



**GENERAL CERTIFICATE OF SECONDARY EDUCATION
DESIGN AND TECHNOLOGY**

A564

Resistant Materials

Technical aspects of designing and making

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
None

**Monday 11 January 2010
Afternoon**

Duration: 1 hour 15 minutes



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly 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 that you know what you have to do before starting your answer.
- Answer **all** the questions in Section A **and** Section B.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

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**.
- All dimensions are in millimetres.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- This document consists of **16** pages. Any blank pages are indicated.

2
Section A

Answer **all** questions.

1 Fig. 1 shows details of an incomplete design for a child’s musical toy made from hardwood.

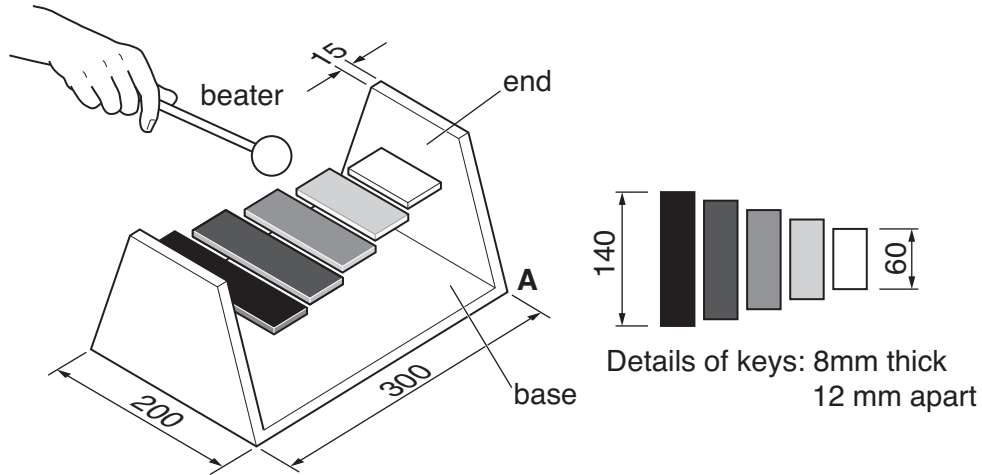


Fig. 1

(a) (i) Complete the table below by naming the tools or items of equipment used to make the shaped end shown in Fig. 2.

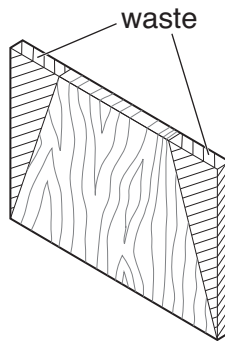


Fig. 2

Stage	Process	Tools / items of equipment
1	Mark out shape	
2	Cut off the waste	
3	Make sure the cut edges are flat	
4	Smooth surfaces	

[4]

(ii) Describe **one** safety precaution you would take when cutting off the waste in stage 2.

.....

..... [1]

(b) Sketch and name a suitable joint for joining the end to the base at corner **A**.

Name of joint

[3]

(c) The hardwood keys are to be supported between the two ends shown in Fig. 1.
In the space below, use sketches and notes to show how the hardwood keys could be:

- supported between the two ends
- kept apart when they are hit with the beater

[4]

[Total: 12]

- 2 Fig. 3 shows details of a safety gate to be made in a school workshop. The safety gate is used to prevent young children from climbing stairs or entering other areas. The safety gate is made from mild steel and the sides are brazed together.

