

Monday 8 June 2015 – 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 pages at the end of this booklet. The question number(s) must be clearly shown.
- 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 **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** An example of a material that can come from a sustainable source is:
- (a) Acrylic
 - (b) Pine
 - (c) Polystyrene
 - (d) Stainless steel
- [1]**
- 2** Which of the following is a renewable energy resource?
- (a) Coal
 - (b) Natural gas
 - (c) Geothermal
 - (d) Crude oil
- [1]**
- 3** Ergonomics is the name given to the relationship between a product and its:
- (a) Manufacture
 - (b) Packaging
 - (c) Cost
 - (d) User
- [1]**
- 4** The first stage of a life cycle assessment of a product is:
- (a) Raw material extraction
 - (b) Manufacturing the product
 - (c) Disposal of the product
 - (d) Using the product
- [1]**

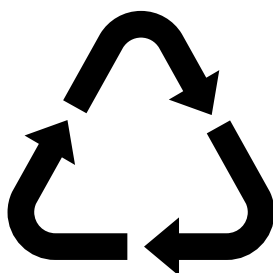
3

5 An example of a material that biodegrades is:

- (a) Nylon
- (b) Softwood
- (c) Cast iron
- (d) Brass

[1]

6 State the meaning of the symbol shown here.



..... [1]

7 Which of the 6Rs refers to approaching design problems differently?

..... [1]

8 With reference to HSE, what do the letters H and S stand for?

H..... & S..... Executive [1]

9 State the term that describes the measurement of impact that human activities have on the environment.

..... [1]

10 State the term that means to manufacture a product in different parts of the world.

..... [1]

4

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

Tick (✓) the box to show your answer.

	True	False	
11 Giving used products to a charity shop is an example of secondary recycling.	<input type="checkbox"/>	<input type="checkbox"/>	[1]
12 Cultural issues arise when designers do not consider how products may affect peoples' beliefs or preferences.	<input type="checkbox"/>	<input type="checkbox"/>	[1]
13 Anthropometrics is the study of the measurements of people.	<input type="checkbox"/>	<input type="checkbox"/>	[1]
14 The eco label is an official sign of Fairtrade.	<input type="checkbox"/>	<input type="checkbox"/>	[1]
15 'Built-in obsolescence' means a product is designed to last forever.	<input type="checkbox"/>	<input type="checkbox"/>	[1]

16 Fig. 1 shows a clock made from recycled bicycle parts and a standard clock mechanism.

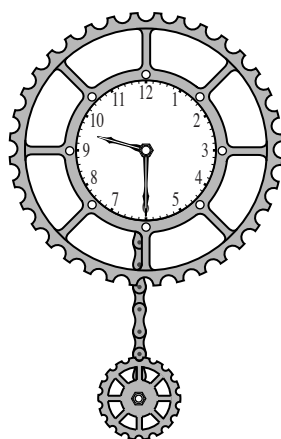


Fig. 1

- (a) Explain **two** reasons why the consumer might consider the clock to be an environmentally friendly product.

1.....

.....

2.....

.....

[4]

- (b) With reference to the clock shown in Fig. 1, explain the meaning of the following **three** terms.

Secondary recycling

.....

.....

.....

Maintenance

.....

.....

.....

Life cycle analysis

.....

.....

.....

[6]

6

- (c) The clock shown in Fig. 1 is designed to hang on a wall.
Use sketches and notes to design a stand to allow the clock to be free standing.

The stand must:

- be made from recycled and/or sustainable materials
- match the theme of the clock
- be stable

[4]

(d)* Discuss the environmental implications of packaging and transporting large, assembled products around the world.

[6]

8

SECTION B

Answer **all** the questions.

You are advised to spend 50 minutes on this section.

- 17 Fig. 2 shows a ramp for a skateboard or BMX bike.

