



**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**DESIGN AND TECHNOLOGY**  
**ELECTRONICS AND CONTROL SYSTEMS**  
 Sustainable Design

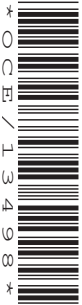
**A512**

Candidates answer on the Question Paper

**OCR Supplied Materials:**  
None

**Other Materials Required:**  
None

**Tuesday 26 January 2010**  
**Morning**  
 Duration: 1 hour



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use 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.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (\*).
- This document consists of **12** pages. Any blank pages are indicated.

**Section A**

Answer **all** questions.

You are advised to spend 15 minutes on this section.

On questions 1–5 **circle** your answer.

**1** With reference to the 6R statements, which describes 'reduce'?

- A** Product designed to be disassembled.
- B** Parts will be replaced.
- C** Fewer parts will be needed.
- D** Make smaller models.

[1]

**2** Solar power devices are fitted to houses to:

- A** Save water.
- B** Stop draughts.
- C** Make houseplants grow.
- D** Reduce energy costs.

[1]

**3** When buying fairtrade goods you can expect the product to:

- A** Be made by multinational companies.
- B** Be sold at a price which supports the growers and producers.
- C** Be made in a factory with exploited labour.
- D** Be decorated with earth colours.

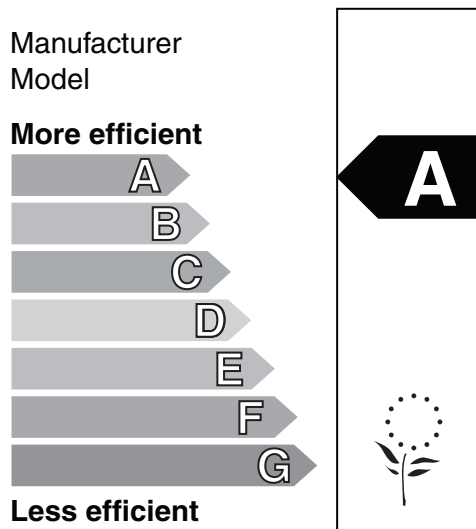
[1]

4 Carbon dioxide emissions are linked to:

- A Greenhouse gases in the atmosphere.
- B Bubbles in water.
- C Charcoal drawing pencils.
- D Shortage of oil.

[1]

5 The symbol below stands for:



- A Community action.
- B Recyclable material.
- C Un-packing instructions.
- D Energy saving.

[1]

6 Fig. 1 shows a label on an electronic power adaptor.

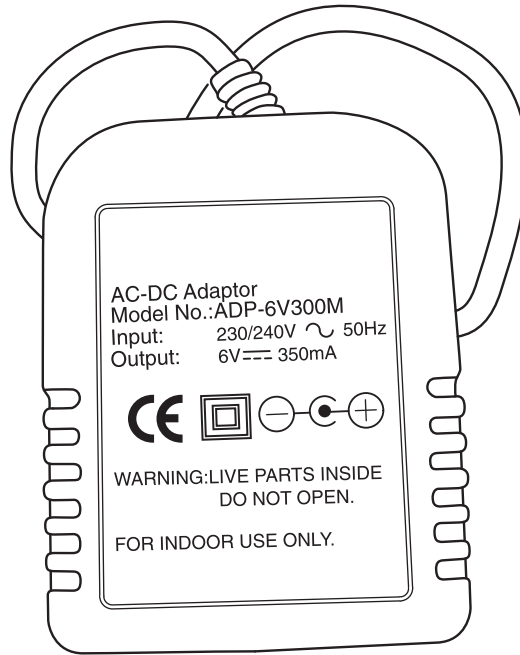


Fig. 1

Give the reason for using a symbol to indicate the power adaptor is double insulated rather than words.

..... [1]

7 What label or letters show that timber is from a managed renewable resource?

..... [1]

8 Which group of plastics is **not** easily recyclable?

..... [1]

9 A lightbulb package is marked 230v 11 w. State why this indicates this is a low energy light bulb.

..... [1]

10 What is the name given to the method of home recycling of vegetables and garden waste?

..... [1]

Decide whether each of the following statements is **true** or **false**.  
Tick (✓) the box to show your answer.

