

Monday 28 January 2013 – Morning

GCSE DESIGN AND TECHNOLOGY
Electronics and Control Systems

A512/01 Sustainable Design

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

None

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. 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**.
- The quality of your written communication will be taken into account in marking your answer to the question marked with an asterisk (*).
- This document consists of **12** pages. Any blank pages are indicated.

SECTION A

Answer **all** questions.

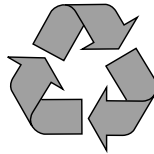
You are advised to spend 15 minutes on this section.

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

- 1** Cardboard packaging from electronic products:
- (a) Can damage the ozone layer
 - (b) Helps absorb greenhouse gases
 - (c) Can be produced sustainably
 - (d) Will not biodegrade **[1]**
- 2** Carbon nanotubes are:
- (a) Small oil pipelines
 - (b) Caused by global warming
 - (c) Cheap to produce
 - (d) Ideal for producing rigid composites **[1]**
- 3** Electronic products should be soldered with lead-free solder because:
- (a) Lead is too heavy to lift
 - (b) Lead is harmful to humans
 - (c) Electricity does not flow through lead
 - (d) Lead is too expensive for everyday electronics **[1]**
- 4** When an aerosol can is empty, you should:
- (a) Compost it
 - (b) Refill it yourself
 - (c) Campaign to reduce harm to the ozone layer
 - (d) Recycle it **[1]**

- 5 Overheating electronic circuits:
- (a) Can cause a fire
 - (b) Emit carbon dioxide
 - (c) Improve home insulation
 - (d) Make your electricity meter run backwards [1]

6 State the meaning of the symbol shown:



..... [1]

7 Name **one** source of energy that contributes to global warming.
 [1]

8 What is meant by the term product analysis?
 [1]

9 Which of the 6Rs means consumers should use less of a product?
 [1]

10 Complete the sentence below
 The E..... T..... Initiative works to improve the working lives of people. [1]

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

Tick [✓] the box to show your answer.

	True	False	
11 Thermoplastics can be incinerated to recover energy	<input type="checkbox"/>	<input type="checkbox"/>	[1]
12 Wind energy is a non-renewable resource	<input type="checkbox"/>	<input type="checkbox"/>	[1]
13 Leaving electronic products on standby wastes energy	<input type="checkbox"/>	<input type="checkbox"/>	[1]
14 Built-in obsolescence makes products last longer	<input type="checkbox"/>	<input type="checkbox"/>	[1]
15 Product globalisation means products are available worldwide	<input type="checkbox"/>	<input type="checkbox"/>	[1]

Total [15]
Turn over

SECTION B

Answer **all** questions.

You are advised to spend 45 minutes on this section.

16 Fig. 1 shows an electronic speed display unit on a public road.



Fig. 1

(a) (i) Suggest **two** environmentally friendly methods of powering the display unit.

1

.....

2

.....

[2]

(ii) Environmentally friendly methods of powering the unit may not be 100% reliable. Suggest **two** ways of making sure power is always available for the unit.

1

.....

2

.....

[2]

(b) Fig. 2 shows a traffic information board that uses LEDs (light emitting diodes) as its light source.



Fig. 2

Give **four** environmental benefits of using LED lighting in a traffic information board.

- 1
- 2
- 3
- 4

[4]

(c) Self-cleaning glass is used in the traffic information board. State **one** way self-cleaning glass can benefit the environment.

-
-
- [1]

17 Fig. 3 shows an electronic stopwatch.



Fig. 3

(a) List **four** specification points a designer should consider when designing a handheld electronic stopwatch.

- 1
- 2
- 3
- 4

[4]

(b) Describe **two** modifications that could be made to the design of the handheld electronic stopwatch shown in Fig. 3 that make it suitable for an elderly person.

- 1
-
-
- 2
-
-

[2]

(c) The electronic stopwatch uses a Lithium coin cell that is not rechargeable.

Give **three** disadvantages of using a cell that is not rechargeable.

- 1
- 2
- 3

[3]

(d) To replace the cell in an electronic stopwatch a tool is needed to remove the cover.

Give **two** disadvantages to the consumer of having to use a tool to replace a cell.

