

**Wednesday 22 May 2013 – Afternoon**

**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 **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** Turning down a room thermostat:
- (a) Lets in twice as much light
  - (b) Reduces heat loss to the surroundings
  - (c) Creates a build up of carbon monoxide
  - (d) Increases room ventilation **[1]**
- 2** In the UK, for maximum efficiency, solar panels should face:
- (a) North
  - (b) West
  - (c) East
  - (d) South **[1]**
- 3** Freecycle is an organisation that promotes:
- (a) Giving away working products for re-use in the local community
  - (b) Personal fitness training
  - (c) Adding an electronic tag to your personal property
  - (d) Purchasing expensive products **[1]**
- 4** Eco-design is the process of designing an electronic product to be:
- (a) Complete with instructions in all languages
  - (b) Made as fast as possible
  - (c) As environmentally friendly as possible
  - (d) As profitable as possible **[1]**

- 5 Tertiary recycling of electronic products means:
- (a) Re-using the material three times
  - (b) Putting up large signs at the local waste processing facility
  - (c) The consumer pays for disposal
  - (d) Chemically breaking down the waste material for re-use [1]

6 Complete the following to give the full meaning of the abbreviation CFC.  
C ..... F ..... Carbon [1]

7 State **one** reason why plastic waste should be recycled.  
..... [1]

8 State why water-based soldering fluxes are increasingly used for electronic circuit assembly.  
..... [1]

9 Name the term for the data tables of human measurements used by designers.  
..... [1]

10 Which of the 6Rs would describe the replacement of a faulty component in a circuit?  
..... [1]

4

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> All plastics can be recycled	<input type="checkbox"/>	<input type="checkbox"/>	<b>[1]</b>
<b>12</b> Chemicals that harm people and animals are called hazardous	<input type="checkbox"/>	<input type="checkbox"/>	<b>[1]</b>
<b>13</b> Energy used in making an electronic product is part of its carbon footprint	<input type="checkbox"/>	<input type="checkbox"/>	<b>[1]</b>
<b>14</b> Cordless power tools help reduce global warming	<input type="checkbox"/>	<input type="checkbox"/>	<b>[1]</b>
<b>15</b> BSI stands for British Safety Insulation	<input type="checkbox"/>	<input type="checkbox"/>	<b>[1]</b>
		<b>Total</b>	<b>[15]</b>

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**Question 16 begins on page 6**

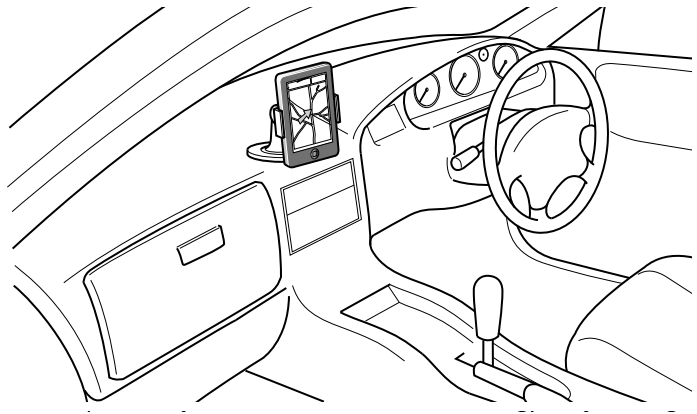
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**SECTION B**

Answer **all** questions.

You are advised to spend 45 minutes on this section.

- 16** Fig. 1 shows a mobile phone being used for satellite navigation in a car. It is fitted into a phone holder.



**Fig. 1**

- (a)** Give **four** benefits of using the phone holder shown in Fig. 1.

1 .....

2 .....

3 .....

4 .....

**[4]**

- (b)** The map database in the mobile phone can be upgraded via the internet.

Explain **one** environmental benefit of upgrading software via the internet.

.....

.....

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

- (c) When designing a phone holder, a designer would refer to the size of the mobile phone and its position in the car.

Explain how this information would help a designer.

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

- (d) Give **two** reasons why the battery life is very much reduced when the mobile phone is used for satellite navigation.

1 .....

2 .....

..... [2]

- (e) Give **one** environmentally friendly way of charging a mobile phone.

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

- (f) Explain how 'hands-free voice control' of a mobile phone can contribute towards improved road safety.

