

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

DESIGN AND TECHNOLOGY

9705/01

Paper 1

May/June 2003

2 hours 30 minutes

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.
Write your answers and working on the separate Answer Booklet/Paper provided.
Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A

Answer **all** questions.

Section B

Answer any **two** questions.

Section C

Answer any **two** questions.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [] at the end of each question or part question.
All dimensions are in millimetres.

The instruction 'discuss' denotes that you should:

- examine critically the issues raised by the question;
- explain and interpret these issues as appropriate;
- introduce evidence wherever possible to support conclusions of arguments.

This document consists of **10** printed pages and **2** blank pages.



Section A

Answer **all** questions.

- 1 (a) Identify **two** pieces of anthropometric data which would have been used in the design of the remote control shown in Fig. 1. [2]
- (b) State which **two** features of the remote control would have been designed based on the data identified in (a). [2]

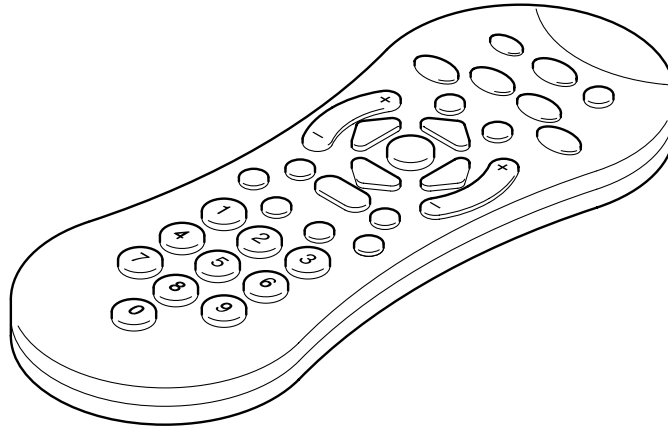


Fig. 1

- 2 Fig. 2 shows a children's skittle carrier.

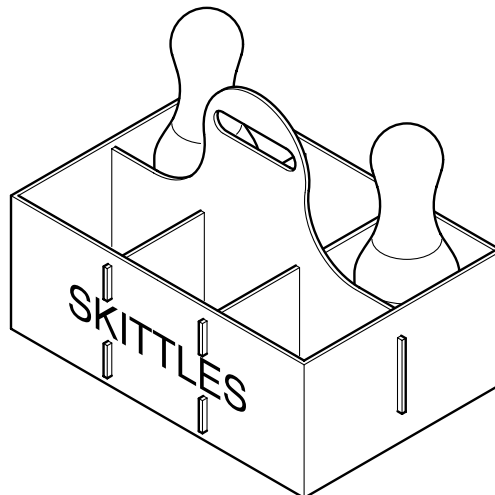


Fig. 2

State and explain:

- (a) **one** advantage of making the carrier from corrugated card; [3]
- (b) **one** limitation of making the carrier from corrugated card. [3]

- 3 (a) State **two** safety hazards and **two** methods of reducing the risk when using a strip heater to bend acrylic sheet. [4]
- (b) State **one** safety hazard and **one** method of reducing the risk when using aerosol spray paint. [2]
- 4 Fig. 3 shows a mechanism.

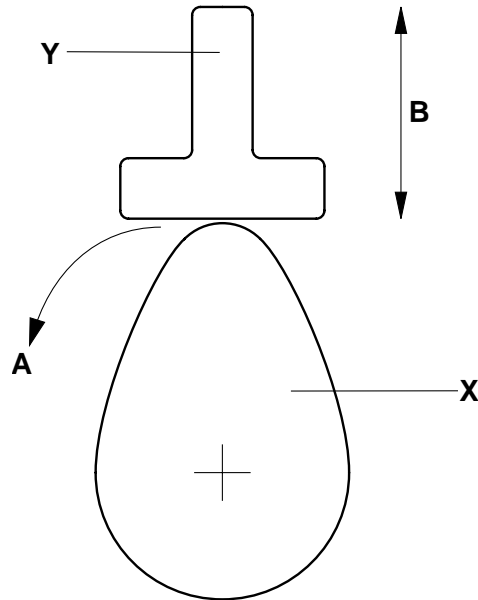


Fig. 3

- (a) Name the type of motion shown at:
- (i) A;
- (ii) B. [2]
- (b) Name the **two** parts of the mechanism X and Y. [2]
- (c) Describe with the aid of notes and sketches **one** other method of producing the motion shown at B. [4]