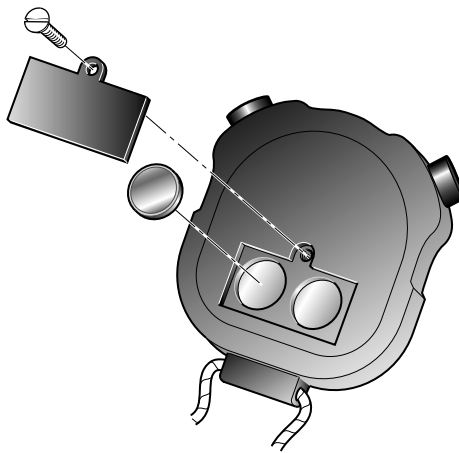
1

.....

2

..... [2]

(e) Using sketches and notes, suggest **one** modification to the battery compartment shown below that would make it easier to replace the cell.



[4]

Total [15]

18 Fig. 4 shows an energy monitor.

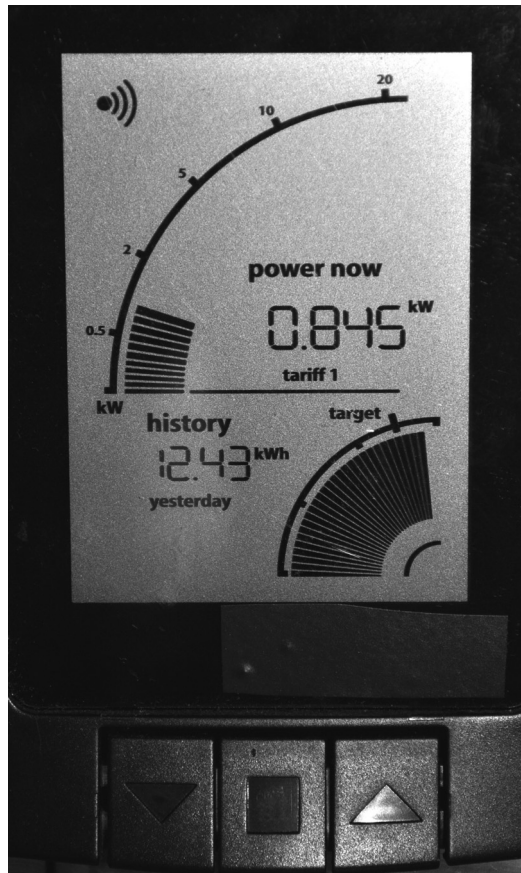


Fig. 4

(a) Explain **two** ways the energy monitor could help a household reduce their carbon footprint.

1

.....

.....

.....

2

.....

.....

[4]

(b) Name **two** fossil fuels that can be used to generate electricity.

1

2

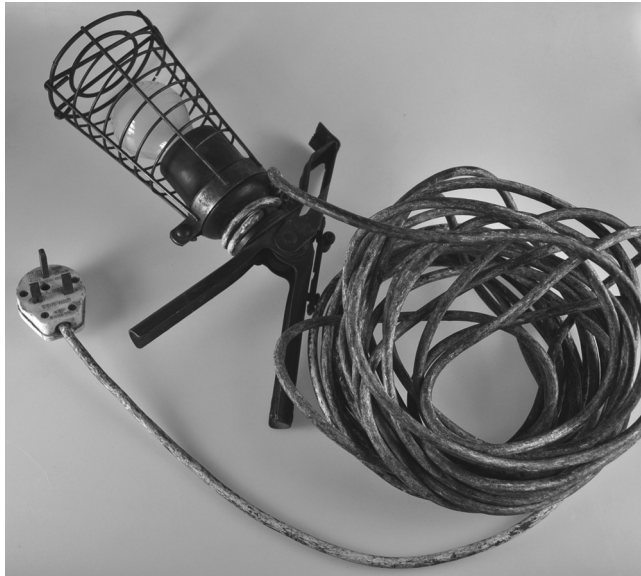
[2]

(c) State **three** situations that could cause an electric shock.

- 1
- 2
- 3

[3]

(d) Fig. 5 shows a mains-powered inspection lamp and a rechargeable LED inspection lamp.



Mains powered inspection lamp



Rechargeable LED Lamp

Fig. 5

Explain **three** advantages to the user of the rechargeable LED inspection lamp compared with the mains powered inspection lamp.

- 1
-
-
-
- 2
-
-
-
- 3
-
-
-

[6]

Total [15]

END OF QUESTION PAPER

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