

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

DESIGN AND TECHNOLOGY

9705/01

Paper 1

October/November 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 Fig. 1 shows a simple acrylic photograph stand.

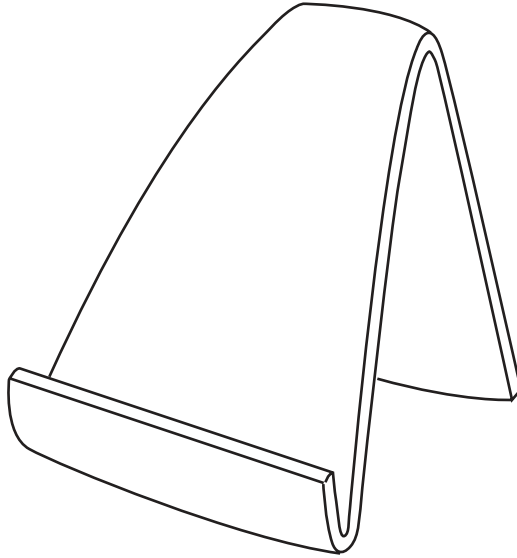


Fig. 1

- (a) Describe, using a flow chart, how a batch of 20 stands could be produced. [5]
- (b) State at which points in the process accuracy and quality would be checked. [3]
- 2 (a) Compare the advantages and disadvantages of using rechargeable batteries as opposed to disposable batteries. [4]
- (b) Explain why batteries should be removed from products when they are not being used for long periods. [3]
- 3 (a) Explain briefly the basic principles employed in CAD (Computer Aided Design). [2]
- (b) Explain briefly the basic principles employed in CAM (Computer Aided Manufacture). [2]
- (c) Identify and discuss **three** advantages to a multi-national company in using CAD rather than more traditional drawing techniques involving pencil and paper. [5]
- 4 A team of students in your school has been asked to design a container for collecting used stamps.
- List **four** key specification points for the container. [4]

- 5 Fig. 2 shows a bottle rack made from steel wire.

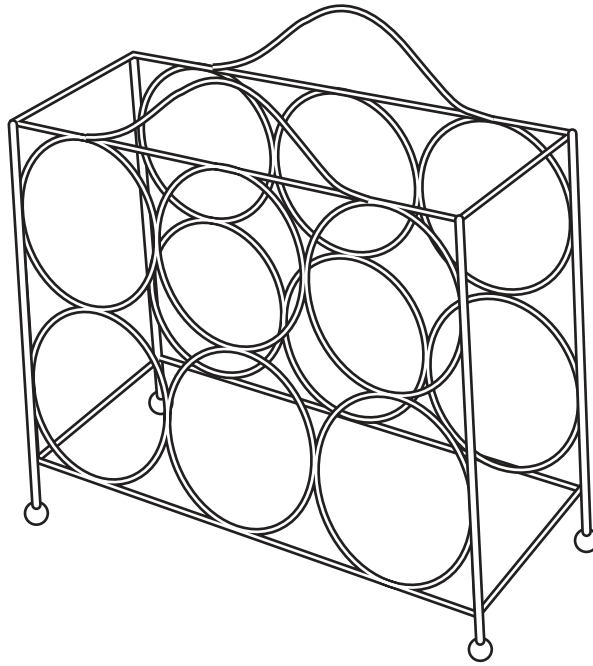


Fig. 2

- (a) Name **two** methods of protecting the surface of the steel wire. [2]
- (b) Describe how **one** of the methods identified in part (a) would be applied. [4]
- (c) Identify and describe **three** different types of testing that could be carried out to assess the success of the bottle rack in terms of function, construction and user needs. [6]

Section B

Answer **two** questions from this section.

- 6 Fig. 3 shows a table to be used in a junior school. The table is supplied flat-pack for self assembly.

