

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

4868

Unit 3: Application of Technology

MONDAY 2 JUNE 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.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

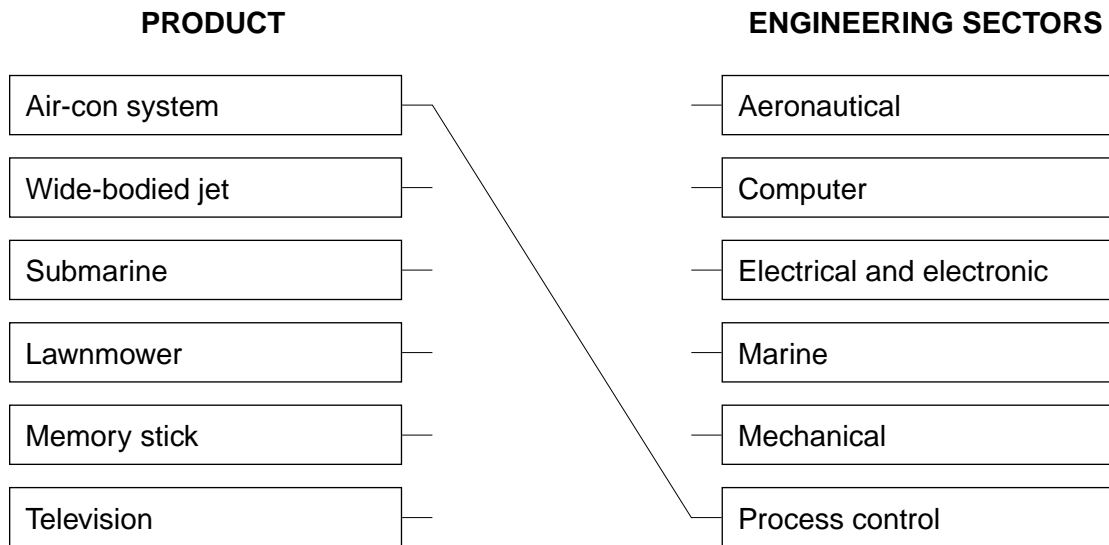
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- Marks will be awarded for the use of correct conventions.
- The total number of marks for this paper is **100**.
- Dimensions are in mm unless stated otherwise.
- Please note that the instruction '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	
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7	
8	
TOTAL	

This document consists of **14** printed pages and **2** blank pages.

1 Engineering 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) For **three** of the products above, complete the table to show:

- **one** example of technology used in each product;
- **one** benefit of using that technology in the product.

An example has been done for you.

Product	Technology used	Benefit
Aircon system	LCD Displays	Show numbers and letters clearly
	[1]	[1]
	[1]	[1]
	[1]	[1]

(c) State **one** engineering sector different from those given above.

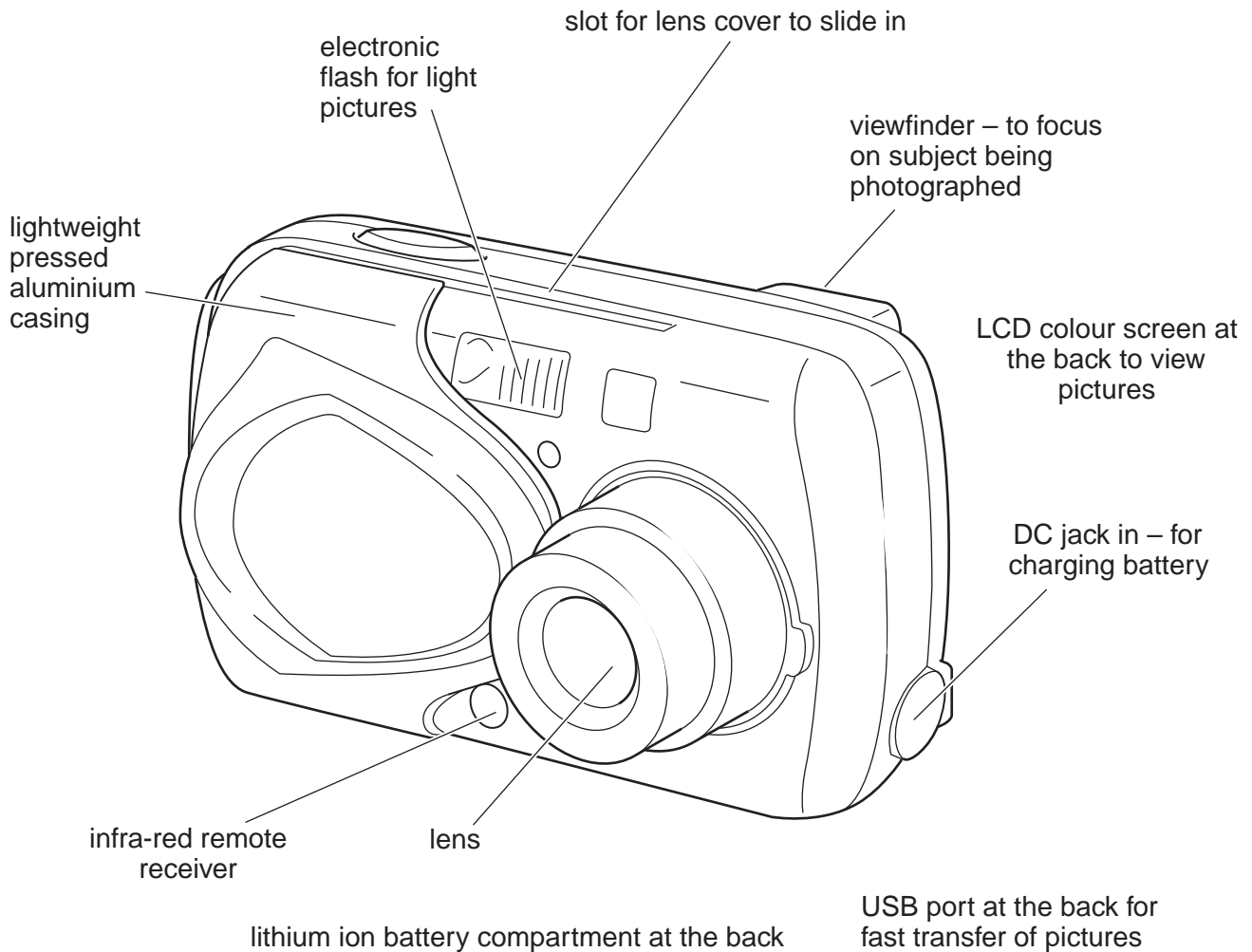
.....[1]