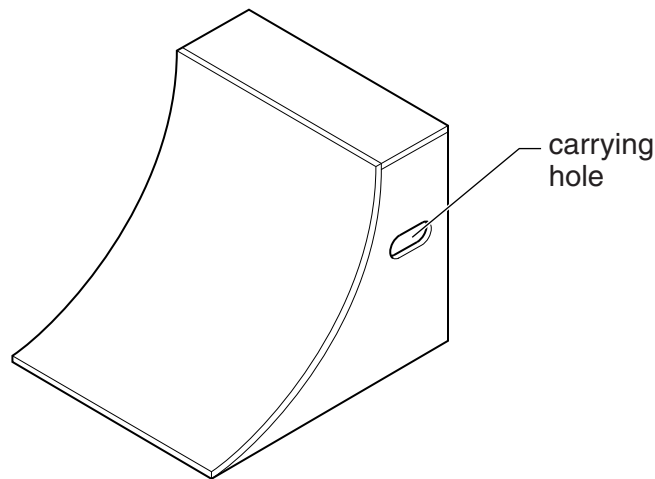


Fig. 2

The ramp is made from 18 mm thick plywood sheet.

- (a) State **one** property of plywood that makes it suitable for the ramp.

..... [1]

- (b) (i) The plywood needs to be bent to form the curved part of the ramp.
Explain **one** method of bending the plywood.

.....

..... [2]

- (ii) State another suitable material that could be used to form the curved part of the ramp.

..... [1]

- (c) Anthropometric data has been used in the design of the carrying hole.
Give **one** piece of anthropometric data and explain how it would have been used in the design of the carrying hole.

Anthropometric data: [1]

How the data has been used.....

.....

..... [2]

9

(d) The ramp is glued and screwed together. Fig. 3 shows one of the corner joints.

