

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

4868

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

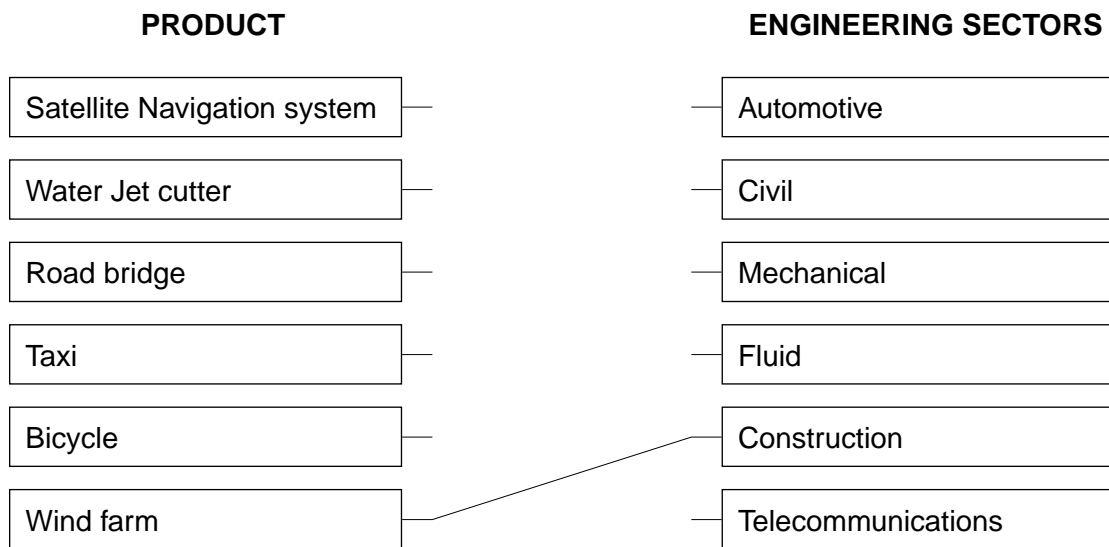
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- Marks will be awarded for the use of correct conventions.
- The total number of marks for this paper is **100**.
- Dimensions are in mm unless stated otherwise.
- Please note that the instruction '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 **15** printed pages and **1** blank page.

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) Choose **one** engineering 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

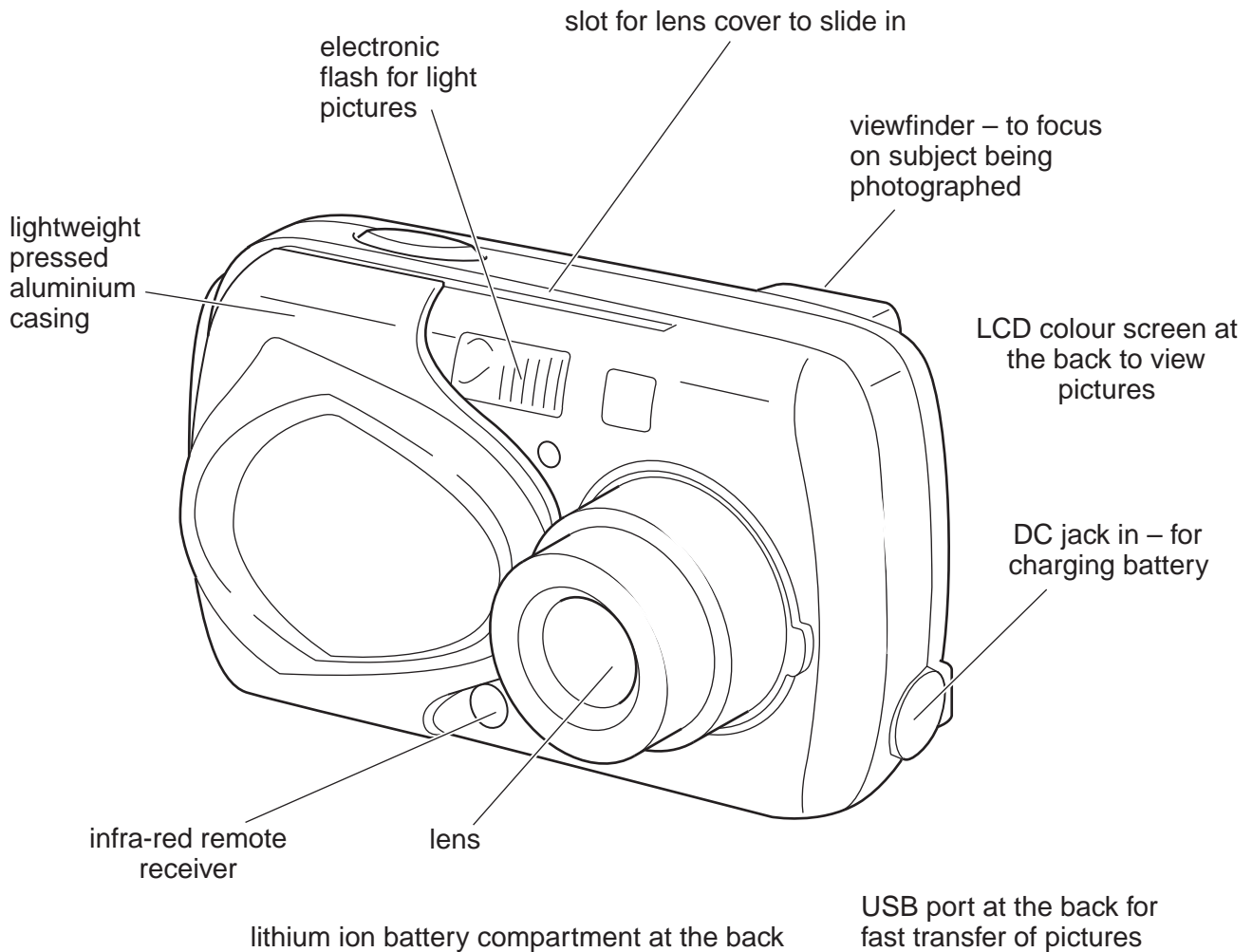
.....

