

General Certificate of Secondary Education

A512

**Design and Technology:
Electronics and Control Systems**

Unit A512: Sustainable Design

Specimen Paper

Time: 1 hour

Candidates answer on the question paper.

Additional materials:

Candidate
Forename

Candidate
Surname

Centre Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name 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 you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do not write in the bar codes.
- Do not write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- The total number of marks for this paper is 60.

FOR EXAMINER'S USE

1		7		13	
2		8		14	
3		9		15	
4		10		16	
5		11		17	
6		12		18	
TOTAL					

This document consists of 9 printed pages and 3 blank pages.

Section A

Answer **all** questions.

1 This symbol stands for:



- (a) School safety policy
- (b) British safety consideration
- (c) British safety institute
- (d) British standards institute

[1]

2 The abbreviation of **COSHH** stands for:

- (a) Centre of social health hygiene
- (b) Central office supporting health hazards
- (c) Control of substances hazardous to health
- (d) Central office substances hazardous to health

[1]

3 Which of the following is **not** a renewable energy resource?

- (a) water
- (b) coal
- (c) wind
- (d) solar power

[1]

4 Biodegradable means that it can:

- (a) grow naturally in the environment
- (b) naturally rot in the environment
- (c) be reusable as a different product
- (d) not grow naturally in the environment

[1]

5 The role of a designer of sustainable products is to:

- (a) create innovative sustainable designs
- (b) modify existing designs
- (c) use traditional designs
- (d) design products that can be bought cheaply

[1]

6 In the space below draw the symbol that would be found on a product that can be recycled.

[1]

7 The term recycling means to a product.

[1]

8 State what is meant by a product being 'Fair trade'

..... [1]

9 What is the term given to the appearance of an object including its shape, colour and texture?

..... [1]

10 What is the name given to the collection of data on human body measurements?

..... [1]

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

True

False

11 Smart materials are materials whose properties can change due to changes in pressure, force, light or temperature.

12 A renewable source is one that cannot be renewed within 50 years.

13 Chemicals that can cause harm to people and animals are called bio products.

14 Job production is used to make large batches of products.

15 Ethical trading is a term used to show that the basic rights of the employees are protected.

[5]

Section A Total [15]

Section B

Eco design is about designing a product with the environment in mind and trying to minimise the damage to the environment throughout a product's life cycle.

A designer must think about the impact on the environment.

16 (a) Explain what the following areas are in the design process.

Product planning:

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

Development:

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

Functionality:

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

Safety:

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

Aesthetics:

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

SPECIMEN

A manufacturer wishes to develop a range of environmental products to be sold in a shop at the Science Museum in London.

(b) Name the product.

..... [1]

(c) Identify **four** specification points for your chosen design product.

1 [1]

2 [1]

3 [1]

4 [1]

Total [15]

SPECIMEN

17 (a) Use sketches and notes to show your initial ideas for your chosen product.

SPECIMEN

(b) Use notes and sketches to develop **one** of your initial ideas.

[5]

(c) With reference to the 6Rs select and describe **two** ways in which your product could address **two** of these issues.

1 [2]

2 [2]

Total [15]

18 (a) (i) Give a suitable method/process used in the construction of your product.

..... [1]

(ii) Describe **four** stages relevant to this method/process.

1 [1]
.....

2 [1]
.....

3 [1]
.....

4 [1]
.....

(b) Name a piece of equipment that would be needed for your method/process.

..... [1]

(c) Give **two** safety precautions that should be taken into account when using tools and equipment.

1 [1]
.....

2 [1]
.....