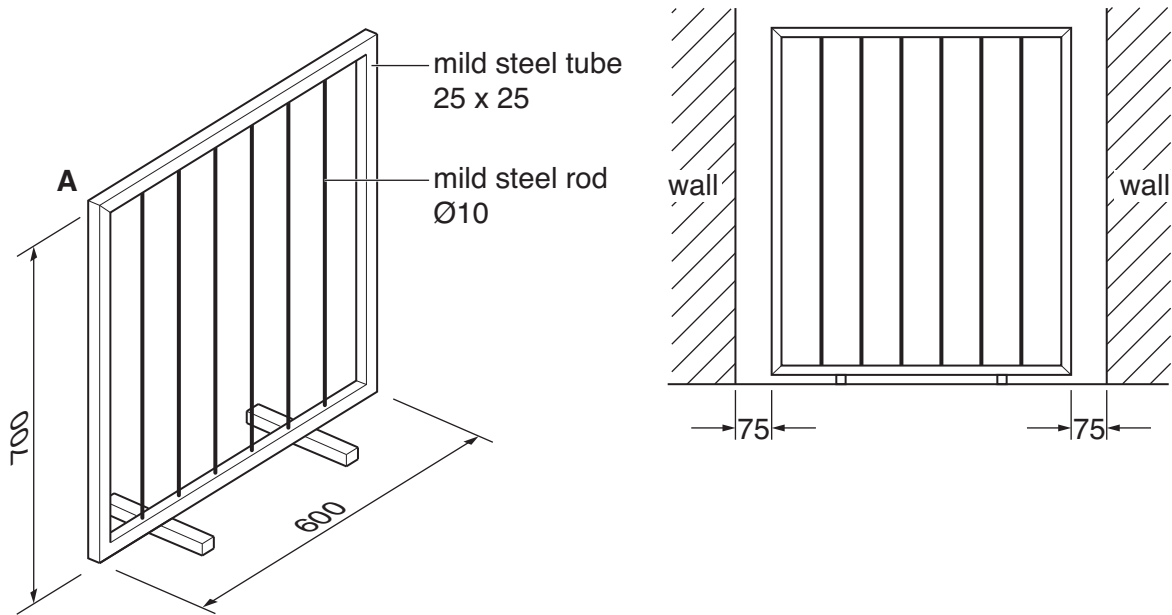
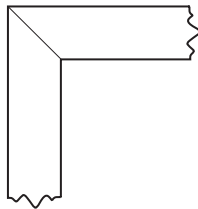


Fig. 3

- (a) (i) Corner A of the safety gate is shown below.



Name the joint at corner A.

..... [3]

- (ii) The sides of the safety gate will be marked out and cut from lengths of mild steel tube. Complete the table below by naming the tools used to make the joint at corner A.

Stage	Process	Tools
1	Mark a line on the surface of the steel tube	
2	Cut the tube to size	
3	Make the cut surfaces smooth	

[3]

(b) State the purpose of the following items of equipment used during the preparation and brazing of the sides of the safety gate:

(i) emery cloth [1]

(ii) flux [1]

(iii) brazing rod [1]

(c) The safety gate will be positioned between two walls as shown in Fig. 3.
A device that could secure the safety gate between the two walls is needed.

Use sketches and notes to show details of a device that will:

- prevent the safety gate from being pushed or pulled away from the wall
- be quick and easy to operate

Include details of materials and methods of construction used.

[5]

[Total: 12]

Turn over

3 Fig. 4 shows details of a table football game.

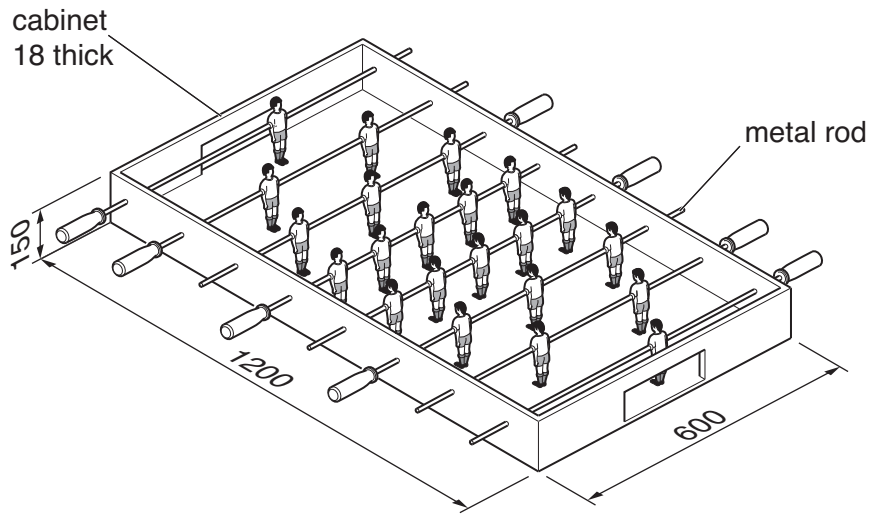


Fig. 4

- (a) (i) The metal rods could be made from Ø15 mild steel **or** aluminium. Choose **either** mild steel **or** aluminium and give a reason for your choice.

