OCR
Oxford Cambridge and RSA

Thursday 14 June 2018 - Afternoon

GCSE DESIGN AND TECHNOLOGY Resistant Materials

A565/01 Sustainability and Technical Aspects of Designing and Making

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
None

Duration: 1 hour 30 minutes

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. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

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 **80**.
- All dimensions are in millimetres unless stated otherwise.
- Your quality of written communication is assessed in questions marked with an asterisk (*).
- This document consists of **20** pages. Any blank pages are indicated.

SECTION A

Answer **all** the questions.

You are advised to spend 40 minutes on this section.

On questions 1–5 circle your answer.

1 Which of the following describes the proper purpose of wind farms?

(a) Collecting methane gas.

(b) Generating electricity.

(c) Providing nesting sites for birds.

(d) Creating a moving sculpture in the countryside. **[1]**

2 Which of the following terms refers to giving a new purpose to a product, without changing it?

(a) Reproduction.

(b) Reflection.

(c) Reuse.

(d) Research. **[1]**

3 The life cycle of a product begins with:

(a) Maintenance.

(b) Disposal.

(c) Raw material extraction.

(d) Distribution. **[1]**

4 Which of the following forms of power is a non-renewable source of energy?

(a) Wave.

(b) Solar.

(c) Hydro-electricity.

(d) Coal. **[1]**

5 Which of the following gives the meaning of the European Ecolabel?

(a) A product has a reduced environmental impact compared to similar products.

(b) A product is made only in Europe.

(c) A product is approved for sale in Europe.

(d) A product is battery-powered. **[1]**

6 State why the recycling symbol shown below is incorrect.

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

7 The letters CAD stand for:

Computer **A**..... **D**esign. **[1]**

8 The ozone layer in the upper atmosphere protects us from which harmful solar radiation?

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

9 State the name of smart, modern materials that change colour according to the brightness of light shining on them.

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

10 Give **one** commonly used method of waste disposal.

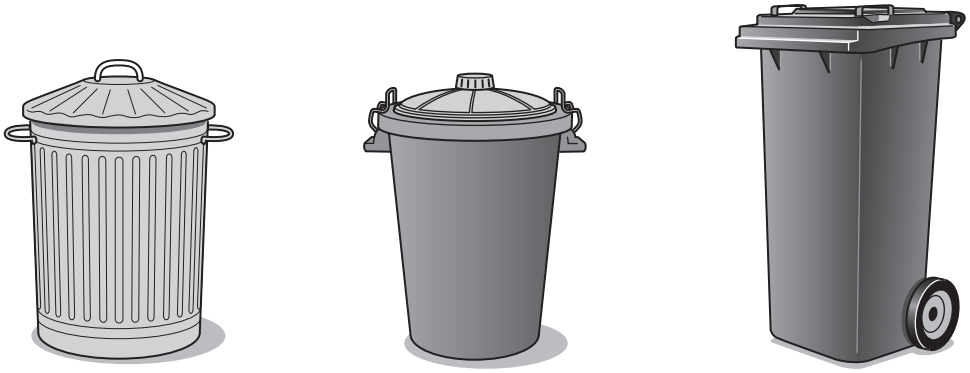
..... **[1]**

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

Tick (✓) the box to show your answer.

		True	False	
11	Thermoplastic products can be manufactured only from recycled plastic bottles.	☐	☐	**[1]**
12	COSHH regulations control the level of exposure of workers to softwood dust.	☐	☐	**[1]**
13	Safety guards on workshop machinery are not needed when an adult is present.	☐	☐	**[1]**
14	Quality Control only occurs when the production process is complete.	☐	☐	**[1]**
15	Eco footprint is a measure of the environmental impact of our actions.	☐	☐	**[1]**

16 Fig. 1 shows three waste bins used for different purposes, and their capacity in litres.



Ash bin
90 litres

Rubbish bin
90 litres

Wheelie bin
140 litres

Fig. 1

(a) Different types of waste bins are often manufactured in one country and then exported all over the world.

State the name given to this form of manufacture and distribution.

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

(b) The ash bin in Fig. 1 is made from corrugated, zinc plated mild steel.
With reference to this bin:

(i) Explain the term 'corrugated'.