5 Fig. 4 shows details of a picture frame.

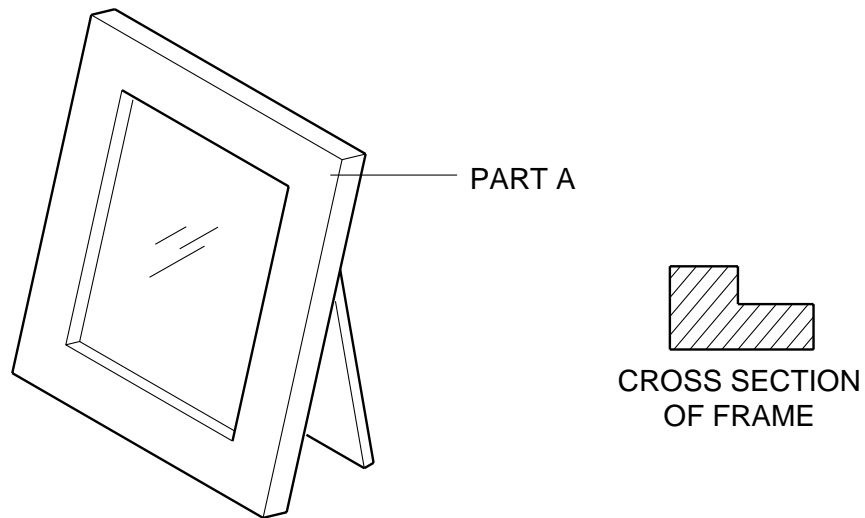


Fig. 4

- (a) State **two** specific materials from which part A could be made. [2]
- (b) For **one** of your materials in (a) use sketches and notes to outline a method of forming or shaping the required cross-section of the frame. [6]
- 6 Households are encouraged to recycle metals, plastics, paper and card. Discuss the issues involved in:
- (a) collection; [3]
- (b) sorting; [3]
- (c) re-use. [2]

Section B

Answer **two** questions from this section.

- 7 Fig. 5 shows a mass-produced fruit basket made from wood. The ends, slats and feet have been shaped and are ready to be assembled using glue and screws.