.....

.....[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 engineering drawings.

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

Benefit 1.....
[1]

Benefit 2.....
[1]

(b) An engineering CAD package comes with a library of standard components. Complete the table below. One has been done for you.

Type of component	Standard engineering component names	
Pneumatic/hydraulic	Valve	[1]
Electrical/electronic	[1]	[1]
Mechanical	[1]	[1]

(c) An engineering 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 engineering company in another country.

.....[1]

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

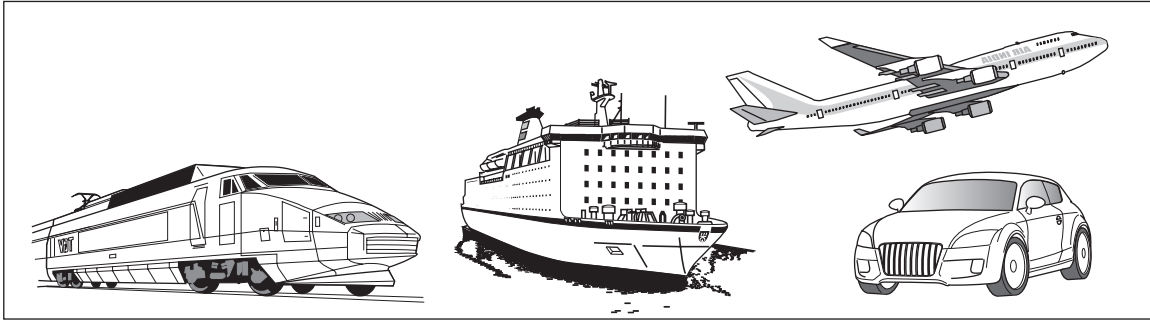
.....

[2]

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

1[1]

2[1]



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 (a) Modern and smart materials are increasingly being used in engineered products. Some types of smart material are given in the table below.

Complete the table.
One has been done for you.

Smart material type	'Smart' property	Product	Benefit of using smart material
Motion control gel	Thickens on movement (shear)	CD loading drawer	Allows automatic loading without risk of damaging CD
Thermochromic dye	[1]	[1]	[1]
Shape memory alloy	[1]	[1]	[1]

- (b) Composite materials are also used in engineered products.

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

.....[1]

- (ii) Describe the composition of this material.

.....

[2]

- (iii) Explain why composites are used in engineered products.

.....

[3]

(c) Physical properties of materials are considered when selecting materials for specific engineered products.

Give **two** other factors that could be considered when selecting materials for specific engineered products.

Factor 1.....[1]

Factor 2.....[1]

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 engineered 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 engineered products.

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

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

(d) Explain how end-user satisfaction is improved.

.....

.....

.....

.....[3]

15
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (OCR) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

OCR is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.