

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 25 January 2011
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, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- 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).
- Answer **all** the questions **in Section A and Section B**.
- 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 is assessed in questions marked with an asterisk (*).
- This document consists of **16** pages. Any blank pages are indicated.

Section A

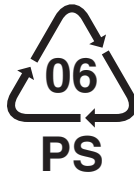
Answer **all** questions.

You are advised to spend 15 minutes on this section.

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

- 1** If a product is said to have a large carbon footprint, does it:
- (a) Leave large black marks on a carpet
 - (b) Need special care when transporting it
 - (c) Produce a significant amount of carbon dioxide during its manufacture or use
 - (d) Only fit into large recycling bins
- [1]**

- 2** The symbol below is moulded into the base of a plastic product.



The symbol is used to inform the consumer of **two** important facts relating to the product.

Fact 1 is:

- (a) Please sell
 - (b) Polystyrene
 - (c) Please save
 - (d) Person safe
- [1]**
- 3** Fact 2 is:
- (a) Triangular shape
 - (b) Recyclable
 - (c) Product won't tip over
 - (d) Part number of product
- [1]**

4 When a re-chargeable battery is discharged, you should:

- (a) Return it
- (b) Reverse it
- (c) Complain to the manufacturer
- (d) Recharge it

[1]

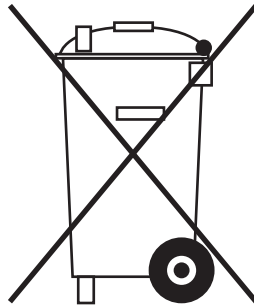
5 Containers of hazardous solvents or chemicals have a small raised triangle symbol moulded onto their surface.

What is the purpose of the small raised triangle?

- (a) It points to the top
- (b) Helps to prevent drips when pouring
- (c) Warns the partially sighted of a hazard
- (d) Makes the container easier to grip

[1]

6 State what is meant by the symbol shown below.



..... [1]

7 State the name of **one** green source of energy.

..... [1]

8 State what the abbreviation '**H & S**' represents.

..... [1]

9 From the 6Rs, the term **reduce** means that designers should:

..... of a product. [1]

10 State what unwanted natural Christmas trees can be made into.

..... [1]

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

Tick (✓) the box to show your answer.

	True	False	
11 Driving a car faster saves energy	<input type="checkbox"/>	<input type="checkbox"/>	[1]
12 A “sweatshop” is somewhere with poor working conditions	<input type="checkbox"/>	<input type="checkbox"/>	[1]
13 The Forest Stewardship Council encourages using sustainable forest products	<input type="checkbox"/>	<input type="checkbox"/>	[1]
14 Recycling is an initiative to promote bicycle sharing	<input type="checkbox"/>	<input type="checkbox"/>	[1]
15 An energy saving light bulb is easier to switch on than a filament bulb	<input type="checkbox"/>	<input type="checkbox"/>	[1]

Total [15]

5
Section B

Answer **all** questions.

You are advised to spend 45 minutes on this section.

16 Fig. 1 shows two different domestic kettles.

Kettle **A** is made from a plastics material.

Kettle **B** is made of a metal alloy.



A

B

Fig. 1

(a) State who kettle **A** was designed for.

..... [1]

(b) Give **two** advantages of kettle **A**.

Advantage 1

Advantage 2 [2]

(c) For kettle **B** state where, during its product life cycle, it will use the most energy.

..... [1]

(d) Kettle **A** is made of a plastics material by injection moulding.

Give **two** environmental benefits of this manufacturing process.

Benefit 1

Benefit 2 [2]

(e) Kettle **B** is made mainly from a metal alloy.

Give **one** environmental advantage and **one** environmental disadvantage of using a metal alloy for the kettle body.

Advantage

.....

Disadvantage

..... [2]

(f) Kettles when over-filled, boil unwanted water and waste energy.

Suggest **two** ways to reduce this wastage.

1

.....

2

..... [2]

(g) Fig. 2 shows the base plate used with Kettle B.

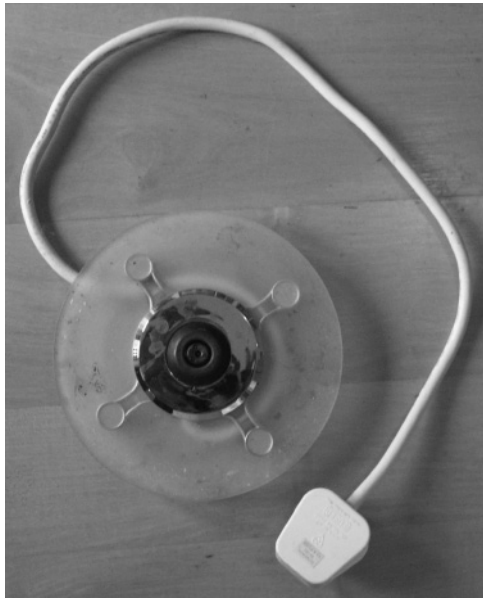


Fig. 2

(i) Give **one** advantage of this for the **end user**.

.....

(ii) Give **one** advantage of this feature for the **manufacturer**.

.....

[2]

(h) Kettles often fail after limited use.

Give **three** reasons why planned obsolescence is environmentally unsound design practice.

Reason 1

.....

Reason 2

.....

Reason 3

.....

[3]

Total [15]

17 Fig. 3 shows an electronic talking timer designed for blind people.



Fig. 3

(a) Identify **four** specification points for a talking timer for blind people.

- 1
- 2
- 3
- 4 [4]

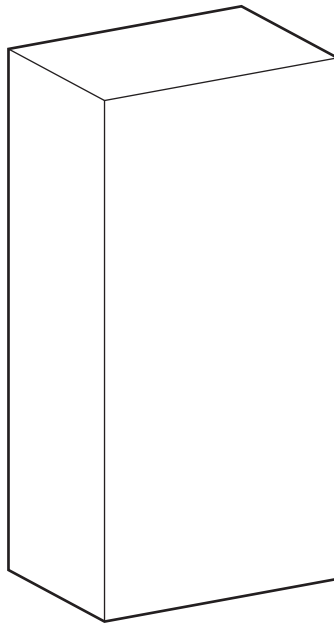
(b) The talking timer uses primary cells to power it.

Explain the difference between primary and secondary cells.

-
-
-
- [2]

(c) The manufacturers wish to modify the talking timer to make it suitable for deaf people.

On the drawing below, produce an annotated sketch to show additional features that would make a timer product suitable for the deaf.



[4]

(d) Products that use renewable energy can have a lower environmental impact.

State **two** possible sources of renewable energy suitable for inclusion in small portable products.

Source 1

Source 2

[2]

- (e) The WEEE Directive regulates the disposal of electrical and electronic equipment at the end of their life.

State the **three** aims of the WEEE Directive.

Aim 1

Aim 2

Aim 3 [3]

Total [15]

11
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18 Fig. 4 shows an electronic energy usage meter.

The meter shows how much power is being consumed by your electrical equipment.



Fig. 4

(a) Suggest **three** ways in which the unit can assist in understanding and controlling energy usage around the home.

- 1
- 2
- 3 [3]

(b) Fig. 5 shows a standard 13 amp 3-pin mains plug.



Fig. 5

Give **two** reasons why two of the pins are insulated for half their length.

Reason 1

Reason 2 [2]

(c) Electronic goods are often packed in cardboard boxes with expanded polystyrene.

(i) For cardboard, select an appropriate 6R and explain how it would apply to cardboard.

Chosen 6R

Explanation [2]

(ii) Explain why expanded polystyrene is used for the packaging.

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

15
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