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.....

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

(ii) Explain why the mild steel has been zinc plated.

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

(iii) Explain one advantage of using mild steel for the ash bin, rather than plastic.

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

(c) The rubbish bin shown in Fig. 1 is made from a moulded plastic. Give **two** reasons why plastic is suitable for this bin.

1.....

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2.....

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[2]

(d) Compared to the other two bins in Fig. 1, the wheelie bin is taller, has a greater capacity and is heavier when full.

Describe **two** design features of the wheelie bin that have been influenced by these features.

1.....

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2.....

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[4]

(e) Give the name of the scientific studies concerned with how products are shaped to fit the people that use them.

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

(f)* Wheelie bins are now very common as waste containers in this country.

Discuss the advantages of using environmentally unfriendly plastics to store household rubbish.

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

SECTION B

Answer **all** the questions.

You are advised to spend 50 minutes on this section.

17 Fig. 2 shows a pull-along toy for a young child.

The body, wings, legs and feet will be cut from MDF and then painted. The base and wheels are to be made from a decorative hardwood with a clear coating.

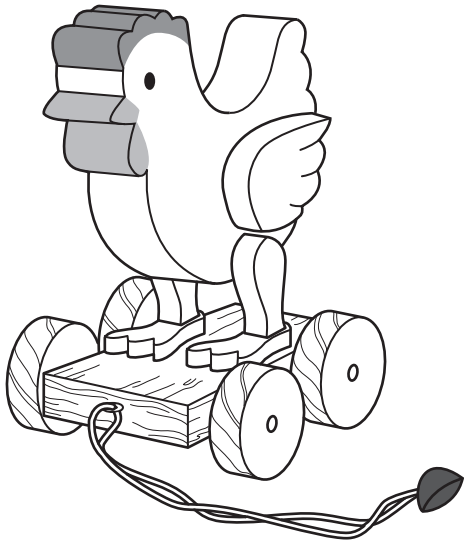

Fig. 2

(a) Name a suitable hardwood for the base and wheels.

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

(b) The hardwood will not be painted, but will be finished with a clear coating.

Explain **two** reasons why the hardwood is finished this way.

1.....

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2.....

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[4]

(c) Fig. 3 shows a drawing of the parts of the pull-along toy. The body will be cut from thicker MDF than the other components.

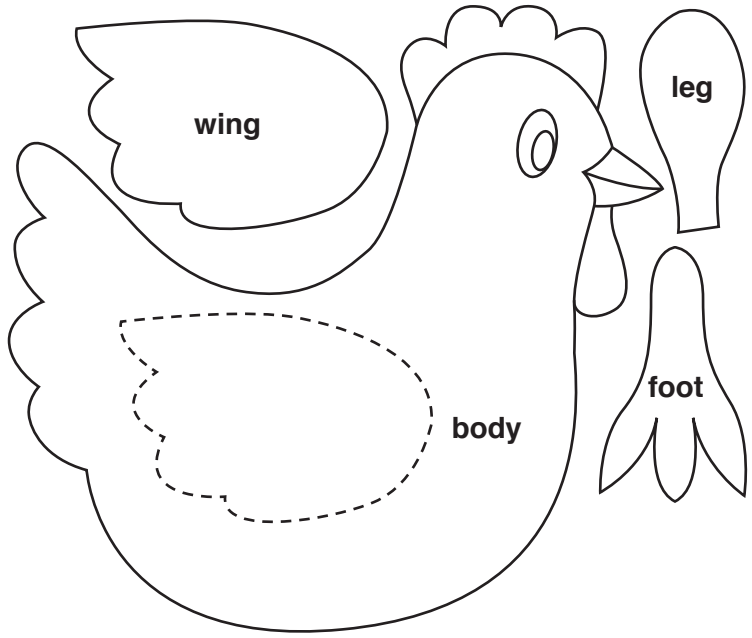

Fig. 3

(i) Fig. 3 has been drawn to a scale of 1:2.

Explain what is meant by a scale of 1:2.

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

(ii) Give **four** instructions to inform the maker how these components should be cut out before smoothing.

1 .....

2 .....

3 .....