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

**Total [15]**

17 Fig. 2 shows a desk lamp which is sold in the UK. A sticker on the bottom of the lamp says 'Made in China'.



Fig. 2

(a) State **two** benefits to a UK company of having the desk lamp manufactured in China.

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

(b) (i) State what is meant by the term globalisation.

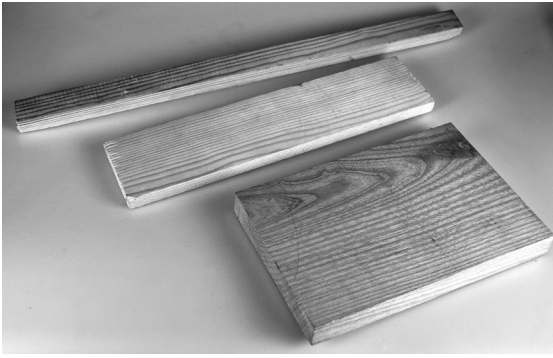
- .....
- ..... [1]

(ii) State **one** advantage and **one** disadvantage of globalisation.

- Advantage .....
- .....
- Disadvantage .....
- ..... [2]



(c) Fig. 3 shows a selection of components.



wooden base and stem



heat-sink, LED, lens, control circuitry, power supply

**Fig. 3**

Using sketches and notes design an energy efficient desk lamp using the components shown in Fig. 3.

[4]



18 Fig. 4 shows two types of lantern.



paraffin/liquid fuel lantern



battery powered LED lantern

Fig. 4

(a) Explain **three** advantages to the user of the LED lantern compared to the paraffin liquid fuel lantern.

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

[6]

- (b) SolarAid® is a charity that works to bring light to rural African communities building and selling their clean efficient lighting systems.

Explain the benefits of this work in helping to sustain rural African communities.

.....

.....

.....

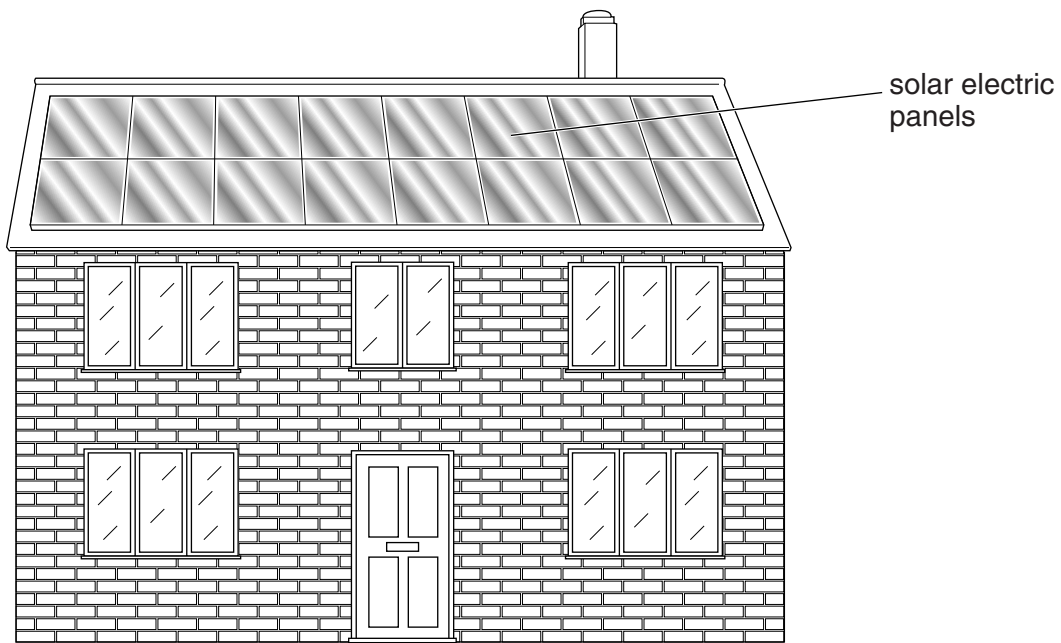
.....

..... [3]

- (c) Give **one** benefit to Solaraid® from advertising their activities on the world wide web.

..... [1]

- (d) (i) Fig. 5 shows a typical solar electric panel installation in the UK.



**Fig. 5**

State **three** advantages to the home owner of having a solar electric panel system installed.

1 .....

2 .....

3 .....

[3]

(d) (ii) Name **two** other sources of renewable forms of energy.

1 .....

2 .....

[2]

**Total [15]**

**END OF QUESTION PAPER**

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