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SPECIMEN

Section A		
Question Number	Answer	Max Mark
1	This symbol stands for: D	[1]
2	The abbreviation of COSHH stands for: C	[1]
3	Which of the following is not a renewable energy resource? B	[1]
4	Biodegradable means that it can: B	[1]
5	The role of a designer of sustainable products is to: A	[1]
6	In the space below draw the symbol that would be found on a product that can be recycled. 	[1]
7	Accept variations of this symbol – e.g. without the shading The term recycling means to a product. re-use	[1]
8	State what is meant by a product being 'Fair trade' fair wages for the workers in less economically developed countries (LEDC's)	[1]
9	What is the term given to the appearance of an object including its shape, colour and texture? aesthetics	[1]
10	What is the name given to the collection of data on human body measurements? anthropometrics	[1]

Section A		
Question Number	Answer	Max Mark
11	Smart materials are materials whose properties can change due to changes in pressure, force, light or temperature. true	[1]
12	A renewable source is one that cannot be renewed within 50 years. false	[1]
13	Chemicals that can cause harm to people and animals are called bio products. false	[1]
14	Job production is used to make large batches of products. false	[1]
15	Ethical trading is a term used to show that the basic rights of the employees are protected. true	[1]
Section A Total		[15]

Section B		
Question Number	Answer	Max Mark
16(a)	<p>Eco design is about designing a product with the environment in mind and trying to minimise the damage to the environment throughout a product's life cycle.</p> <p>A designer must think about the impact on the environment. Explain what the following areas are in the design process.</p> <p>Two marks for each section.</p> <p>Product Planning: 2x1 [2]</p> <ul style="list-style-type: none"> • Research, analysis of existing products. • Technical data of product. • Disassembly of existing products. • Properties required by product. • Choosing right materials & components. • Method of manufacture. • Tools & equipment needed. <p>Development: 2x1 [2]</p> <ul style="list-style-type: none"> • Changing an aspect or all of the design; components, materials, size etc. • Enhancing a product with technological features. • Range of ideas. <p>Functionality: 2x1 [2]</p> <ul style="list-style-type: none"> • Is it fit /capable for its intended purpose/ use? • Ease of manufacture. • Works efficiently. • Functions as intended. <p>Safety: 2x1 [2]</p> <ul style="list-style-type: none"> • Safe use & disposal of the product. • Legal requirements & legislation. • Safety standards- electrical safety, BSI etc. • Safety in the workplace & safety of workers when making. • Safety of user. <p>Aesthetics: 2x1 [2]</p> <ul style="list-style-type: none"> • The look / appearance of the product. • Style of product. • Properties of product- attractiveness, eye-catching etc. 	[10]

Section B		
Question Number	Answer	Max Mark
16(b)	<p>Name the product. One mark for any suitable product.</p>	[1]
16(c)	<p>Identify <u>four</u> specification points for your chosen design product. One mark for each specification point. Max four. 1x4 [4] Generic design points e.g. 'cheap', 'durable', 'light' etc NOT acceptable</p> <ul style="list-style-type: none"> • Age/ target market/ user. • Size range, ergonomic/ anthropometrics. • Technological properties and features. • Style. • Maintenance. • Assembly techniques/ finishes. • Components required. • Production/ manufacturing methods. 	[4]

Section B		
Question Number	Answer	Max Mark
17(a)	<p>Use sketches and notes to show your initial ideas for your chosen product.</p> <p>Maximum of six marks. 6x1 [6]</p> <ul style="list-style-type: none"> • Design idea with no notes/ annotation. • One idea with labelling. • More than one idea with notes. • A range of design solutions & annotation. • A range of design solutions, annotation and technical detail. • A very well drawn & creative range with annotation and full technical detail. 	[6]
17(b)	<p>Use notes and sketches to develop <u>one</u> of your initial ideas.</p> <p>Answers must reflect the product focus & refer to 'design need'. Maximum of five marks. 5x1[5]</p> <ul style="list-style-type: none"> • One developed solution showing an idea from the initial ideas with some development but no annotation • One developed idea with notes • Clear & annotated development of an idea. • Idea & annotation that refers / links to specification points. • Idea & annotation that refers to three specification points <p>Points to consider: Views giving detail. Techniques/ methods identified. Technological control systems identified or shown. Sizes/ measurements. Materials, components. Finishing. Costing.</p>	[5]
17(c)	<p>With reference to the 6Rs select and describe <u>two</u> ways in which your product could address <u>two</u> of these issues.</p> <p>Credit any reference to any two of the 6Rs. 2x2 [4]</p> <ul style="list-style-type: none"> • Recycle - material, product, disassembly. • Re-use - pass on (friend, family), charity shop, third world country. • Reduce - production process, costs, emissions, wastage materials, transport, life cycle. • Refuse - use of sustainable materials, biodegradable. Materials we should refuse to use. • Rethink - materials & components used, purpose of product. • Repair - fixing products. 	[4]

