

DESIGN AND TECHNOLOGY

6043/01

Paper 1 Technology

October/November 2017

2 hours 30 minutes

Additional Materials: Answer Booklet/Paper.
 Plain paper.
 Sketching equipment.



READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.
Write your Centre number, candidate number and name on the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO NOT WRITE IN ANY BARCODES.

Part A

Answer **all** questions.

Part B

Answer **four** questions.

Answer **two** questions from Section 1 and **two** questions from Section 2.

You are advised to spend no longer than 45 minutes on Part A.

Use sketches where appropriate to help answer any question. You may use coloured pencils.

All dimensions are in millimetres.

The number of marks is given in brackets [] at the end of each question or part question.

At the end of the examination, fasten all your work securely together.

This document consists of **12** printed pages.

Part A

Attempt **all** questions.

- 1 Name the tools that you would use for each of the processes.

Fig. 1 shows softwood 10 thick.

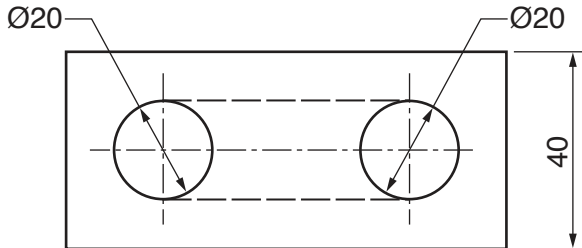


Fig. 1

- (a) cutting holes through the softwood [1]
 (b) cutting through the softwood along the dotted lines [1]

Fig. 2 shows a brass sheet.

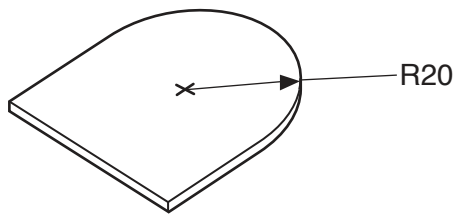


Fig. 2

- (c) marking the semi-circle R20 on the brass sheet [1]
 (d) ensuring that the marking tool does not slip in use on the brass sheet [1]

Fig. 3 shows a shape marked out on acrylic to be produced as a batch of 25.

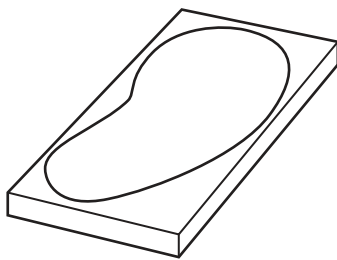


Fig. 3

- (e) ensuring that each shape is marked out identically on the acrylic [1]
 (f) marking the outline of the shape on to acrylic. [1]

2 Fig. 4 shows a piece of workshop equipment.

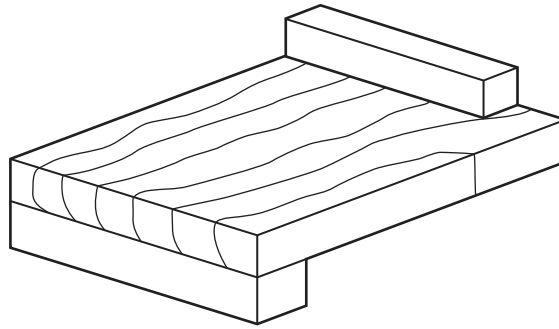


Fig. 4

(a) Name the equipment. [1]

(b) State its purpose. [1]

3 Sketch the following tools:

(a) Sash cramp [2]

(b) Bradawl. [2]

4 Fig. 5 shows a child's toy made from beech.

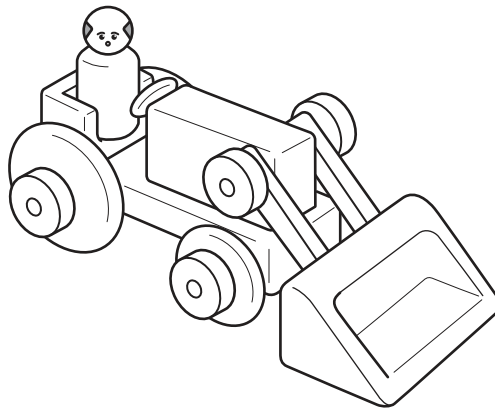


Fig. 5

Give **two** reasons why beech is a suitable material for a child's toy. [2]

5 Explain the workshop term 'tempering'. [2]

6 G.R.P. is used in the manufacture of many products.

(a) State what the initials G.R.P. stand for. [1]

(b) Name a product made from G.R.P. [1]

- 7 Name **two** tools that could be used to accurately measure the diameter of a bar. [2]
- 8 Fig. 6 shows a plastic cup, a garden bench and a saucepan.