Chosen metal

Reason [1]

- (ii) In use, the holes in the sides of the cabinet in which the metal rods run become worn and enlarged. In the space below, use sketches and notes to show how this could be overcome.

[2]

- (b) The handles on the metal rods have been ergonomically designed. Name a 'smart' material that could be used in a school workshop to make an ergonomic handle.

..... [1]

- (c) (i) Fig. 5 shows one footballer and the metal rod to which it is attached. The footballers are made from injection moulded plastic.

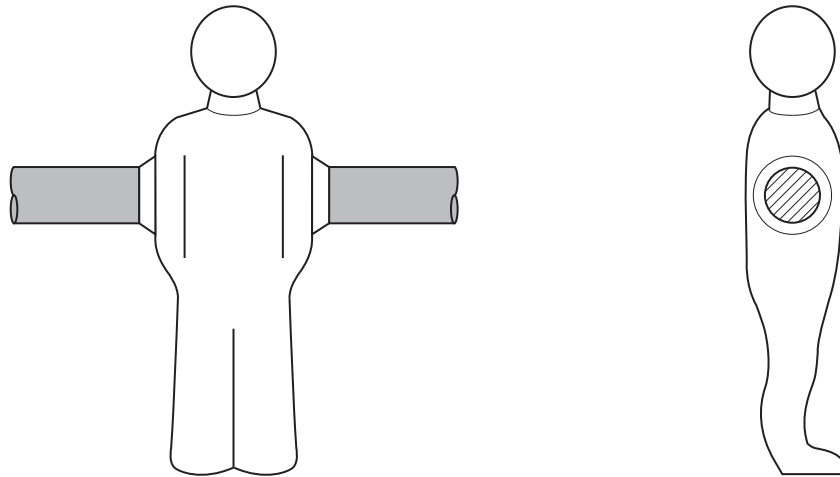


Fig. 5

Add sketches and notes to Fig. 5 to show how the footballer could be secured to the metal rod. [2]

- (ii) Explain why products made by injection moulding are only relatively cheap when they are made in large quantities.

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..... [2]

- (d) Use sketches and notes to design a scoring system that could be used during a game of table football.

The scoring system must:

- be fixed to the cabinet
- record a maximum of five goals scored at each end
- include details of materials and fittings used

[4]

[Total: 12]

Turn over

8
Section B

Answer **all** questions.

4 Fig. 6 shows a desk tidy made from 6 mm thick MDF.

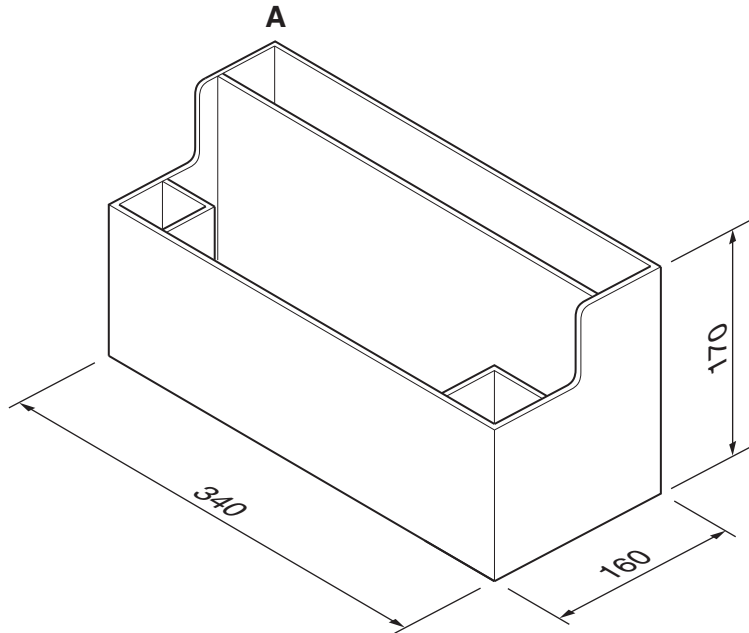


Fig. 6

(a) Give **one** reason why the use of MDF could be considered 'environmentally friendly'.

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

(b) The MDF used to make the desk tidy is **only** 6 mm thick.
In the space below, use sketches and notes to show a suitable corner joint at **A**.

