OCR
Oxford Cambridge and RSA

Friday 16 June 2017 – 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

* A 5 6 5 0 1 *

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

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 is one of the 6Rs?

(a) Readjust

(b) Resolve

(c) Reuse

(d) Respond **[1]**

2 Biodegradable materials will:

(a) Rust

(b) Get stronger

(c) Remain the same

(d) Break down naturally **[1]**

3 An example of a non-renewable energy source is:

(a) Biofuel

(b) Coal

(c) Hydro-electricity

(d) Solar **[1]**

4 COSHH (Control of Substances Hazardous to Health) is connected to:

(a) Product analysis

(b) Risk assessment

(c) Market research

(d) Design development **[1]**

5 Carbon offsetting requires companies to purchase:

(a) Carbon credits

(b) Fairtrade materials

(c) Recycled packaging

(d) Local labour **[1]**

6 The letters **E T I** stand for:

Ethical **T**..... **I**nitiative **[1]**

7 State the meaning of the logo shown here.

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

8 Tick (✓) the final stage of a life cycle analysis.

Disposal	Distribution	Product Use

[1]

9 Peoples' beliefs and way of life are referred to as:

Their C..... **[1]**

10 State the term given to the study of people's body sizes.

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

Decide whether each of the following statements is **True** or **False**.

Tick (✓) the box to show your answer.

		True	False	
11	A BSI kitemark™ confirms that a product has been tested.	☐	☐	**[1]**
12	Tertiary recycling is using a product again for the same purpose.	☐	☐	**[1]**
13	Fairtrade promotes cheaper products.	☐	☐	**[1]**
14	Aesthetics relates to the appearance of a product.	☐	☐	**[1]**
15	CFCs harm the ozone layer.	☐	☐	**[1]**

16 Fig. 1 shows a waste bin that is to be used in a school playground.

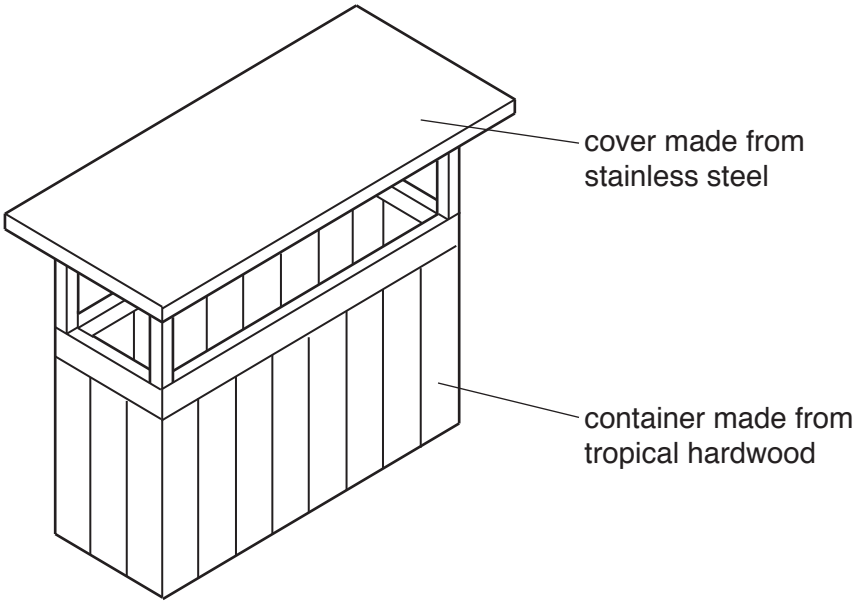

Fig. 1

(a) Give **one** method of gathering information about the target market that might have been used before the waste bin was designed.

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

(b) With reference to the waste bin shown in Fig. 1 explain the meaning of the following:

(i) the term 'disassembly' .....

.....

.....

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

(ii) the 6R 'refuse' .....

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

(c) The container of the waste bin is protected by a clear finish.

(i) State **one** reason for using a clear finish on the container.

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

(ii) Give **two** benefits of using a finish with LVOC (low volatile organic compound) content.

1 .....

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

(d) A large plastic bin bag is used to line the container of the waste bin.
Explain why an alternative to using plastic bags should be considered.

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

(e) Different types of rubbish become mixed together in the waste bin. It is also difficult to empty.

Use sketches and notes to show modifications to the waste bin to make the recycling of waste easier.

The waste bin must:

- be easy to empty
- be made from sustainable and/or recyclable materials
- have easily identifiable compartments for both general waste and recyclable waste.

[4]

(f)* Discuss the social and environmental implications of products that are designed with built-in obsolescence.

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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 mild steel gate latch.

