OCR
RECOGNISING ACHIEVEMENT

GCSE **4880**

MANUFACTURING (DOUBLE AWARD)

UNIT 3: Application of Technology

TUESDAY 16 JANUARY 2007 Morning

Time: 1 hour 30 minutes

Candidates answer on the question paper.
No additional materials are required.

Candidate Name

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Show all working for calculations.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

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; and
  - use **one** specific example or piece of evidence to support your answer.

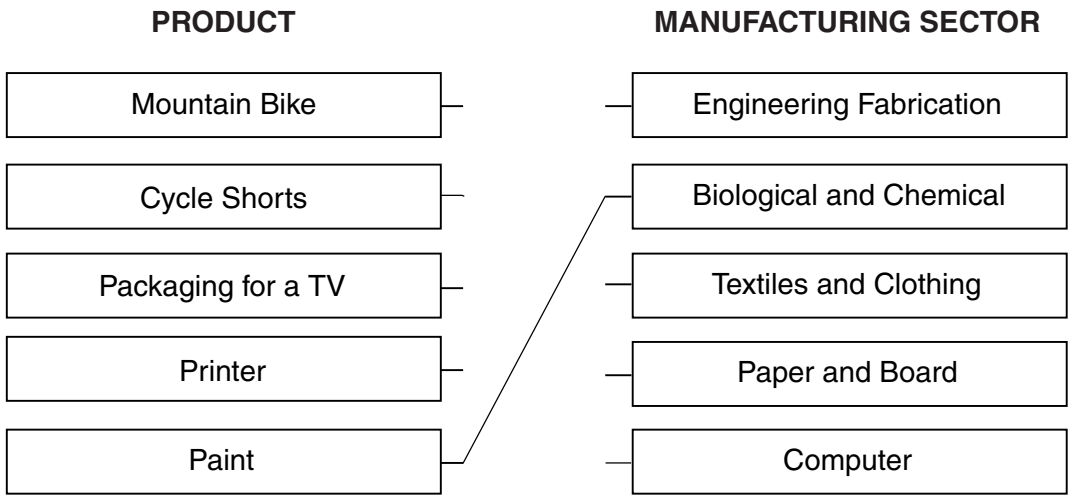
FOR EXAMINER'S USE	
Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
Question 6	
Question 7	
Question 8	
TOTAL	

This document consists of **12** printed pages.

1 **(a)** Manufacturing sectors produce different products.

Complete the links below to identify the sector which makes the products listed.

One has been done for you.



[4]

(b) For **three** of the products listed in part **(a)** identify:

- a modern technology used by each product; and
- the technology it replaces.

An example has been done for you.

Product	Modern Technology	Technology Replaced
Paint	Synthetic binding agents	Lead pigment
	[1]	[1]
	[1]	[1]
	[1]	[1]