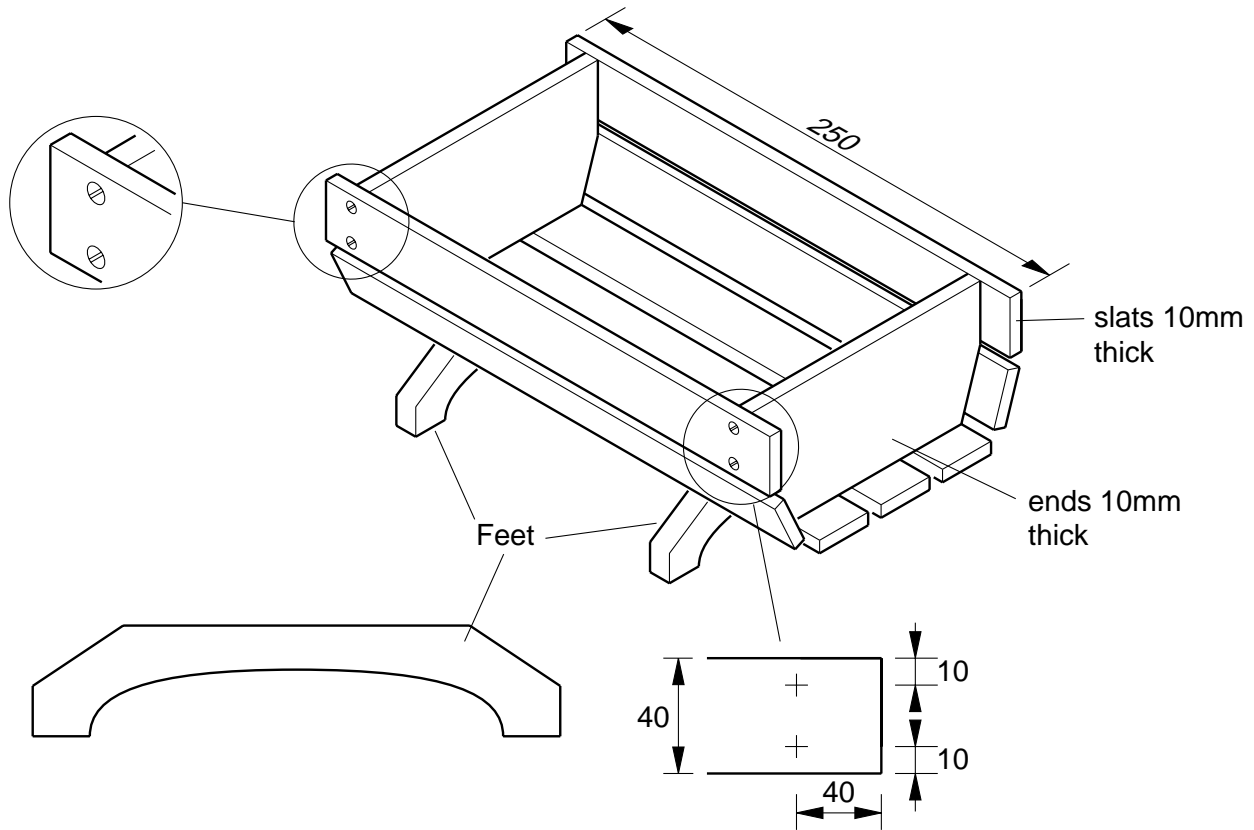


Fig. 5

- (a) Specify a suitable wood for the basket and give **two** reasons for your choice. [3]
- (b) Use sketches and notes to describe the major stages of marking out, cutting and shaping the feet. [9]
- (c) Sketch and label a suitable drilling jig that would allow for easy and accurate drilling of the holes in the slats. Your design must allow for safe use on a pillar drill. [8]

8 Fig. 6 shows a design for a desk tidy to be made in a school workshop.

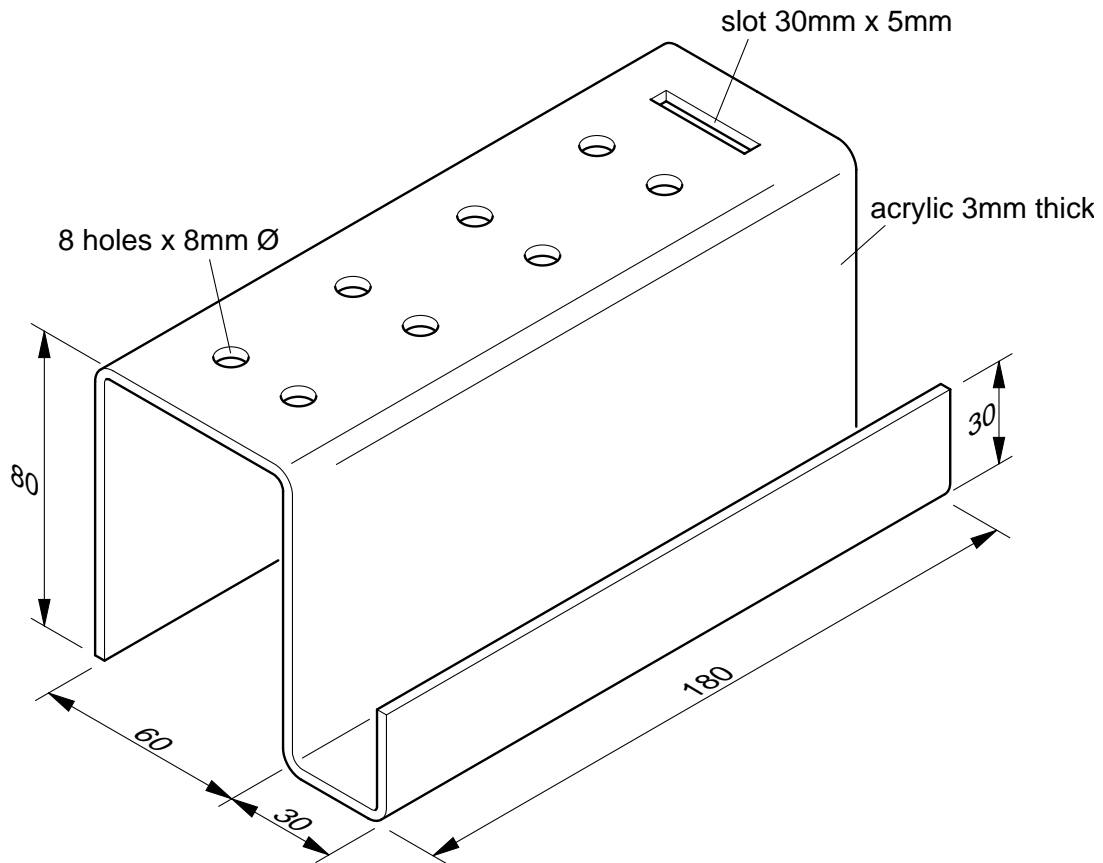


Fig. 6

(a) Sketch approximately full size and dimension the net (development) of the single piece of acrylic that would be required to make the desk tidy. Show the correct positions for the slot, the holes for pencils and the folds. [8]

(b) Produce a table or chart that shows:

- the main stages of manufacture;
- the tools required;
- the machinery required.