- |   | <b>True</b>              | <b>False</b>             |            |
|---|--------------------------|--------------------------|------------|
| <b>11</b> LEDs are very efficient compared to filament bulbs.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <b>[1]</b> |
| <b>12</b> Gas powered patio heaters are an efficient use of non-renewable energy.                 | <input type="checkbox"/> | <input type="checkbox"/> | <b>[1]</b> |
| <b>13</b> Manufacturing can cause environmental problems.   | <input type="checkbox"/> | <input type="checkbox"/> | <b>[1]</b> |
| <b>14</b> Leaving a television on standby uses no energy.   | <input type="checkbox"/> | <input type="checkbox"/> | <b>[1]</b> |
| <b>15</b> Rechargeable nickel cadmium (nicad) batteries should be disposed of in a landfill site. | <input type="checkbox"/> | <input type="checkbox"/> | <b>[1]</b> |

**Section A Total [15]**

**Section B**

Answer **all** questions.

You are advised to spend 45 minutes on this section.

**16** Renewable energy can power electrical products.

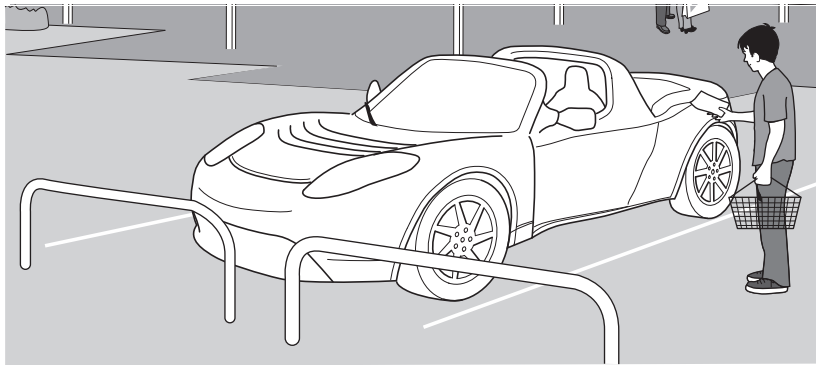
**(a)** Give **two** ways of producing renewable electrical energy.

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

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

**(b)** Improvements in technology can lead to new products.

Fig. 2 shows a battery powered sports car.



**Fig. 2**

1 State **two** ways new technology is used in the design and manufacture of modern vehicles.  
.....  
.....  
..... [2]

2 State **two** environmental issues with electrically powered cars.  
.....  
.....  
..... [2]

3 Describe how renewable energy can be used to power electric cars.

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

(c) When using mirrors to collect energy from the sun the power can be focussed to give very high temperatures.

(i) State **three** ways this energy can be used.

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

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

3 .....  
..... [1]

(ii) Give a suitable location for a solar energy farm.

..... [1]

(iii) Give a method of storing collected solar energy for use during the night.

..... [1]

**Total [15]**

17 Fig. 3 shows a wind up torch with the handle out for winding.

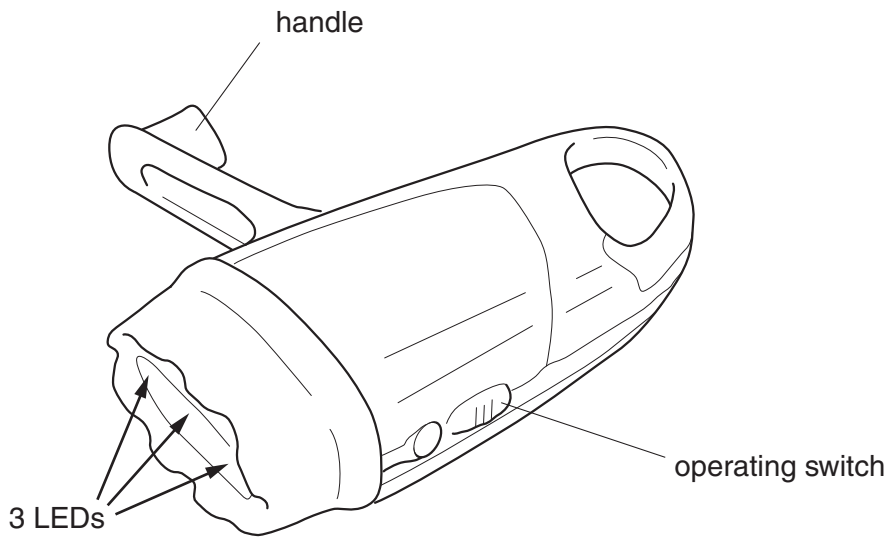


Fig. 3

(a) A specification point is: use a turning handle to provide energy.