[2]

- (c) In the space below, use sketches and notes to show a modification to the design of the desk tidy so that a small quantity of paper clips could be stored. The modification must allow for easy access to the paper clips.

[3]

- 5 Fig. 7 shows two small tables. Both tables are made from hardwood and are the same overall length, width and height. Table **A** is made by laminating. Table **B** is made by fabrication.

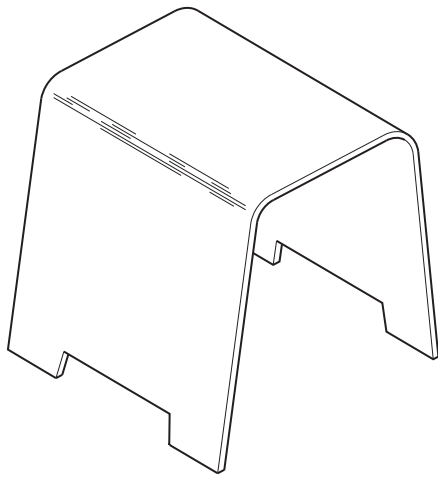


Table **A** laminated

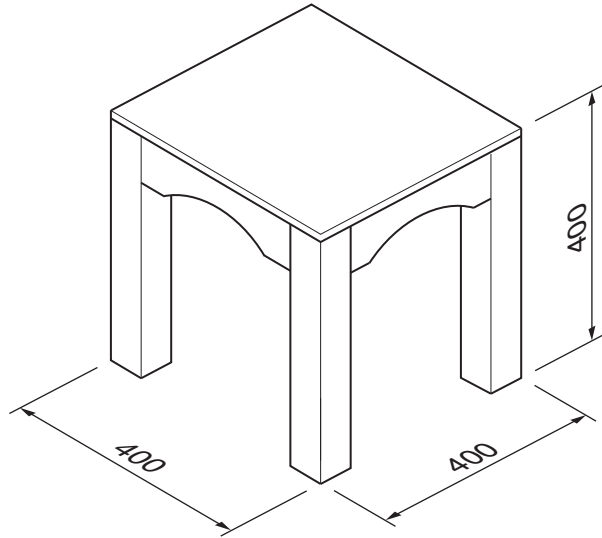


Table **B** fabricated

Fig. 7

- (a*) Evaluate the methods of manufacture for **both** tables to decide which of the two methods of manufacture would be the cheaper to batch produce.

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..... [6]

- (b) A 6 mm thick sheet of glass is to be inserted into the top of Table A. The area to be removed for the glass is shown in Fig. 8.

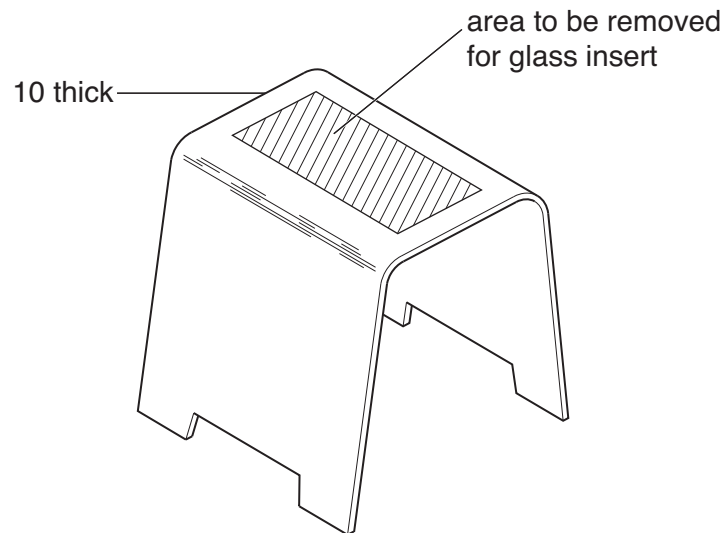


Fig. 8

In the space below, use sketches and notes to show how the 6 mm thick sheet of glass could be inserted into the top of Table A.

Include the following details:

- the processes involved in cutting out the area shown in Fig. 8
- the names of the tools and equipment used to complete the processes
- the method of supporting the 6 mm thick glass sheet in the space produced

[6]

[Total: 12]

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