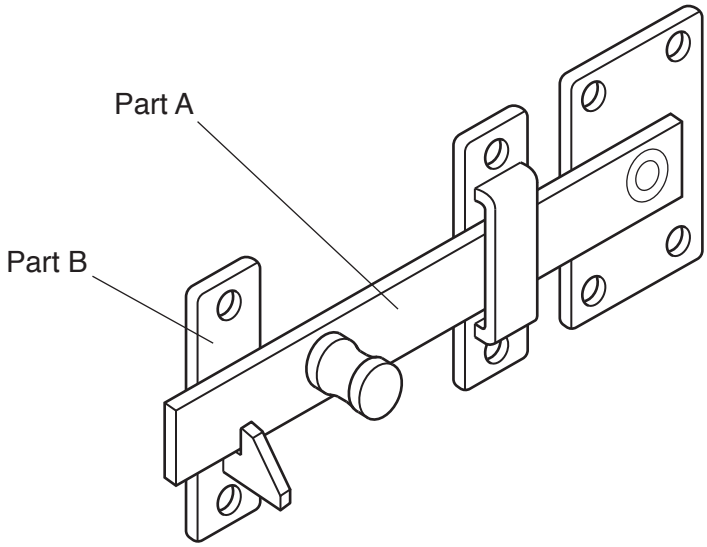

Fig. 2

(a) State **one** property of mild steel that makes it a suitable material for the gate latch.

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

(b) Part A of the gate latch (the latch arm) is made from a length of flat mild steel bar. The table below shows the processes used to manufacture the latch arm.

Complete the table below by stating **one** tool or item of equipment for each process.

Process	Tool or item of equipment
Cutting the bar to length	
Smoothing the edges	
Marking the pivot hole position	
Making the pivot hole	

[4]

(c) Fig. 3 shows Part B of the gate latch, made from two pieces of mild steel welded together.

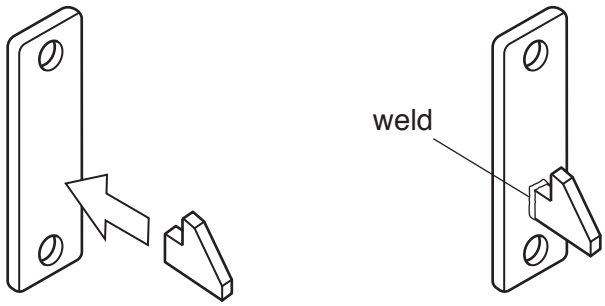

Fig. 3

State **one** other method of permanently joining the two pieces together.

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

(d) The gate latch has a spray painted finish.

(i) State **one** reason why the gate latch is painted.

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

(ii) State **one** safety precaution that should be taken when spray painting.

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

(iii) State **one** other suitable method of finishing the gate latch, apart from painting.

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

(e)* The gate latch could be produced by different production methods.

Discuss the advantages and disadvantages of one-off production compared to mass production methods.

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

18 Fig. 4 shows a wooden tray.

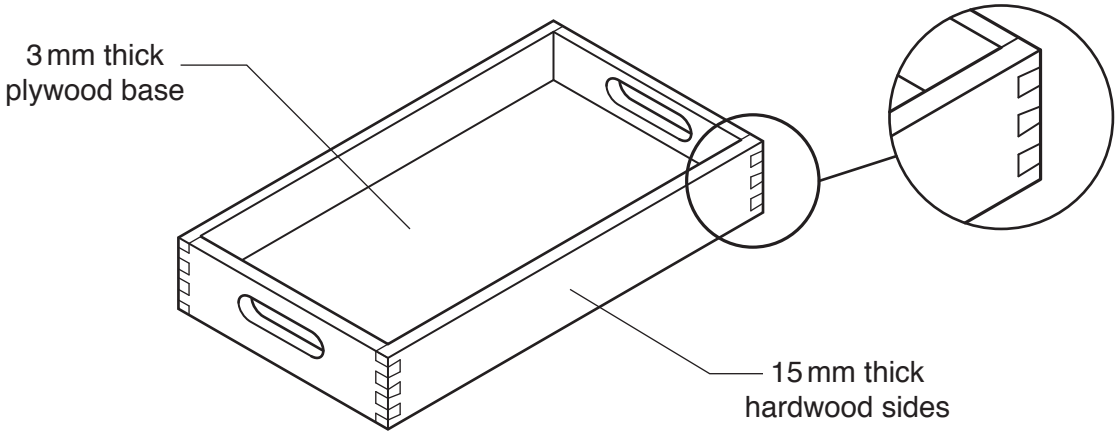

Fig. 4

(a) Name the type of joint used on the corners of the tray.

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

(b) Name a suitable adhesive for securing the joints on the corners of the tray.

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

(c) Name a suitable hardwood for the sides of the tray.

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

(d) The cut out handles on the sides of the tray are made in three stages.
Fig. 5 shows the first stage.