[12]

9 Fig. 7 shows details of a wind chime to hang from the branch of a tree.

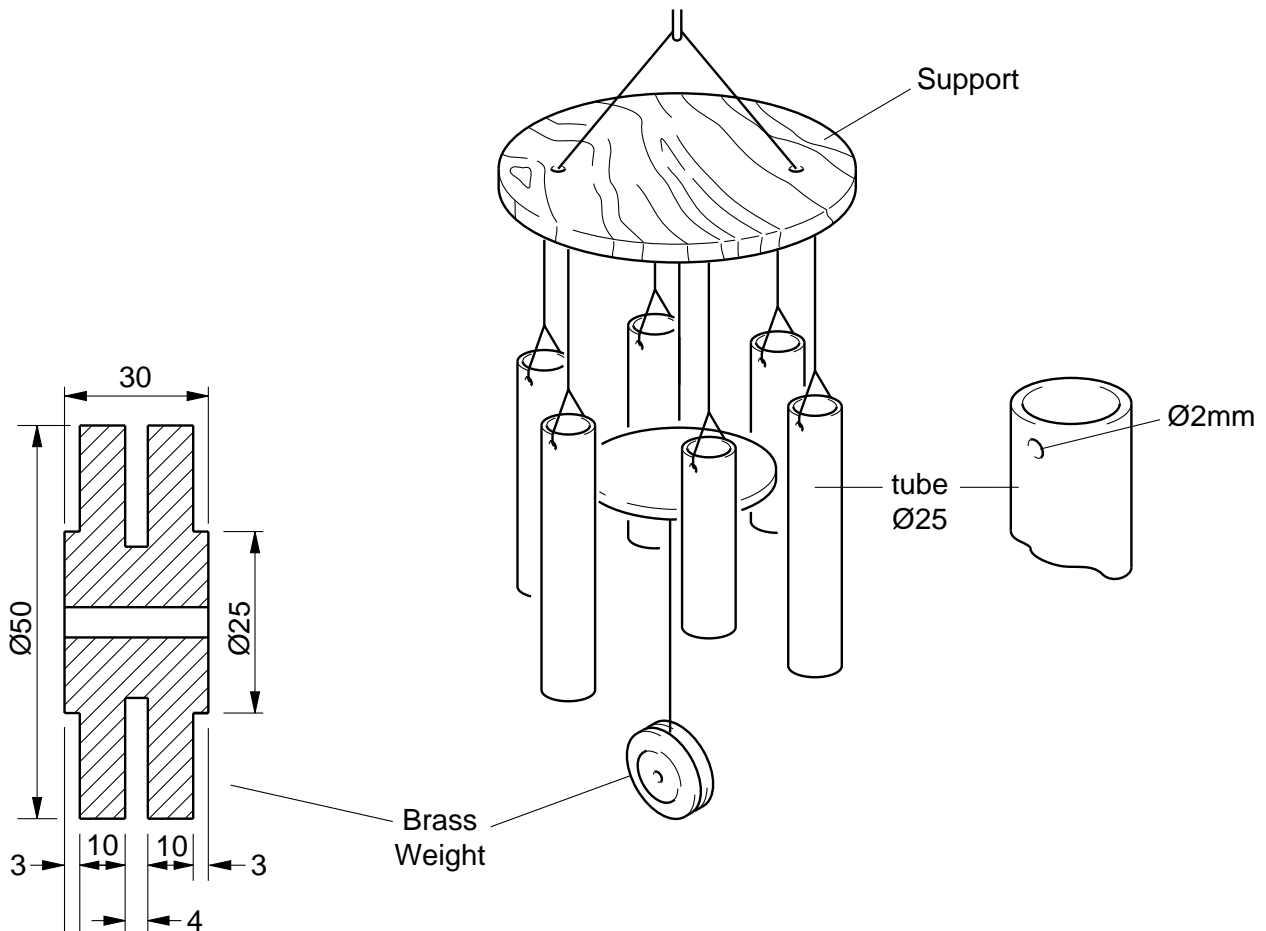


Fig. 7

- (a) Specify a suitable hardwood for the support and give **two** reasons for your choice. [3]
- (b) Aluminium has been selected as the material to be used for the tubes. Give **two** reasons why this would be a good choice of material. [2]
- (c) Use sketches and notes to describe how the 2 mm diameter holes in a tube could be drilled accurately. [5]
- (d) Use sketches and notes to describe how the brass weight would be manufactured on a centre lathe. [10]

Section C

Answer **two** questions from this section.