Section B		
Question Number	Answer	Max Mark
18(a)(i)	<p>Give a suitable method/process used in the construction of your product. Any one suitable method.</p>	[1]
18(a)(ii)	<p>Describe <u>four</u> stages relevant to this method/process. Four marks for description of relevant stages relating to i) technique or method selected. 4 x 1 [4]</p> <ul style="list-style-type: none"> • Preparation of materials. • Selection of appropriate control technology • Specialist tools & equipment. • Method of making / process referring to specialist terminology. 	[4]
18(b)	<p>Name a piece of equipment that would be needed for your method/process. Any one suitable / relevant piece of specialist equipment needed for (a)(ii). Do not credit any repeats from (a)(ii).</p>	[1]
18(c)	<p>Give <u>two</u> safety precautions that should be taken into account when using tools and equipment. Two marks: 2x1 [2]</p> <ul style="list-style-type: none"> • Safe use of control technology e.g. electricity • Protective clothing • Safety labelling • Safety of machinery – drilling, cutting, soldering, assembly 	[2]

Section B		
Question Number	Answer	Max Mark
18(d)*	<p>Products become 'obsolete' after a few years.</p> <p>Discuss the difference between fashion and planned obsolescence.</p> <p>Planned</p> <p>Continually changing designs. Continually changing technologies. Specific life span/ time limit. To persuade users to upgrade/ replace. Product fails after a specified time by manufacturer. Becomes obsolete/ non functional. To generate long term sales volume by reducing time between repeat purchases.</p> <p>Fashion</p> <p>In style and out of style Continually changing designs affected by changing technologies. Minor 'feature' changes/ re styling. 'Feeling' out of date. Allows for 'self expression' Cheaper Replaceable.</p> <p>Level 1 (0-2 marks)</p> <p>Basic discussion, showing some understanding of the meaning of 'obsolete' in the context of electronic and control system products. Can provide a description of some of the conflicts that exist between fashion and planned obsolescence.</p> <p>There will be little or no use of specialist terms. Answers may be ambiguous or disorganised. Errors of grammar, punctuation and spelling may be intrusive.</p> <p>Level 2 (3-5 marks)</p> <p>Adequate discussion, showing an understanding of the meaning of 'obsolete' in the context of electronic and control system products. Can provide a description of the conflicts that exist between fashion and planned obsolescence.</p> <p>There will be some use of specialist terms, although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, grammar and punctuation</p> <p>Level 3 (6-7 marks)</p> <p>Thorough discussion, showing a clear understanding of the meaning of 'obsolete' in the context of electronic and control system products. Can provide a clear description of the conflicts that exist between fashion and planned obsolescence.</p> <p>Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar.</p>	[7]
Section B Total		[45]
Paper Total		[60]

Assessment Objectives Grid (includes QWC)

Question	AO1	AO2	AO3	Total
1	1			1
2	1			1
3			1	1
4	1			1
5	1			1
6		1		1
7	1			1
8	1			1
9			1	1
10	1			1
11			1	1
12			1	1
13			1	1
14			1	1
15			1	1
16	10	5		15
17		11	4	15
18	12	3		15
TOTAL	29	20	11	60