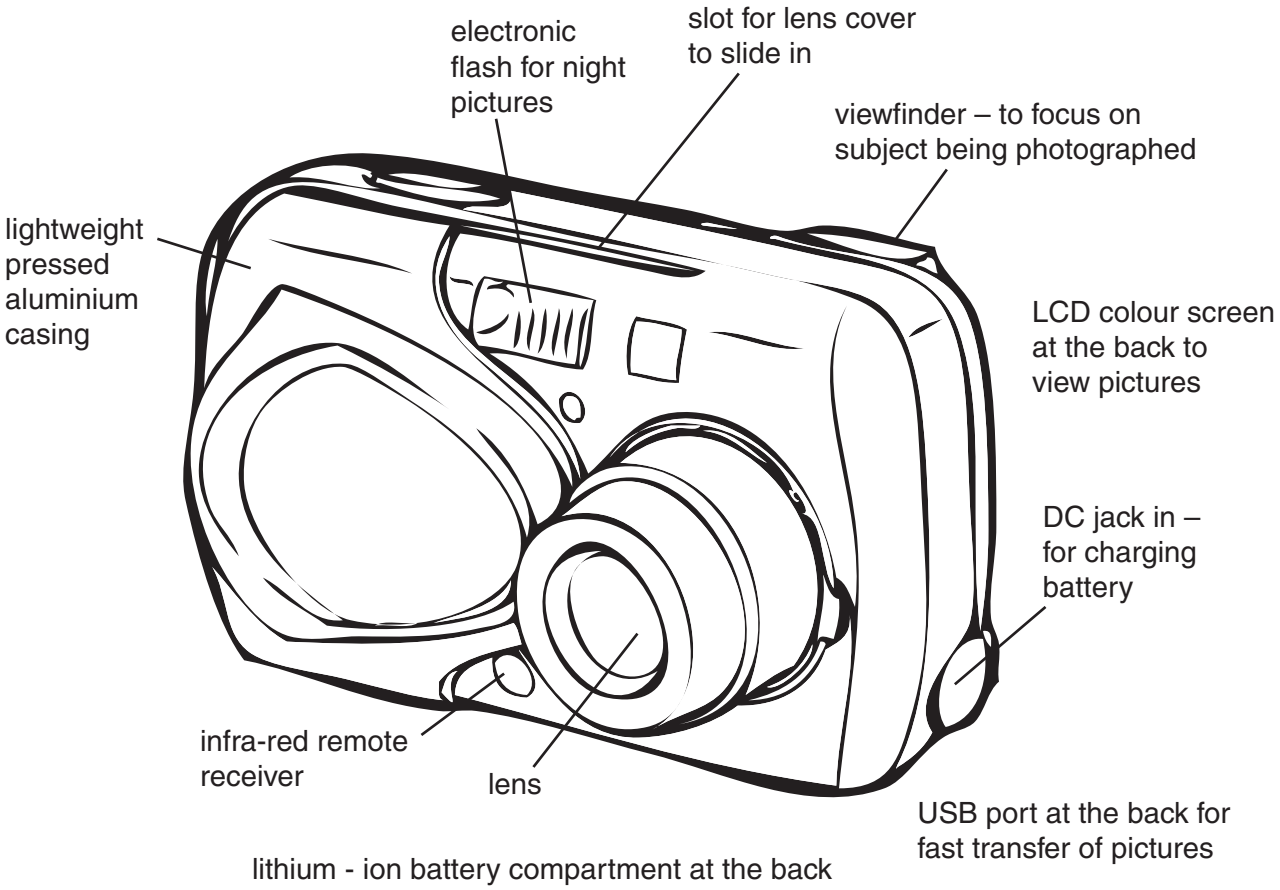
(c) Give **two** reasons why manufacturing products are classified into different sectors.

1 .....[1]

2 .....[1]

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; and [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 or for repetition of points.

Your chosen product for **Question 2** ....

3 Modern materials have improved many products.

The use of modern materials can:

- reduce the weight of a product;
- make a product stronger;
- make a product easier to use; or
- make a product safer.

(a) State **one** example of a product that uses a modern material to reduce its **weight** and name the modern material used.

Product .....[1]

Modern material .....[1]

(b) State **one** example of a product that uses a modern material to make it **stronger** and name the modern material used.

Product .....[1]

Modern material .....[1]

(c) State **one** example of a product that uses a modern material to make it **easier to use** and name the modern material used.

Product .....[1]

Modern material .....[1]

(d) State **one** example of a product that uses a modern material to make it **safer** and name the modern material used.

Product .....[1]

Modern material .....[1]

(e) Describe **two** effects on the **workforce** when a company uses modern materials.

1 .....

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.....[2]

2 .....

.....

