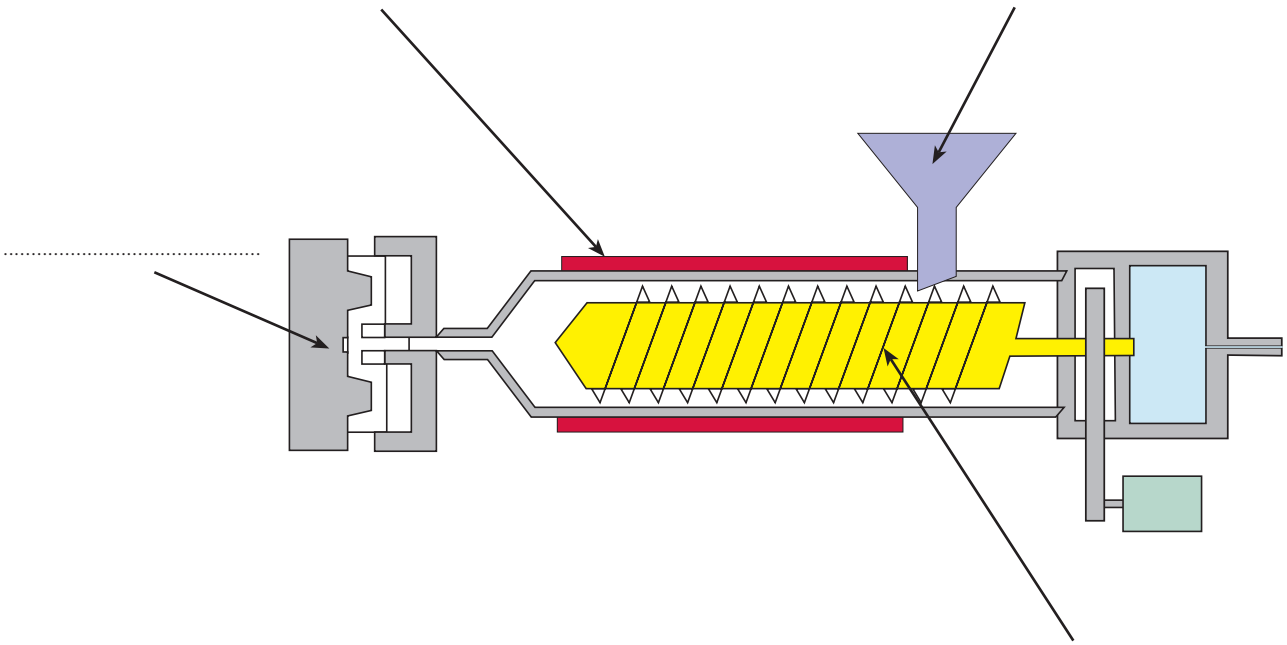
Marked out of 60 *60 minutes*

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

(a) The diagram shows the injection moulding process.

(i) Label the diagram by selecting the correct name for each part of the machine from the list below. [4]

Hopper Mould Feed Screw Heating Chamber Motor



(ii) State **two** reasons for using injection moulding to make commerical products. [2]

Reason 1: .....

Reason 2: .....

Examiner only

(b) Quality Control is very important in the production of commerical products. Explain what you understand by the term **Quality Control**. [2]

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(c) Explain why many commercial products are designed in Europe and the USA but manufactured in the Far East. [2]

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Examiner only

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

(a) Metals are classified as ferrous or non-ferrous. Complete the table below by inserting each material in the correct column. [4]

Brass Cast Iron Mild Steel Aluminium

Ferrous metals	Non Ferrous metals
.....	.....
.....	.....

(b) Study the performance characteristics listed below and use lines to connect them with the correct meaning. [3]

Performance Characteristic	Meaning
Malleability	Ability to be hammered without breaking.
Ductility	Ability to resist cutting.
Hardness	Ability to be stretched without breaking.

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(c) Complete the table by naming the correct material to match the following descriptions. [5]

Material	Description
.....	Hard plastic, available in a wide range of colours, used to make car rear light clusters.
.....	Hard, straight grained wood, wear and impact resistant, used to make mallets.
.....	Smooth surfaced and stable manufactured board, made by gluing tiny particles of wood together.
.....	Alloy of steel, 18% chrome and 8% nickel.
.....	Tough plastic with high impact resistance used to make safety helmets.

(d) Sketch **one** type of knock down fitting (KDF) and explain how it is used. [3]

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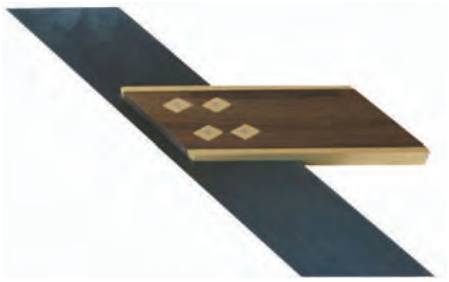
7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.

(a) Name **three** safety precautions when using a pillar drill. [3]

Pillar Drill	Safety Precaution
	1. .....
	2. .....
	3. .....