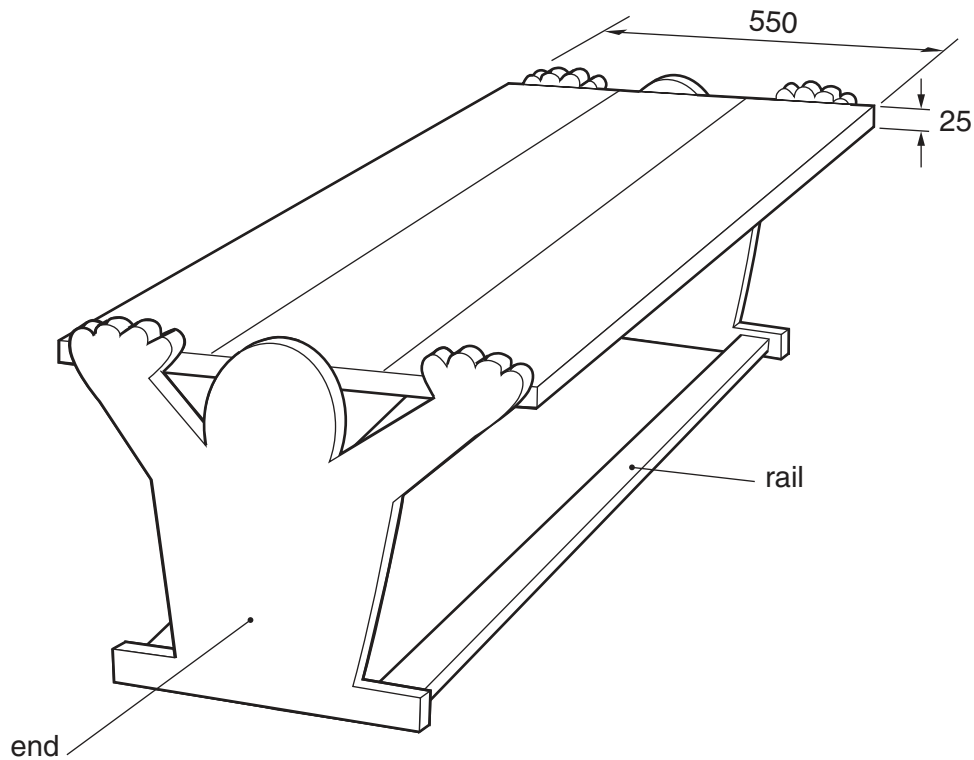


Fig. 3

- (a) Name a suitable solid timber for the table top. [1]
- (b) Name a suitable manufactured board for the table ends. [1]
- (c) Use sketches and notes to describe how you would mark out, cut out and shape the table ends from your selected manufactured board. [9]
- (d) Use sketches and notes to show a method of attaching the rails to the table ends. [7]
- (e) Give **two** stages in the preparation of the table top before applying a varnished finish. [2]