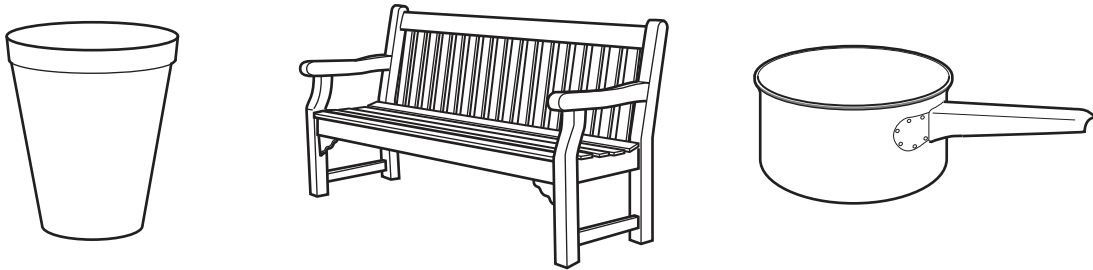


Fig. 6

- For each, state an appropriate specific material. [3]
- 9 State **two** safety precautions that should be taken when using a drilling machine. [2]
- 10 State the name of an alloy and give **two** metals that are used to make that alloy. [3]

Part B

Attempt **four questions**, **two** from Section 1 and **two** from Section 2.

All questions carry equal marks.

Section 1 – Tools and Materials

11 Three different tools are shown in Fig. 7.

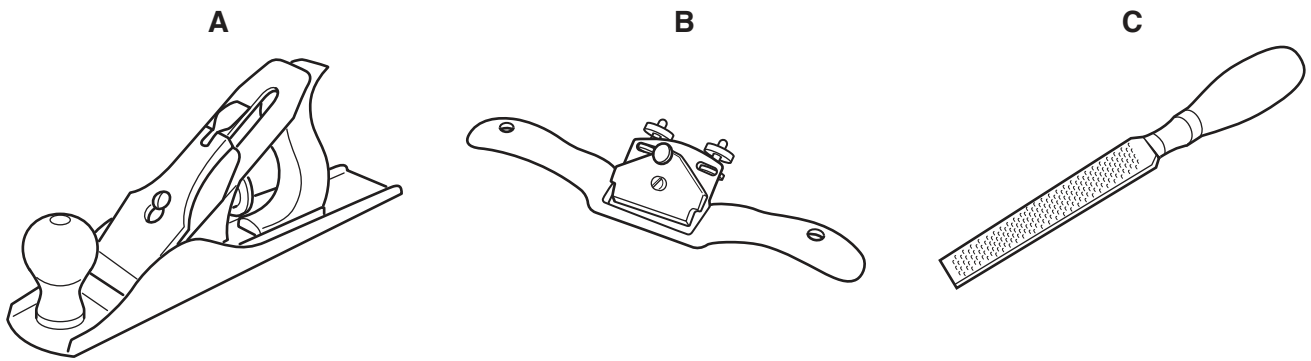


Fig. 7

- (a) Name the tools shown in Fig. 7 and state a specific use for each. [6]
- (b) Describe:
- (i) how the blade is adjusted in tool **A**
 - (ii) how the blade is adjusted in tool **B**
 - (iii) the difference in the cutting action of tool **A** and tool **C**. [6]
- (c) Sketch the following and explain the purpose of each:
- (i) countersink bit
 - (ii) tap wrench. [6]

12 A wide variety of sheet material is used in the manufacture of products.

Copy the chart below onto one full page.

Complete the copied chart giving a use for each material and the properties that make them suitable for that use.

Material	Use	Properties
Medium Density Fibreboard		
Phenol formaldehyde		
Duralumin		
Acrylic		
Plywood		
Copper		

[18]

13 (a) Materials are classified into main groups.

(i) State the two main groups for each of the following materials:

- wood
- metal
- plastic.

[3]

(ii) Name **one** specific material for each group given in your answer to part (i). [6]

(b) Working with materials presents hazards. Name a specific material and explain the hazards involved when working with that material and the safety precautions needed. [3]

(c) When designing products, material selection is an important consideration.

Explain:

(i) the environmental considerations relating to selection of materials when designing the product [3]

(ii) the economic considerations relating to selection of materials when designing the product. [3]

14 (a) Name the tools used to:

- (i) cut an M6 external thread on a $\text{Ø}6$ mild steel rod [1]
- (ii) make a flat bottomed $\text{Ø}18$ hole $\times 10$ deep in hardwood 20 thick [1]
- (iii) cut a curved shape in acrylic sheet 5 thick. [1]

(b) Fig. 8 shows marking out on a 300×240 sheet.