(b) Name the **four** tools shown below. [4]

	 .....
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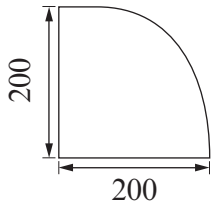
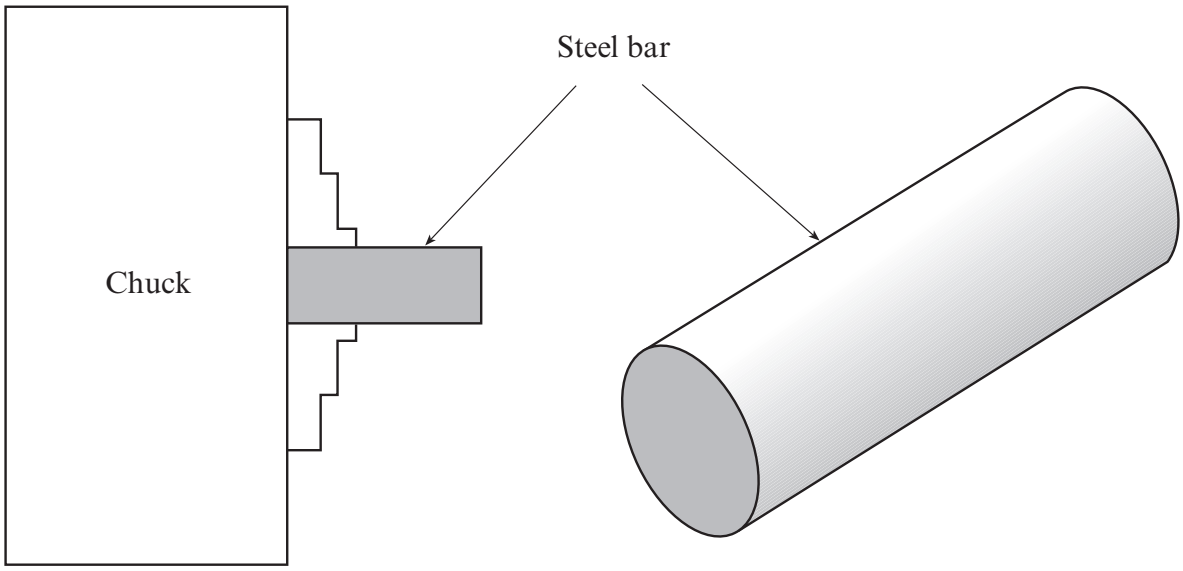
(c) Using notes and sketches describe in detail how you would manually mark out, cut out and finish a curve on the 5 mm piece of Acrylic shown. [5]



Dimensions in mm

(d) The diagram shows a 20 mm diameter steel bar secured into the chuck on a centre lathe. Name **three** operations that can be carried out on the bar using a lathe. [3]



(i) .....

(ii) .....

(iii) .....

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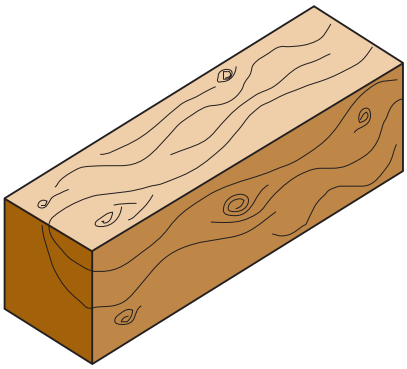
(e) The diagram shows a block of wood that is to be turned between centres on a woodworking lathe.



Using notes and sketches explain the stages you would go through to prepare and secure the wood ready for turning. [5]

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

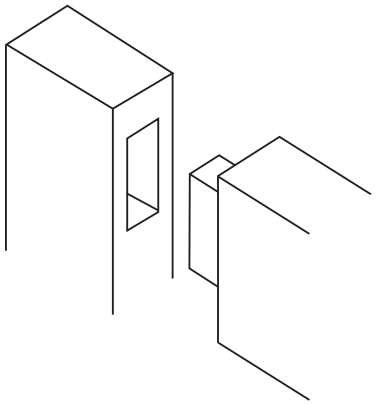
(a) From the list below, select the correct process used to make the following products. [4]

Blow Moulding Steam Bending Casting Vacuum forming Dip Coating

Product	Process
	.....
	.....
	.....
	.....

Examiner only

(b) (i) Name the joint shown in the diagram. [1]



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(ii) Explain the advantages of this joint over a butt joint. [3]

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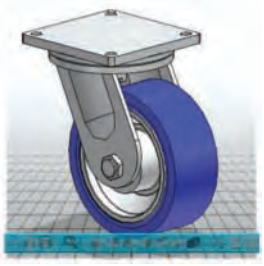
(c) Explain the benefits of using 3D CAD software to develop design ideas. [3]



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(d) Discuss the issues a manufacturer would need to consider before changing to a wholly computer controlled production process. [4]

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Examiner only

For continuation only.