7 Fig. 4 shows a design for a CD holder.

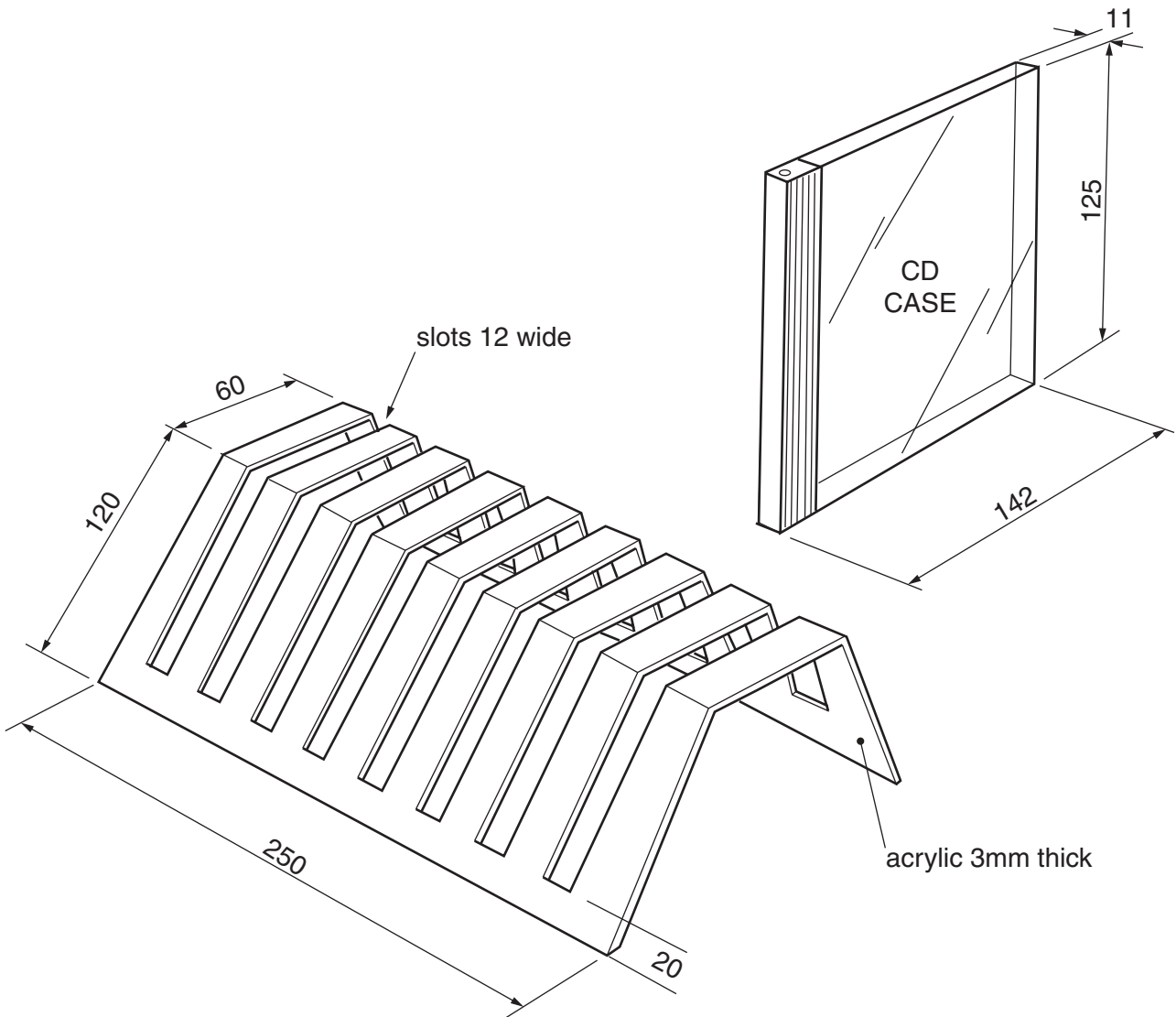


Fig. 4

- (a) Write a specification stating **four** key points that may have been considered at the design stage. [4]
- (b) The CD holder is to be made in the school workshop. Produce a table or chart that explains:
- (i) the **four** main stages of manufacture;
 - (ii) the tools needed;
 - (iii) the machinery needed;
 - (iv) any health and safety issues.
- [10]
- (c) Two or more holders need to be fastened together to hold more CDs. Use notes and sketches to show a modified one piece design that allows identical holders to be fastened together. [6]

- 8 Fig. 5 shows a design for a wind speed indicator to be manufactured in a school workshop.