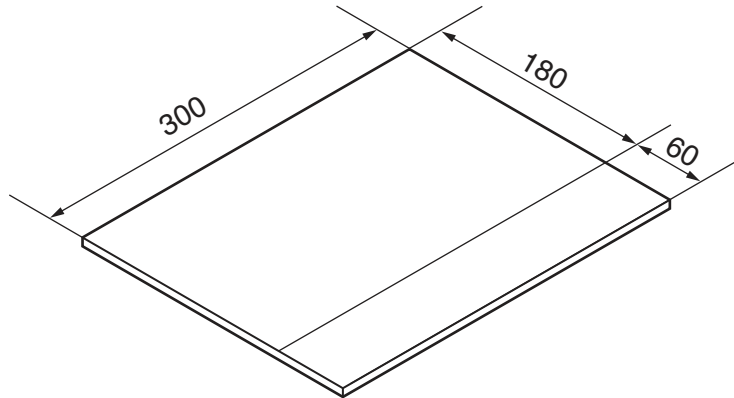


Fig. 8

Use labelled sketches to describe a different method of cutting a strip of width 60 from each of the following sheet materials:

- (i) copper 1 thick
- (ii) acrylic 3 thick
- (iii) plywood 9 thick. [12]

(c) Explain the importance of well-maintained tools when making products. [3]

Section 2 – Processes

15 Fig. 9 shows a clothes rack and details of a peg.

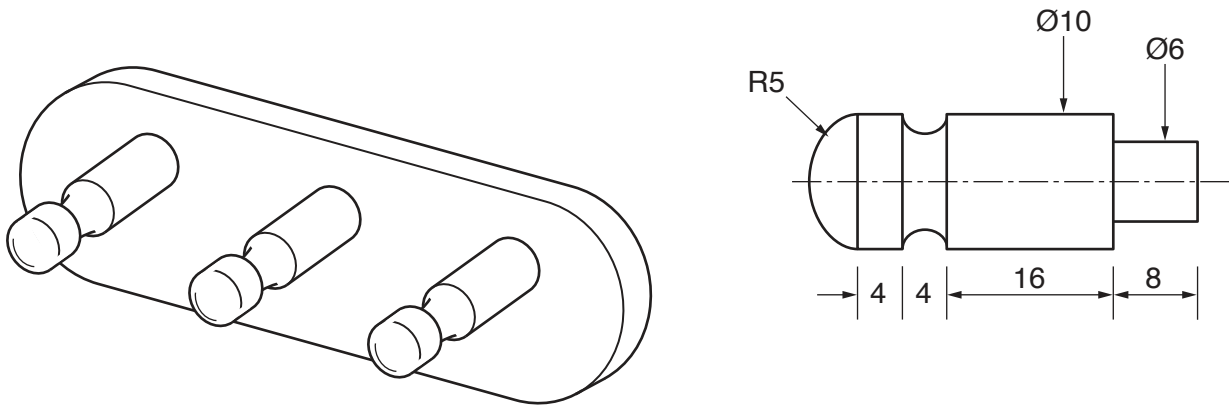


Fig. 9

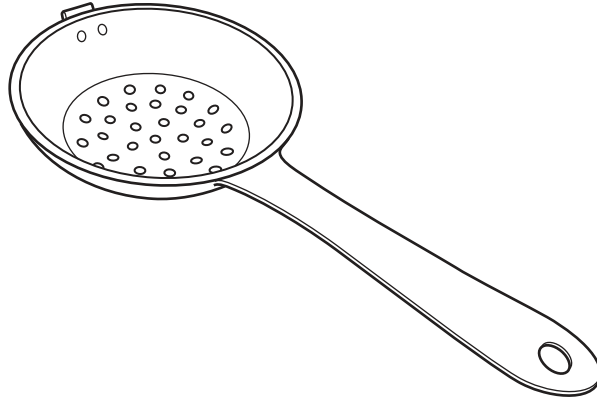
Three identical pegs are required.

- (a) Suggest a suitable material for the peg and give **two** reasons for your choice. [3]
- (b) Using the material selected in (a), describe using sketches and notes how to:
- (i) make one peg
 - (ii) ensure that all three pegs are identical
 - (iii) produce an appropriate finish on the pegs. [15]

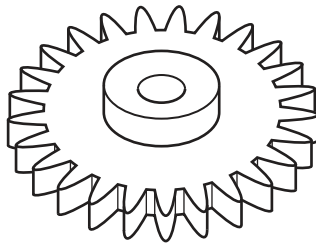
16 Fig. 10 shows three products made using different processes.

Choose **two** of the products and for each, use sketches and notes to describe the process.

(a) Process: **Hollowing** the bowl part of an aluminium strainer.



(b) Process: **Injection moulding** a simple gear wheel.



(c) Process: **Steam bending** the side of a guitar.

