

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
 MANUFACTURING (DOUBLE AWARD)**

4880

Unit 3: Application of Technology

TUESDAY 15 JANUARY 2008

Morning

Time: 1 hour 30 minutes

Candidates answer on the question paper.

Additional materials: No additional materials are required



Candidate Forename

Candidate Surname

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Show all working for calculations.
- Do **not** write in the bar codes.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

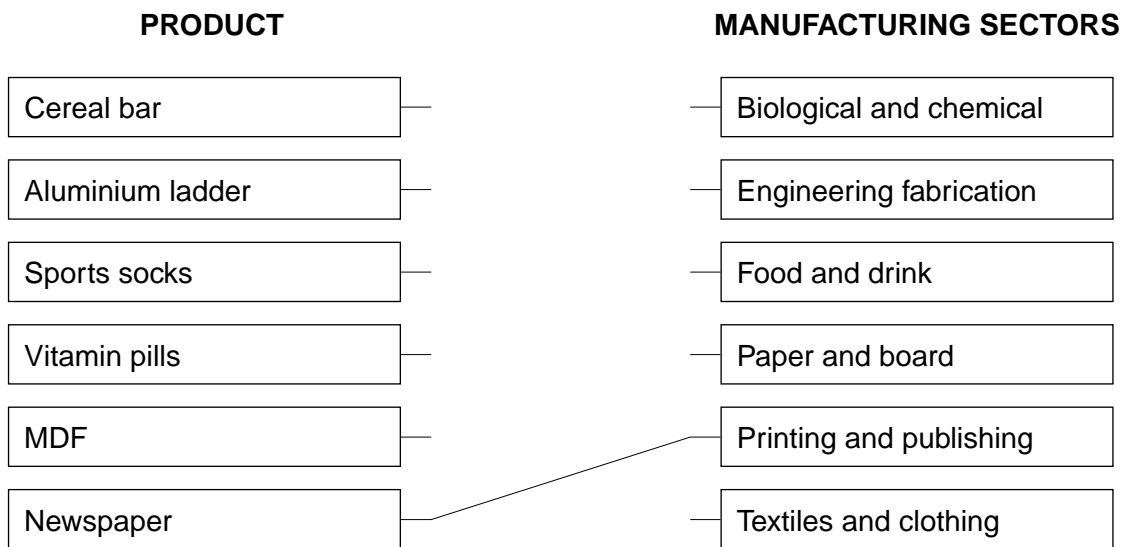
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- Marks will be awarded for the use of correct conventions.
- The total number of marks for this paper is **100**.
- Dimensions are in mm unless stated otherwise.
- Please note that the instruction 'discuss' denotes that you should:
 - identify **three** relevant issues/points raised by the question;
 - explain why you consider **two** of these issues to be relevant;
 - use **one** specific example or piece of evidence to support your answer.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

This document consists of **13** printed pages and **3** blank pages.

1 Manufacturing sectors produce different products.

(a) Complete the links below to identify the sector which makes the products listed.
One has been done for you.



[5]

(b) Choose **one** manufacturing sector with which you are familiar and:

- name **two other** products produced in the sector;
- state **one** example of technology used in the sector;
- describe **two** benefits of using the technology in the sector.

Sector

Product 1[1]

Product 2[1]

Technology

.....[1]

Benefit 1

.....

.....

.....[2]