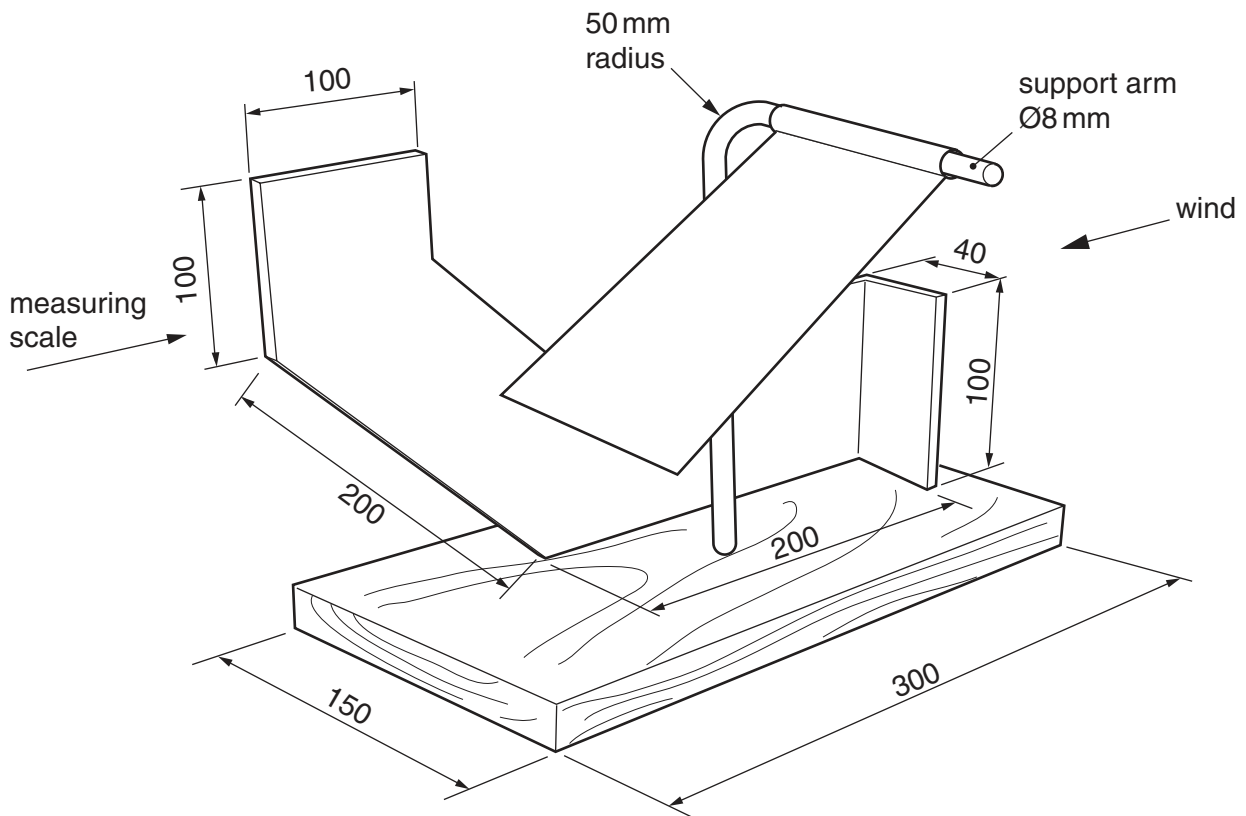


Fig. 5

- (a) Name a suitable hardwood for the base. [1]
- (b) Name a suitable adhesive for joining the mild steel support arm to a hole drilled into the wooden base. [1]
- (c) Use sketches and notes to show how to bend the mild steel support arm to the required radius. [4]
- (d) Use sketches and notes to describe how you would mark out, cut, shape and form the measuring scale from sheet aluminium. [8]
- (e) Show, by using notes and sketches, a method of fixing the measuring scale to the support arm which will allow it to be removed for cleaning. [6]

Section C

Answer **two** questions from this section.

- 9 Fig. 6 shows a chair made from wood with an upholstered seat.

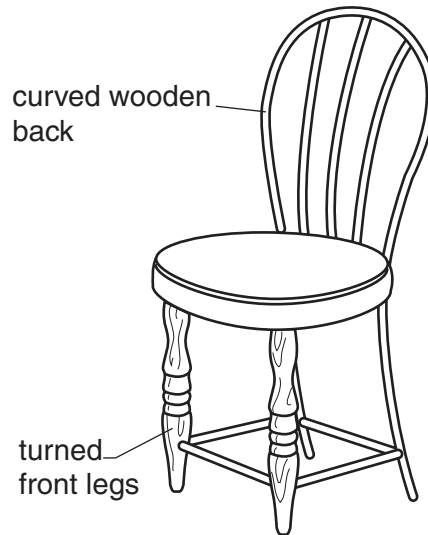


Fig. 6

- (a) The back of the chair has been made by bending laminated wood around a former. The legs have been turned.

Use sketches and notes to explain what is meant by each of the following terms:

- (i) laminated wood; [2]
(ii) a former; [2]
(iii) turned. [2]

Question 9 continues on page 8.

When considering what type of chair to use in a school the chair shown in Fig. 7 was chosen rather than the wooden one shown in Fig. 6.