.....[2]

4 Fig. 1 shows a domestic washing machine.

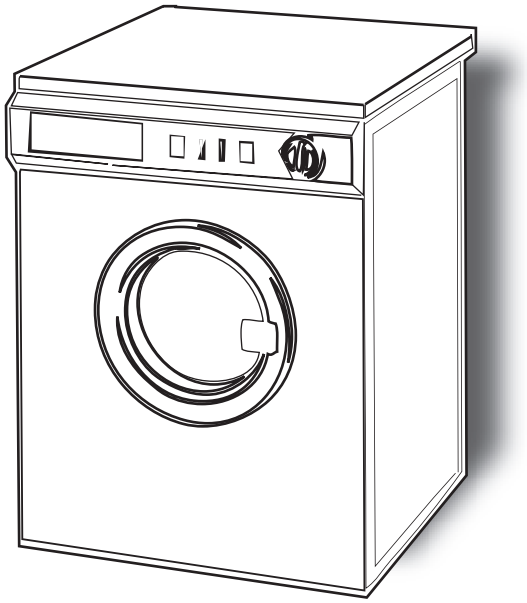

Fig. 1

(a) Give **two** examples of how ICT is used when **designing** a washing machine.

1 .....[1]

2 .....[1]

(b) Give **two** examples of how ICT is used when **marketing** washing machines.

1 .....[1]

2 .....[1]

(c) Describe the function of an **embedded system** in a washing machine.

.....

.....

.....[2]

(d) Describe how **automation** is used in the manufacture of a washing machine.

.....

.....

.....[2]

(e) Describe **one** benefit of modern technology **to users** of washing machines.

.....

.....

.....[2]

(f) At the end of their useful lives, washing machines and refrigerators have to be disposed of. Describe **two** difficulties when disposing of washing machines or refrigerators.

Difficulty 1 .....

.....

.....[2]

Difficulty 2 .....

.....

.....[2]

5 Robotics is widely used in Manufacturing.

The advantages of using robotics include:

- continuous operation;
- improved reproducibility (repetition);
- increased speed; and
- working in hazardous environments.

(a) Explain, using an example, how robotics can achieve each of these advantages:

continuous operation .....

.....

.....

.....[3]

improved reproducibility .....

.....

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.....[3]

increased speed .....

.....

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.....[3]

working in hazardous environments .....

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.....[3]

(b) Explain **one** disadvantage to a manufacturing company of introducing robotics into their manufacturing operations.

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.....[2]

6 During the making of a product various factors have to be considered at each stage.

The stages of making a product are:

- designing;
- production planning;
- material supply and control;
- processing – production;
- packaging; and
- dispatch.

(a) Complete the table below to identify **two** different factors for each stage.
One has been done for you

Stage	Factors to be Considered
Designing	Factor 1 [1]
	Factor 2 [1]
Production planning	Factor 1 [1]
	Factor 2 [1]
Material supply and control	Factor 1 [1]
	Factor 2 [1]
Processing – production	Factor 1 [1]
	Factor 2 [1]
Packaging	Factor 1 **Protective materials such as bubble wrap are needed**
	Factor 2 **Information on the packaging needed to easily show what is inside the packaging**
Dispatch	Factor 1 [1]
	Factor 2 [1]

(b) Name a product you have investigated.

Product .....

In the table below state **one** specific test you carried out on the product and give the information discovered.

Specific Test	Information Discovered
[1]	[1]

7 This question is about the application of Modern and Smart Materials and Components.

(a) Many modern products are made using polymers.

Explain, using **one** example, what is meant by the term polymer.

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.....[2]

(b) An alloy is a mixture of metals.

Explain, using **one** example, the advantages of an alloy over a pure metal.

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.....[2]

(c) Shape memory alloys are classed as smart materials.

Explain why a shape memory alloy is a smart material.

.....

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.....[2]

(d) Thermochromic inks are widely used in many products.

Explain, using **one** example, the features of thermochromic inks.

.....

.....

.....[2]

(e) Computers use different kinds of memory device.

Name **two** different memory devices and state a specific use for each.

Device 1 .....[1]

Specific use .....[1]

Device 2 .....[1]

Specific use .....[1]

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8 **(a)** Discuss the impact of embedded systems on modern manufactured products.

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.....[6]

(b) Discuss the impact of Programmable Logic Controllers (PLCs) in the manufacture of modern products.

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.....[6]