Benefit 2

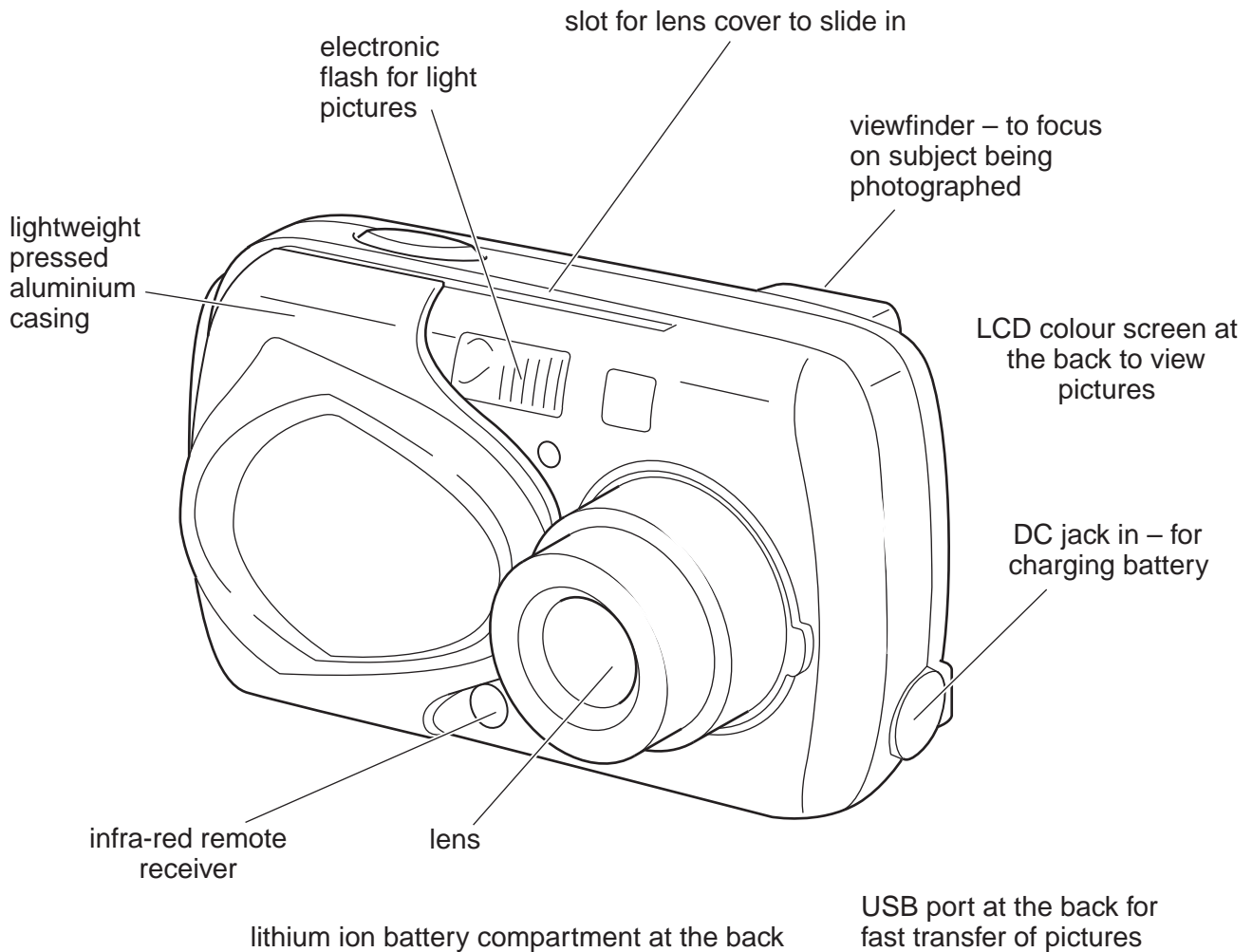
.....

.....

.....[2]

- 2 The sketch and notes below explain how technology and materials are used in the design and manufacture of a digital camera.

Example product: *Digital Camera*



Choose a **different** product and use sketches and notes to explain how technology and materials are used in its design and manufacture.

Your answer must include:

- the technologies used; [4]
- how materials/components are used; [4]
- the structure and form of the product. [4]

Use the example of the digital camera to help plan your answer.

Marks will NOT be given for information copied from the example.

Your chosen product for **Question 2**.

3 A CAD package can be used to produce manufacturing drawings.

(a) Give **two** benefits of using CAD to produce manufacturing drawings.

Benefit 1
.....[1]

Benefit 2
.....[1]

(b) State **two** items of hardware used with a computer when producing manufacturing drawings.

1[1]

2[1]

(c) A manufacturing company in another country needs a copy of a CAD drawing **as soon as possible**.

(i) Identify **one** ICT application that could be used to send a CAD drawing to the manufacturing company in another country.
.....[1]

(ii) Describe how you would send a CAD drawing using the application you identified in part (i).
.....
.....
.....[2]

(d) (i) Identify **three** more ICT applications used when designing manufactured products.