3
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- 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 is used to produce engineering drawings which can be saved on computer.

(a) (i) State **two** types of engineering drawings.

1[1]

2[1]

(ii) Describe **one** benefit of saving CAD drawings on a computer.

.....

[2]

(iii) Describe **one** benefit of using CAD to produce engineering drawings.

.....

[2]

Other ICT applications are used when designing engineered products.

(b) Complete the table below to identify:

- a **different** ICT application for each design task;
- a **different** activity carried out when using the ICT application.

An example has been done for you.

Design task	ICT application	Activity carried out
Research materials available	Web browser	Use on-line encyclopaedia
Contact material supplier	[1]	[1]
Evaluating design ideas	[1]	[1]
Show designs to a client	[1]	[1]

7
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- 4 The use of modern technology can:
- reduce the weight of a product;
 - make a product easier to use;
 - make a product safer;
 - reduce a product's impact on the environment.

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

Product[1]

Technology[1]

(b) State **one** example of a product that uses modern technology to make it easier to use and state the technology used.

Product[1]

Technology[1]

(c) State **one** example of a product using modern technology to make it safer and state the technology used.

Product[1]

Technology[1]

(d) State **one** example of a product using modern technology which helps to reduce its impact on the environment and state the technology used.

Product[1]

Technology[1]

(e) Give **two** disadvantages to a company when it starts to use modern technology for the first time.

Disadvantage 1[1]

Disadvantage 2[1]

(f) Describe **two** benefits to society when modern technology is used in a product.

Name of product

Benefit 1

.....

.....

.....[2]

Benefit 2

.....

.....

.....[2]

5 Three groups of engineering materials are

- alloys;
- ceramics;
- composites.

Some examples of engineering materials are:

- brick;
- concrete;
- duralumin;
- glass reinforced plastic;
- phosphor bronze;
- stainless steel;
- tungsten carbide.

(a) Complete the table to show, for **three** of the materials listed above:

- its material group;
- **one** product in which it is used;
- **one** benefit of using the material in that product.

One example is done for you.

Chosen Material	[✓] Group	Product	Benefits
Phosphor Bronze	[✓] Alloy [] Ceramic [] Composite	Petrol hose fittings	Does not spark when struck
1	[] Alloy [] Ceramic [] Composite [1]	[1]	[1]
2	[] Alloy [] Ceramic [] Composite [1]	[1]	[1]
3	[] Alloy [] Ceramic [] Composite [1]	[1]	[1]

(b) Identify **one** different material from each of the material groups above.

(i) Alloys

.....[1]

(ii) Ceramics

.....[1]

(iii) Composites

.....[1]

(c) Choose **one** of the materials listed in part (a) and describe **one** potential benefit of its use to the global environment.

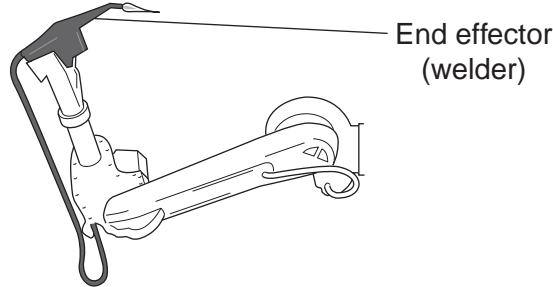
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.....

.....[2]

- 6 Three examples of systems and control technology are:
- Robotics;
 - Programmable Logic Controllers (PLCs);
 - Control using general purpose computers and components.

(a) Part of a robot is shown below.



The end effector can be changed to suit the task.

Complete the table below to show **two different** uses of robotics in production.

Product	Robotic task	Type of end effector
[1]	[1]	[1]
[1]	[1]	[1]

(b) (i) Give **two** uses of PLCs in production processes.

1
[1]

2
[1]

(ii) Describe **two** advantages of using PLCs rather than general purpose computers in production processes.

1

[2]

2

[2]

7 (a) Explain what is meant by Computer Integrated Engineering (CIE).

.....
.....
.....
.....
.....
.....
.....[4]

(b) Potential benefits to an engineering company when using CIE include:

- improved product quality;
- efficient production planning;
- reduced waste;
- shorter time taken to get a new product onto the market (shorter lead time).

(i) Describe how CIE improves product quality.

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

(ii) Describe how CIE improves production planning efficiency.

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

(iii) Describe how CIE reduces waste.

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

(iv) Give **two** reasons why reducing the lead time is a benefit to an engineering company.

1
.....[1]

2
.....[1]

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