10 Fig. 8 shows a model steam train from a railway set.

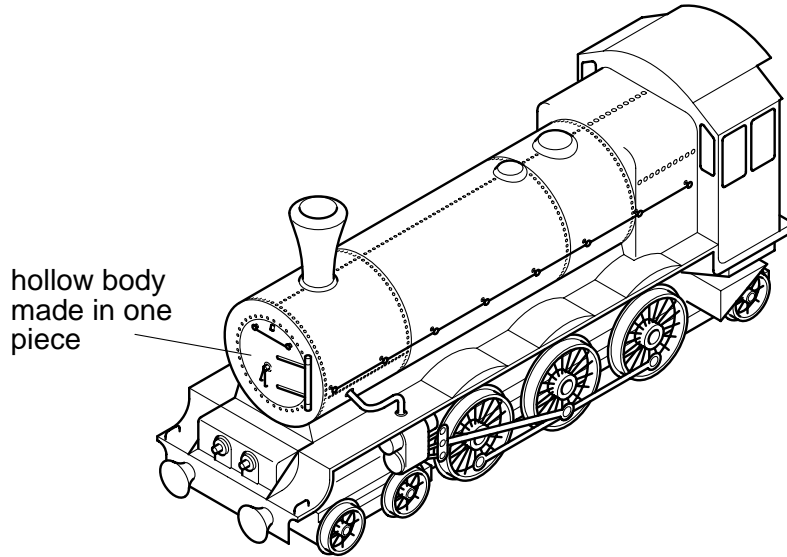
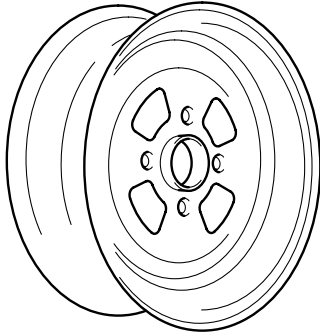


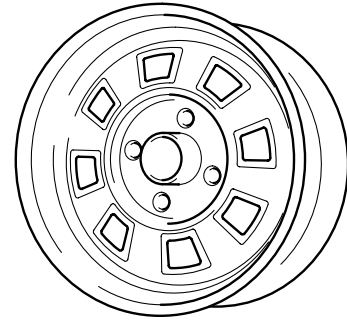
Fig. 8

- (a) (i) Name a suitable material and process for making the hollow body in one piece from plastic. [2]
- (ii) Name a suitable material and process for making the hollow body in one piece from metal. [2]
- (b) (i) Explain **two** reasons, related to safety, why plastic would be the better material to use if the model steam train was going to be used by young children. [6]
- (ii) Explain **two** reasons, **one** related to function and **one** to aesthetics, why metal would be the better material to use if the model steam train was going to be used by older children or adults. [6]
- (c) Discuss, with the aid of examples, the safety standards that a toy to be used by young children should meet. [4]

- 11 Fig. 9 shows two types of wheel used on motor cars. One of the wheels is fabricated from mild steel pressings while the other is cast from aluminium alloys.



Pressed Steel



Alloy Casting

Fig. 9

- (a) Explain what is meant by each of the following terms:
- (i) fabricated; [2]
 - (ii) mild steel pressings; [2]
 - (iii) aluminium alloys; [2]
 - (iv) cast. [2]
- (b) Discuss, with relation to function, aesthetics and safety, the advantages and disadvantages of using:
- (i) alloy wheels; [6]
 - (ii) steel wheels with plastic wheel trims. [6]

12 The frame of the pushchair shown in Fig. 10 has been made from stainless steel tubing.



Fig. 10

- (a) Explain **two** properties that make stainless steel particularly suitable for this product. [4]
- (b) Explain why tubing has been used rather than solid bar. [2]
- (c) Explain **two** disadvantages of using mild steel for the frame. [4]
- (d) The frames of some pushchairs are made from aluminium. State **one** specific advantage and **one** specific disadvantage of using aluminium for the frame. [2]
- (e) Discuss, with the aid of diagrams, the ergonomic factors that the designer would have needed to consider when designing the pushchair. [8]