4 .....

[4]

(d) To make the toy shown in Fig. 2 more appealing it needs to rock from side to side as it is pulled along.

In the space below, use notes and sketches to show how this rocking motion can be achieved, **without** using any extra components.

Show all construction details.

[4]

18 Fig. 4 shows a decorative pendant in the shape of a butterfly.

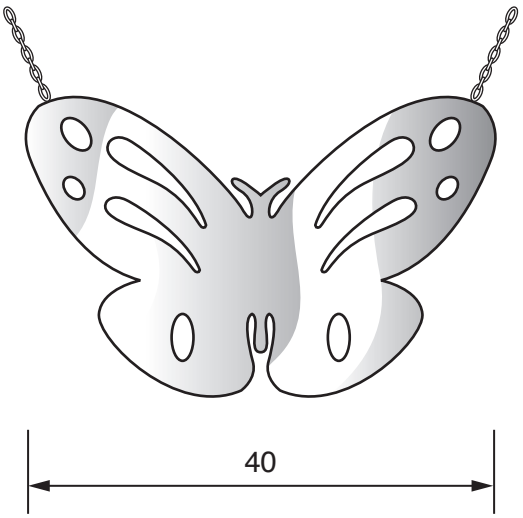

Fig. 4

(a) (i) The pendant will be made from red, see-through acrylic sheet.

Tick (✓) the correct technical term which means see-through.

Opaque	Transparent	Translucent	Cloudy

[1]

(ii) State an appropriate thickness for the acrylic sheet.

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

(b) In the space below, use notes and sketches to show how the acrylic sheet can be pierced and cut using hand tools.

Include details of any tools and techniques used.

[4]

(c) Explain **one** method which could be used to make the flat design look more life-like.

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

(d) Name **one** thermoforming plastic, other than acrylic, that could be suitable for this pendant.

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

(e)* A batch of pendants could be cut using a modern laser cutter.

Discuss the advantages and disadvantages of using laser cutters to pierce and shape small objects.

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.... **[6]**

19 Fig. 5 shows a mobile phone stand made from mild steel strip, 50 mm wide.

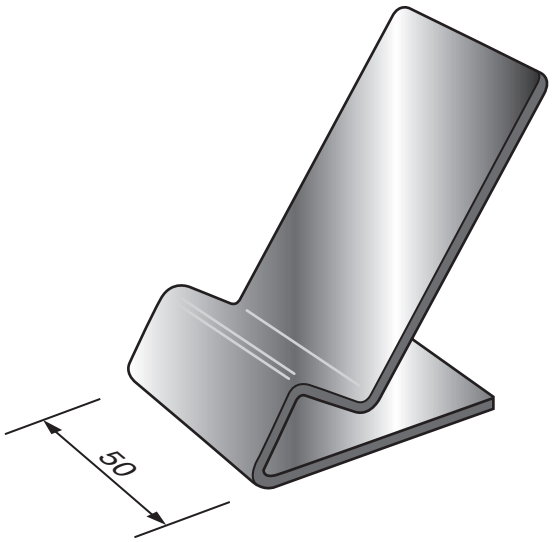

Fig. 5

(a) The faces of the strip need to be marked where it is to be bent.

Give the name of **three** tools needed to mark one of the faces.

1.....

2.....

3.....

[3]

(b) When bent to shape, the mobile phone stand will be given a paint finish.

State **two** reasons for painting the mild steel.

1.....

2.....

[2]

(c) An alternative to a paint finish would be a plastic dip coating.

Give **three** stages in the process of dip coating.

1.....

2.....

3.....

[3]

(d) The mobile phone stand is to be modified to prevent the phone from slipping off the smooth surface.

Give **one** way the mobile phone stand could be modified.

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

(e) In the space below, use sketches and notes to show **one** design idea for a stand for a tablet computer.

Your stand should be:

- capable of being adjusted to provide a comfortable viewing angle
- capable of being folded flat for storage
- lightweight
- able to support a tablet of approximately 275 × 180 mm
- made from a metal that does not require protection
- finished so that it does not scratch the surface on which it is placed, or the back of the tablet.

Include details of materials and methods of construction.

[6]

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).