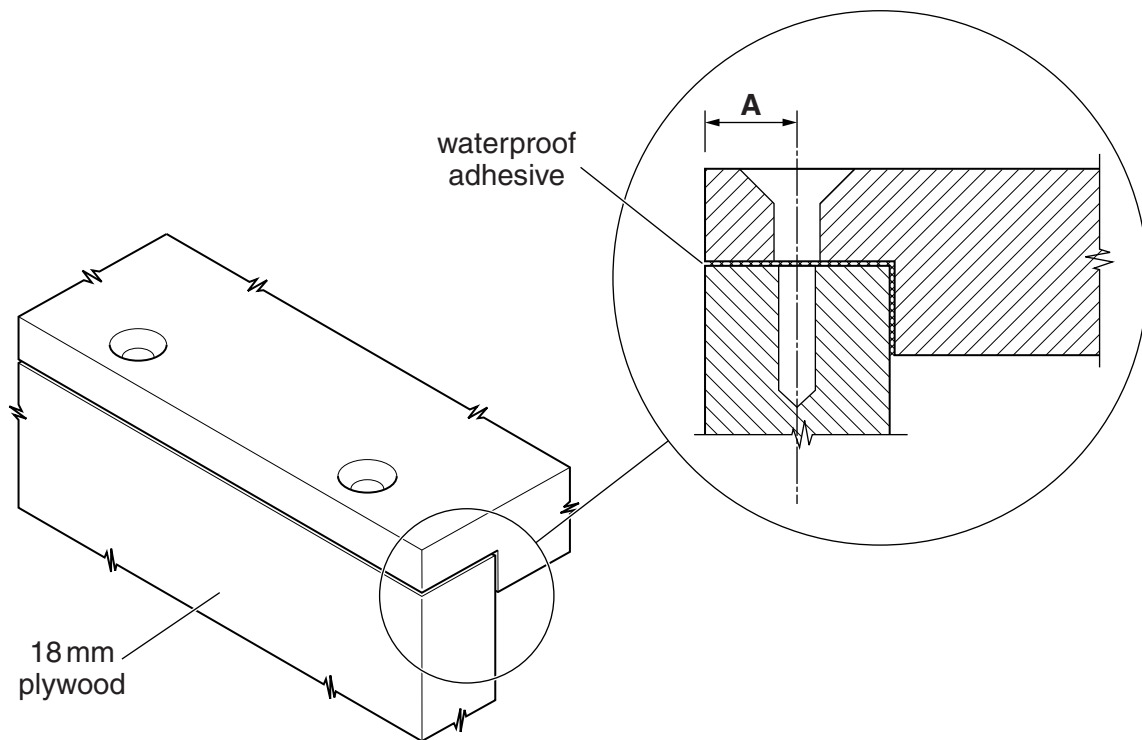


Fig. 3

(i) Name the type of joint shown in Fig. 3.

..... [1]

(ii) State a suitable size for dimension A.

..... [1]

(e) (i) The table below shows four types of screw. Tick (✓) the most suitable screw for the joint.

[1]

(ii) State **one** reason why stainless steel screws would be used instead of mild steel screws.

..... [1]

10

- (f) Complete the table below to show **one** suitable tool for each process of constructing the joint.