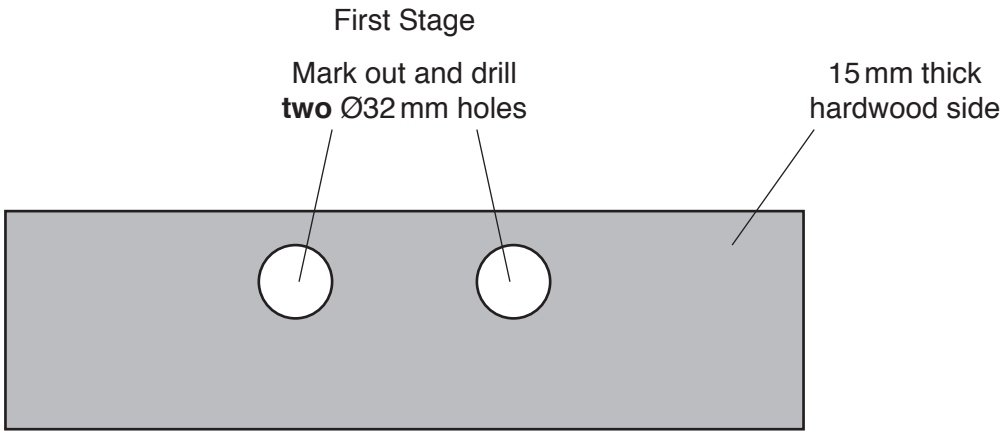

Fig. 5

Tick (✓) the most suitable drill bit for making the holes.

Masonry bit	HSS bit	Countersink bit	Forstner bit

[1]

(e) Fig. 6 shows the second stage.

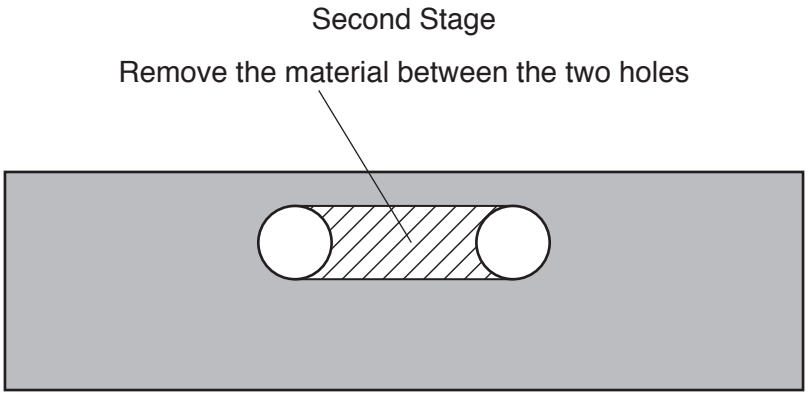

Fig. 6

Explain **one** method of removing the material shown using workshop hand tools.

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.....

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

(f) The base of the tray is made from plywood. Plywood is a manufactured board.

(i) Name **one** other manufactured board.

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

(ii) Give **one** advantage, other than cost, of using plywood for the base of the tray compared to solid timber.

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

(g) The tray could be made easier to use for some children.

Use sketches and notes to show **one** design for a modified tray. Include details of materials and methods of construction used.

The tray must:

- hold cups and plates securely in place
- be easier to clean
- be easier to carry
- be safer for a child to use.

[6]