1[1]

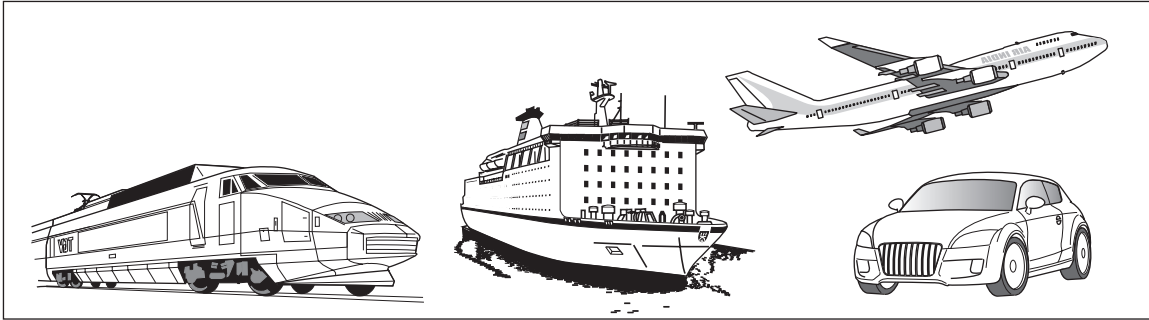
2[1]

3[1]

(ii) Describe how **one** of these ICT applications is used when designing manufactured products.
.....
.....
.....[2]

7
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Transport has improved in many ways through the application of technology. For example, modern cars are safer and more comfortable for passengers.

(a) (i) Describe **two** ways in which the application of technology has made modern transport safer for passengers.

1
.....
.....[2]

2
.....
.....[2]

(ii) Describe **two** ways in which the application of technology has made modern transport more comfortable for passengers.

1
.....
.....[2]

2
.....
.....[2]

(b) Transport systems can cause damage to the environment.

(i) Describe **two** ways in which transport systems cause damage to the environment.

1
.....
.....[2]

2
.....
.....[2]

(ii) Describe how some of this damage to the environment is being reduced.

.....
.....
.....[2]

5 Modern and smart materials are increasingly used in components of manufactured products. Some examples of smart materials are listed below.

- Photochromic glass
- Shape memory alloy
- Thermochromic dye
- Modified starch
- Antimicrobial fibre

(a) Complete the table for **two** smart materials chosen from the list above. Photochromic glass has been done as an example.

Smart material	'smart' property	Two components made with the smart material	Application of the smart material
Photochromic glass	Darkens when exposed to light	Lenses	Light sensitive spectacles
		Window panes	In museums to stop strong light damaging exhibits
		[1]	[1]
	[1]	[1]	[1]
		[1]	[1]
	[1]	[1]	[1]

(b) Composite materials are also used in manufactured products.

(i) Name **one** composite material.

.....[1]

(ii) Explain why composites are used in manufactured products.

.....

[3]

6 Two examples of systems and control technology are:

- Programmable Logic Controllers (PLCs);
- Robotics.

(a) PLCs are used in different stages of production including assembly, finishing, packaging and dispatch.

(i) State **one** process in the **assembly** stage of production that can be controlled by a PLC.
.....[1]

(ii) State **one** process in the **finishing** stage of production that can be controlled by a PLC.
.....[1]

(iii) Describe how PLCs are used in the **dispatch** of products.
.....
.....
.....[2]

(iv) Describe **two** benefits of using PLCs in the production of manufactured products.
Benefit 1
.....
.....[2]

Benefit 2
.....
.....[2]

(b) Robotics can also be used in different stages of production.

Describe **two** factors that may be considered when deciding whether to use robotics in the production of manufactured products.

1
.....
.....[2]

2
.....
.....[2]

- 7 A company has been investigating different ways of manufacturing a product. The table indicates the initial research carried out by the company into the costs of various forms of production. The method chosen will depend upon the type of product and volume of production required.

Method of manufacture	Manufacturing cost per unit	Outlay on equipment	Reject rate	Manufacturing time per unit
Outsourced	Medium	None	High	Very long
Manual	High	Low	High	Long
Fully automated	Low	Very high	Low	Short
Semi automated	Medium	High	Medium	Medium

Complete the table below to show for each method of manufacture:

- a typical product made by this method;
- the production volume;
- two reasons why the method is most suitable.

Outsourced has been done as an example.

Method of manufacture	Product	Volume of production	Reasons
Outsourced	Buttons	High	Time and cost to set up production.
			Just in Time delivery saves money tied up in stock.
Manual	[1]	[1]	[1]
			[1]
Fully automated	[1]	[1]	[1]
			[1]
Semi automated	[1]	[1]	[1]
			[1]

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