OCR
RECOGNISING ACHIEVEMENT

# Wednesday 25 January 2012 – Morning

## GCSE DESIGN AND TECHNOLOGY
**Electronics and Control Systems**

**A512/01** Sustainable Design

*A528610112*

Candidates answer on the Question Paper.

**OCR supplied materials:**
None

**Other materials required:**
None

**Duration:** 1 hour

*A512201*

| Candidate forename | | Candidate surname | |
|---|---|---|---|

| Centre number | | | | | | Candidate number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions in Section A **and** Section B.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

**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 will be assessed in questions marked with an asterisk (*).
- This document consists of **16** 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** A product is said to contribute to global warming if it:

**(a)** Keeps the whole house warm

**(b)** Emits a greenhouse gas during use

**(c)** Warms colder parts of the house

**(d)** Makes a good patio heater **[1]**

**2** Environmentally friendly packaging for an electronic product should be:

**(a)** Easy to fold up and keep

**(b)** Glossy with a picture of the product on the outside

**(c)** Made of a sustainable material

**(d)** Made with a clear window so the purchaser can see the product inside **[1]**

**3** Chip and Pin is:

**(a)** A device for eating french fries

**(b)** A badge promoting sustainability

**(c)** An electronic security measure for consumers

**(d)** Sawdust and nails on a workshop floor **[1]**

**4** When an alkaline battery is worn out, you should:

**(a)** Dispose of it with the household waste

**(b)** Take it to a battery bank

**(c)** Complain to the shop where you bought it

**(d)** Recharge it **[1]**

**5** Coin cells used in small electronic products:

**(a)** Pay for themselves during use

**(b)** Can present a choke hazard to young children

**(c)** Can be used as currency

**(d)** Make an interesting clicking noise **[1]**

**6** State the meaning of the symbol shown below.

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

**7** Name **one** source of sustainable energy.

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

**8** State what the abbreviation 'Alu' represents on a fizzy drinks can.

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

**9** Name the 6R that means consumers should not buy a product.

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

**10** State how an unwanted, but fully functioning mobile phone should be recycled.

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

Decide whether each of the following statements is **true** or **false**.

Tick (✓) the box to show your answer.

| | | True | False | |
|---|---|---|---|---|
| **11** | Fairtrade means that you can swap one product for another | ☐ | ☐ | **[1]** |
| **12** | Turning down a room thermostat can contribute to lower energy bills | ☐ | ☐ | **[1]** |
| **13** | Timber harvested from tropical rain forests is not sustainable | ☐ | ☐ | **[1]** |
| **14** | You can make financial savings by using a bottle bank | ☐ | ☐ | **[1]** |
| **15** | Coal-fired power stations contribute to global warming | ☐ | ☐ | **[1]** |

**Total [15]**

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## Section B

Answer **all** questions.

You are advised to spend 45 minutes on this section.

**16** Fig. 1 shows a flat screen television manufactured in the 1990's.

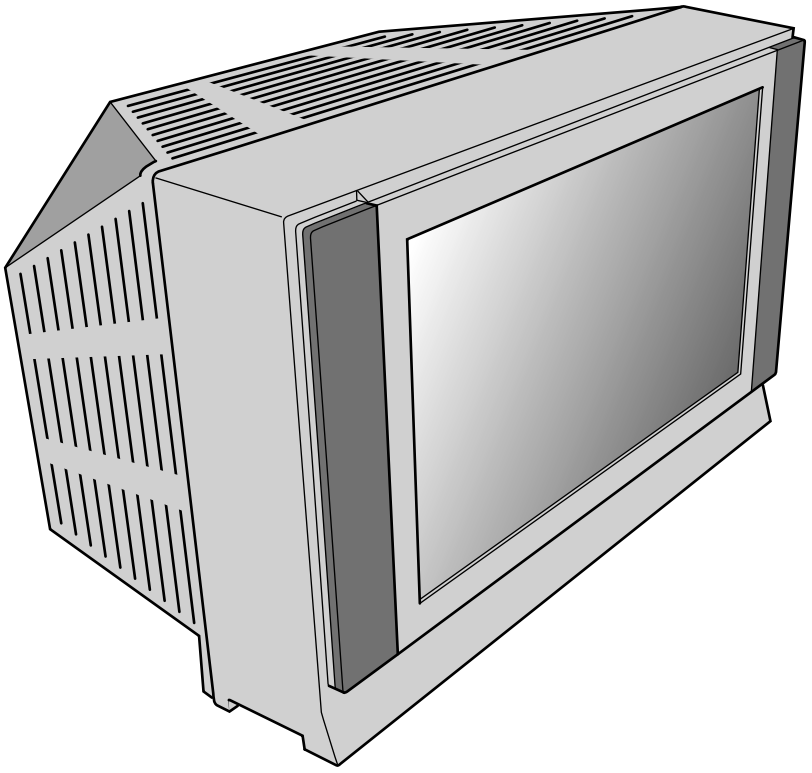

**Fig. 1**

**(a)** Give **three** changes in television design since this television was manufactured.
For each change, explain an environmental benefit.