Process	Tool
Marking the positions for the screw holes	
Making the pilot hole	
Tightening the screw	

[3]

- (g) When complete, the ramp is to be finished with a 'smart' molecular coating that repels water. Tick (✓) the name given to the technology used in this type of coating.

Alphatechnology	Microtechnology	Nanotechnology	Hexotechnology

[1]

18 Fig. 4 shows a microphone stand.

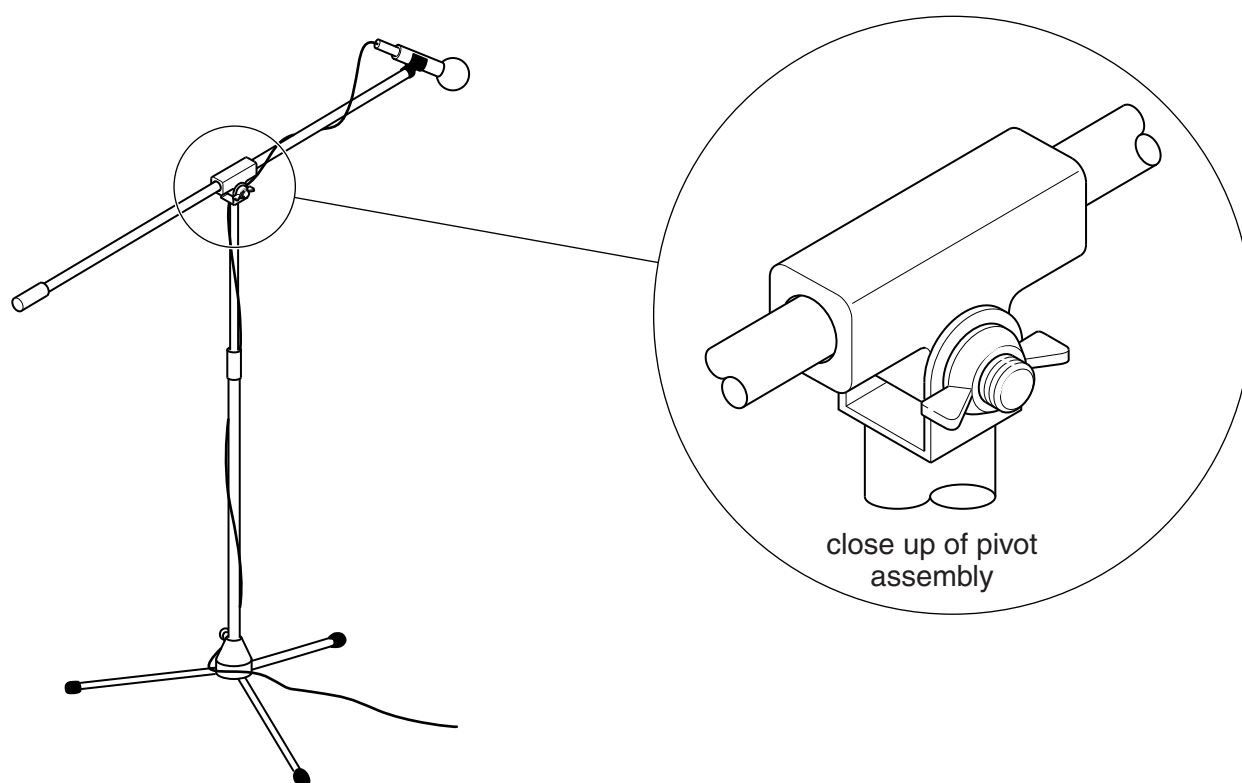
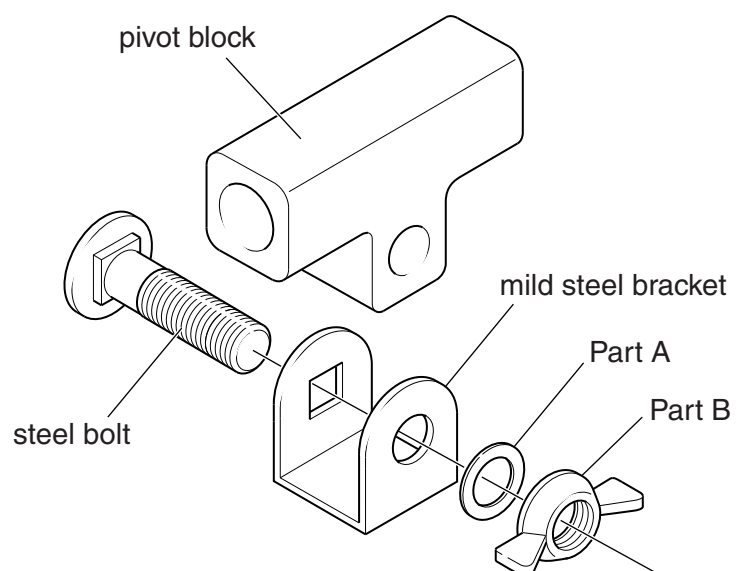