19 Fig. 7 shows a games controller holder made from 3 mm thick acrylic. The holder is made in two parts.

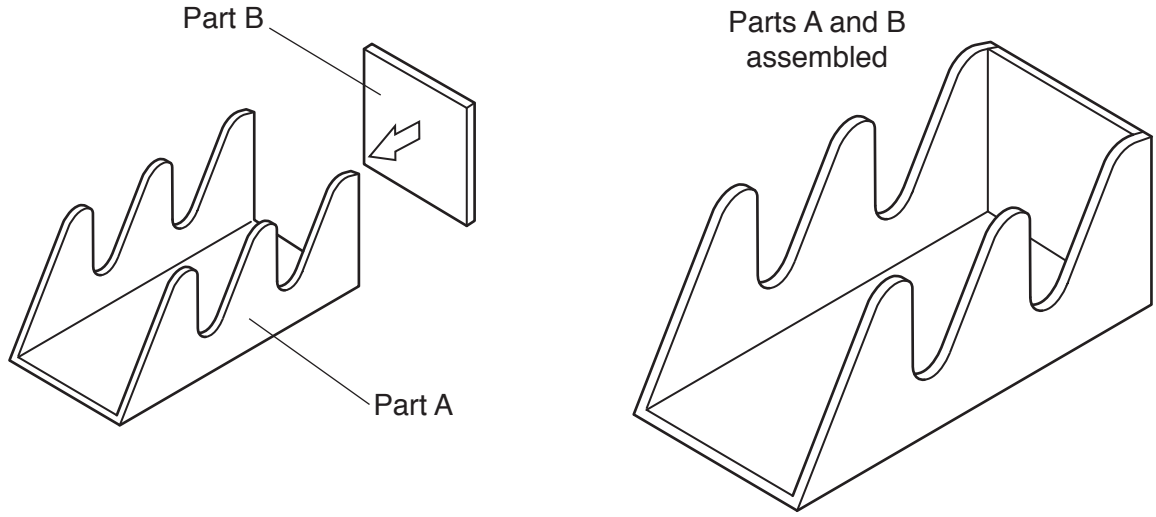
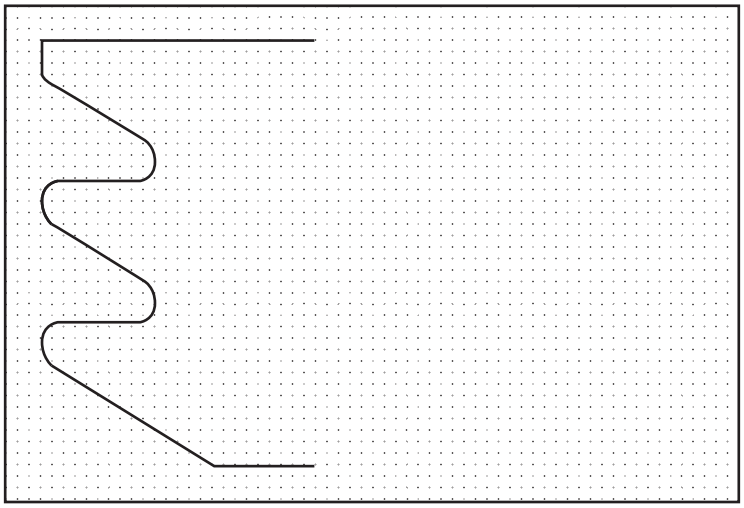


Fig. 7

(a) The two parts are to be designed and made using CAD/CAM. What do the letters CAD stand for?

(i) **C**..... **A**..... **Design** **[1]**

(ii) The screen shot shown below shows an incomplete CAD drawing of Part A.



Tick (✓) the command you would use to complete the drawing of part A.

Copy	Stretch	Mirror	Group

[1]

(b) The parts will be cut out using CAM.

State a suitable CAM machine for cutting out parts A and B.

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

(c) CAD/CAM can be quicker and easier than using hand tools.
Give **two** other advantages of using CAD/CAM to cut out the acrylic Parts A and B compared to using hand tools.

1 .....

.....

2 .....

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

(d) After being cut out, Part A needs to be bent into a U shape.

Use sketches and notes to show the stages involved in bending Part A accurately and safely into the correct U shape.

Show details of all tools, materials, techniques and safety precautions used.

[5]

(e) Fig. 8 shows a cross-section of Part A after bending to shape.
The shape of Part B requires some modification to make it fit snugly into Part A.

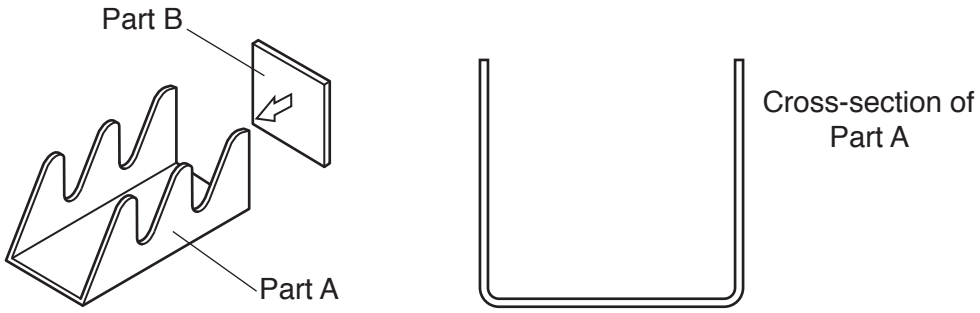
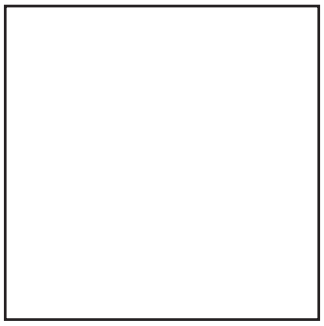


Fig. 8

(i) Sketch **one** modification of Part B onto the drawing below to allow it to fit into Part A.



[1]

(ii) Explain how you would make this modification to Part B using workshop hand tools.

.....

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

(f) Name a suitable adhesive for fixing Part B into Part A.

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

(g) Name **one** thermoplastic, other than acrylic, that could be used to make the games controller holder.

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

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).