Change 1 .....

Benefit 1.....

.....

Change 2 .....

Benefit 2 .....

.....

Change 3 .....

Benefit 3 .....

..... **[6]**

**(b)** The television shown in Fig. 1 is made from a range of materials/components.
Identify **three** of these materials/components and state how each one can be re-used.

| | Material/component | Re-use |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |

**[6]**

**(c)** Televisions are often left on standby.

State why this is discouraged.

.....

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

**(d)** Digital photo frames have become increasingly popular.
Explain **one** environmental disadvantage of using a digital photo frame.

.....

.....

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

**Total [15]**

**17** Fig. 2 shows a rechargeable electronic toothbrush.

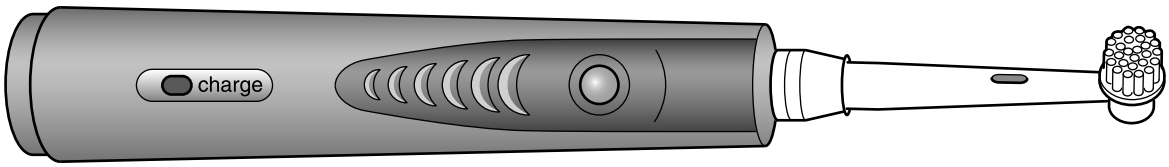


**Fig. 2**

**(a)** Identify **three** specification points for the rechargeable electronic toothbrush.

1 .....

2 .....

3 ..... **[3]**

**(b)** The toothbrush uses a NiMH rechargeable cell.
Explain **one** environmental benefit of using rechargeable cells.

.....

.....

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

**(c)** The cell used in the toothbrush is not user replaceable.

Explain why this is not environmentally friendly.

.....

.....

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

Fig. 3 shows two symbols found on the packaging of an electronic toothbrush.

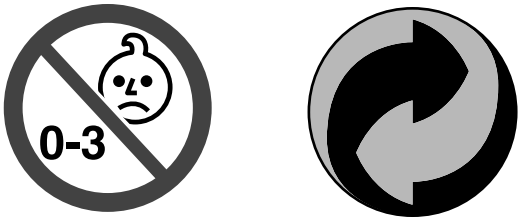


**Fig. 3**

**(d)** Name the **two** symbols shown in Fig. 3.

1.....

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

Fig. 4 shows an electronic toothbrush.
When activated, a circuit contained in the toothbrush base flashes an LED.

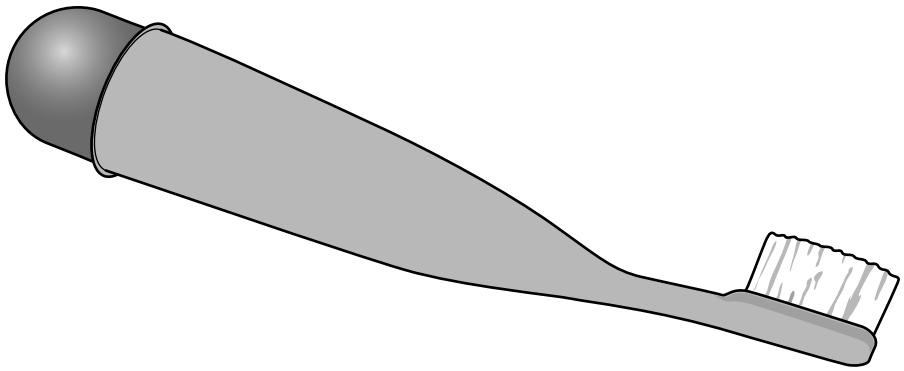

**Fig. 4**

**(e) (i)** Identify a user group for this toothbrush.

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

**(ii)** Give **one** benefit of this electronic toothbrush.

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

**(f)** Using sketches and notes, design a 'tooth brushing timer'.
Your design must have features that are:

- child friendly
- environmentally friendly

**[4]**

**Total [15]**

**18** Fig. 5 shows a portable solar panel used for camping.

**Fig. 5**

**(a) (i)** Suggest **two** ways the electricity generated by the solar panel could be used when camping.

1 .....

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

**(ii)** Solar panels have to be carefully positioned in order to function.
State **one** reason for this.

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

**(b)** Solar panels are often described as having a long pay-back time.
Explain what this means.

.....

.....

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

**(c)** Secondary recycling is often carried out in the electronics industry.
Explain what is meant by secondary recycling.

.....

.....

.....

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

**(d)** Explain **one** reason why electronic waste should be processed separately from household waste.

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

**(e)*** Discuss how rapid developments in electronic products can impact on the environment.

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..... **[6]**

**Total [15]**

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