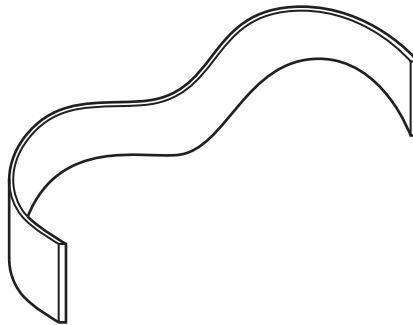


Fig. 10

[18]

17 Fig. 11 shows a holder used in a restaurant for salt, pepper and assorted sauces.

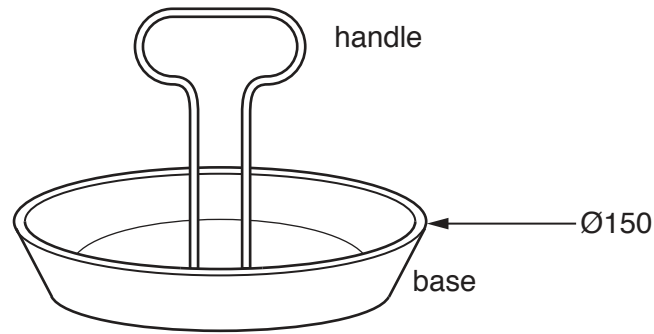


Fig. 11

- (a) For each of the named parts of the holder, identify suitable materials to be used and describe using sketches and notes:
- (i) making the base [5]
 - (ii) making the handle [5]
 - (iii) joining the handle to the base. [5]
- (b) Ten holders are required. Describe how the holder could be modified to enable easy storage when empty. [3]

18 The design of a chair and details of an end-cap are shown in Fig. 12.

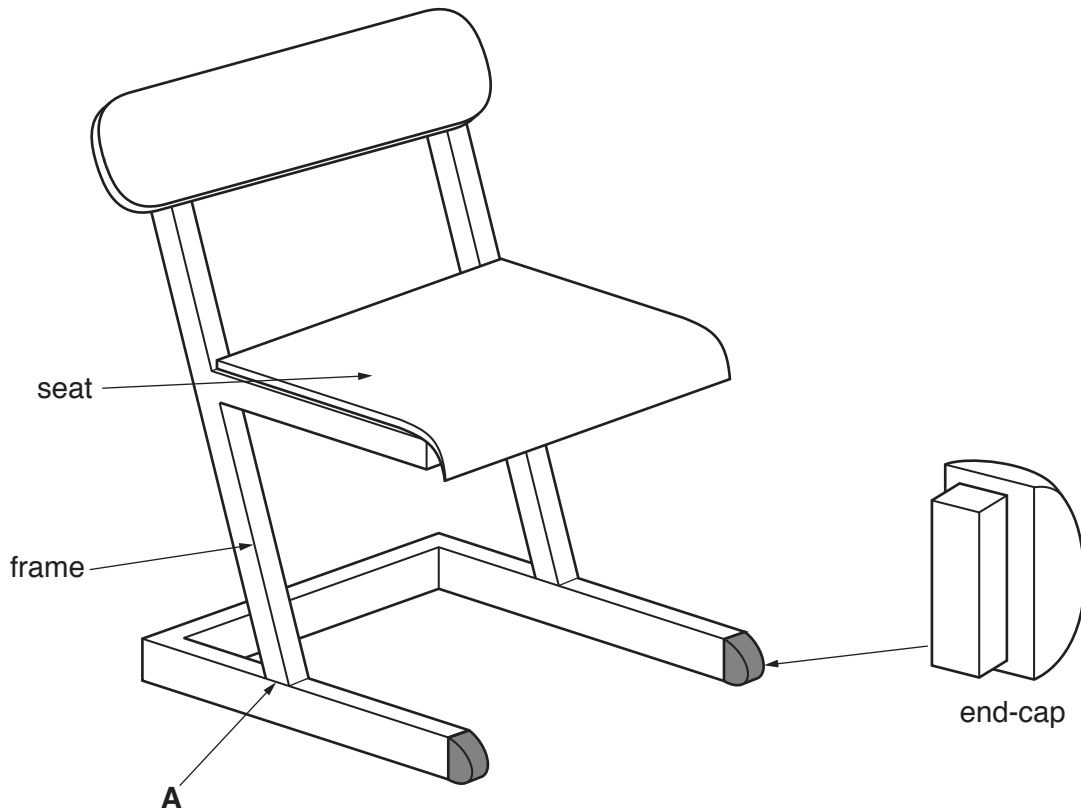


Fig. 12

The frame is made from rectangular section mild steel tube, the seat is laminated birch and the end-cap is made from nylon.

(a) For **two** of the following, use sketches and notes to describe how to:

(i) mark out and join the tubular steel frame at **A**

(ii) make the laminated seat

(iii) make an end cap.

[12]

(b) Use sketches and notes to describe how you would attach the seat to the frame.

[6]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.