Fig. 4

(a) An exploded view of the pivot assembly is shown below.



(i) Give the name of Part A [1]

(ii) Give the name of Part B [1]

12

(b) State **one** reason why Part B has been used rather than a simple hexagonal nut.

..... [1]

(c) The bracket is made from one piece of 3 mm mild steel as shown in Fig. 5 below.



Fig. 5

Complete the table below to show **one** tool or item of equipment for each process involved in the manufacture of the bracket.

Process	Tool or item of equipment
Cutting the outer shape	
Smoothing the edges	
Bending into shape	

[3]

(d) Explain how to make the square hole in the bracket using workshop tools.

.....

.....

.....

.....

..... [3]

- (e)*** Parts of the microphone stand are manufactured using CAM/CNC.
Discuss the advantages and disadvantages of manufacturing products using CAM/CNC compared to making them by hand.

[6]

14

19 Fig. 6 shows a trophy.

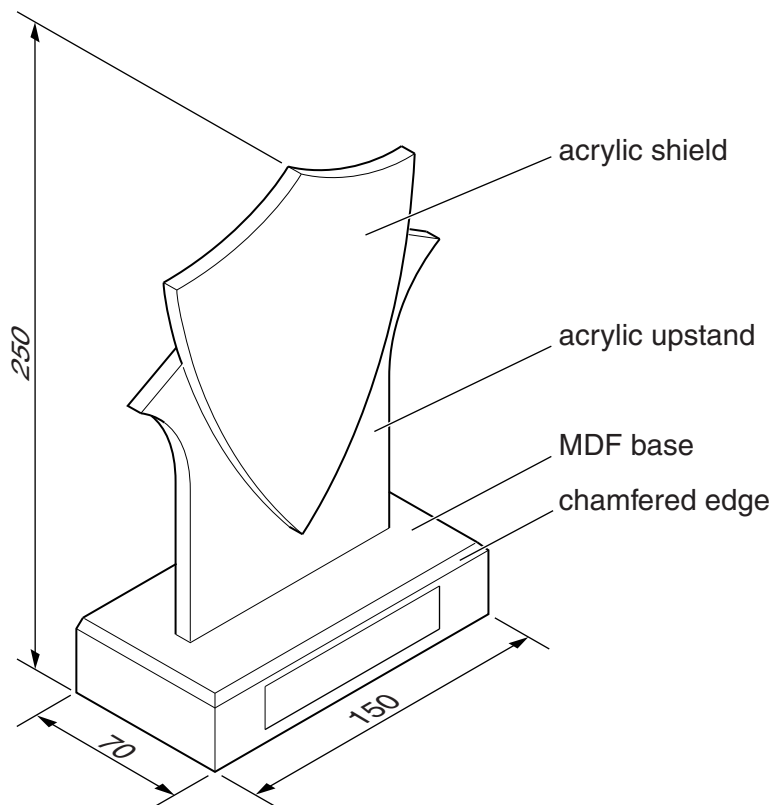


Fig. 6

(a) The shield on the trophy is to be cut from a large sheet of acrylic.

Fig. 7 shows the acrylic sheet with three possible positions for marking out and cutting the shield.

Tick (✓) the most suitable position.

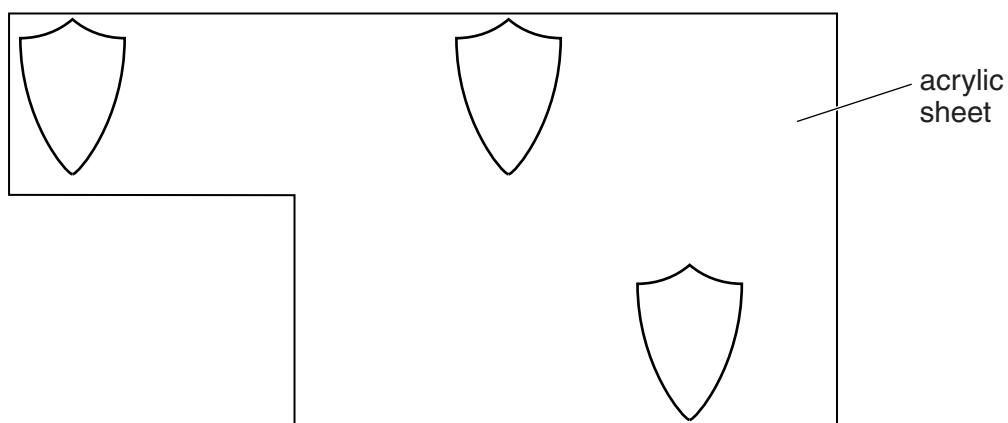


Fig. 7

[1]

(b) State a suitable adhesive to join the acrylic shield and upstand together.

[1]

15

- (c) Use sketches and notes to show a suitable method of joining the upstand of the trophy to the base.

[3]

- (d) The base of the trophy is made from a single block of MDF. The top edges are to be chamfered.

- (i) Name **one** workshop power tool that could be used to make the chamfer.

..... [1]

- (ii) Name **one** workshop hand tool that could be used to make the chamfer.

..... [1]

- (e) The base is to be sprayed with black gloss paint.

Explain how to prepare the surface of the MDF base before it is sprayed.

.....

.....

..... [2]

16

- (f) A case is needed to display the trophies.

Use sketches and notes to show **one** design for a trophy display case. Include details of materials and methods of construction used.

The case must:

- hold six trophies
- be wall mounted
- be lockable
- allow trophies to be viewed from different angles

[6]

END OF QUESTION PAPER

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This image shows a full page of primary-ruled paper. It features a vertical solid line on the left side, creating a narrow margin. The rest of the page is filled with horizontal dashed lines, providing a guide for handwriting practice. There are no markings, text, or illustrations on the page.

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