List **three** more specification points the designer would have used for the product.

- 1 .....
  - 2 .....
  - 3 .....
- ..... [3]

(b) Give **two** reasons for using LEDs as the light source for the torch.

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



(c) The wind up torch, shown in Fig. 3, is to be modified for use by young children.

On Fig. 4 use sketches and notes to show **two** improvements that will make the product better suited to this user group.

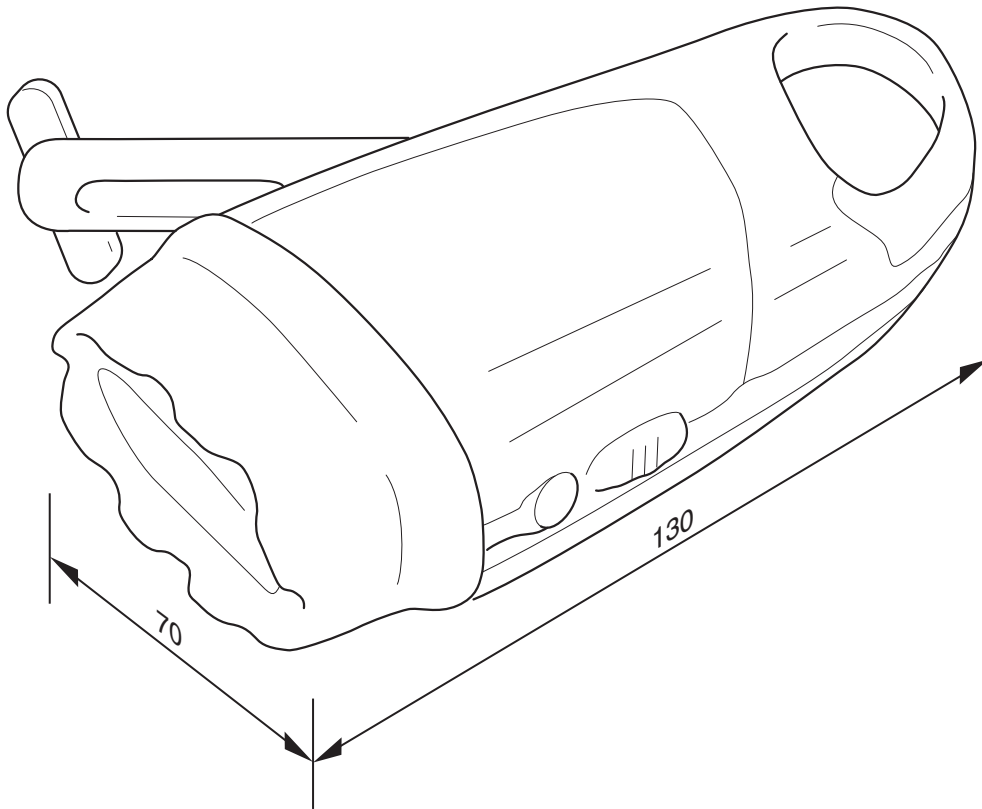


Fig. 4



18 New products such as those in Fig. 5 should be designed to take account of their potential effects on the environment. Sustainability issues should be part of the product specification.

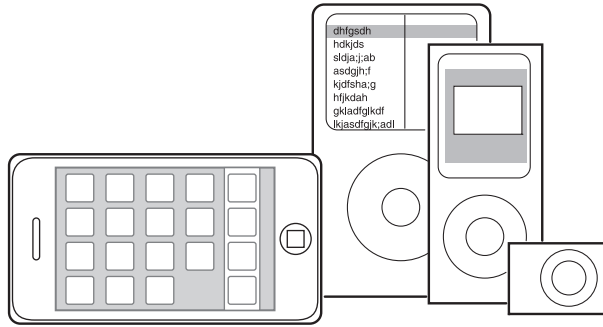


Fig. 5

Describe how the designer should consider the following:

(a) The responsible use of materials

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..... [3]

(b) The carbon footprint during manufacture

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..... [3]

(c) The use of environmentally friendly packaging

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..... [3]

(d) The life-cycle of the product

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..... [3]

(e) The disposal and recycling of the product when no longer needed.

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.....

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.....

.....

..... [3]

**Total [15]**



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