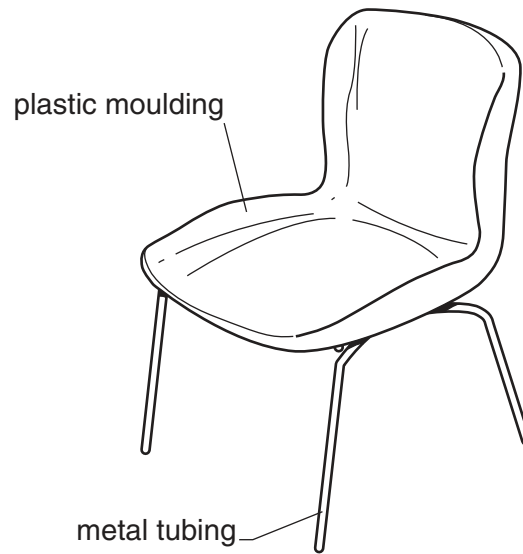


Fig. 7

- (b) Discuss, in relation to function, safety and durability, the advantages of using the metal and plastic chair in a school situation rather than the wooden one. [8]
- (c) With the aid of diagrams identify and explain the ergonomic data that would have been used when designing a chair for use in schools. [6]

10 Four different types of battery powered light are shown in Fig. 8.

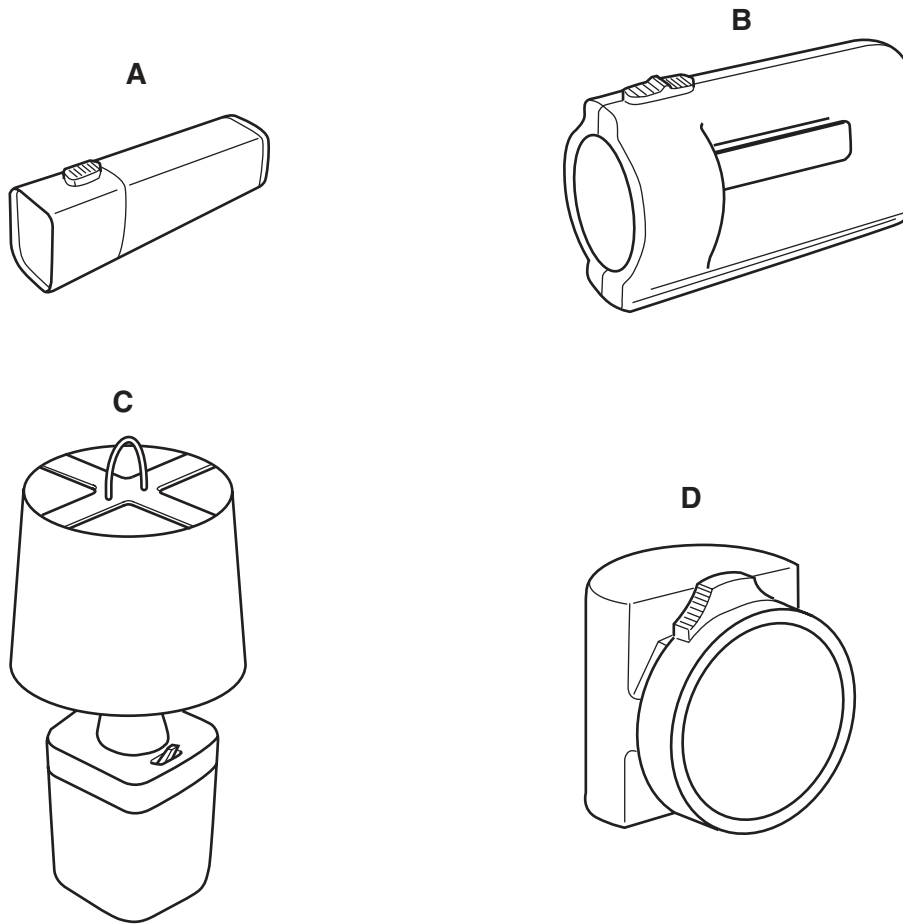


Fig. 8

- (a) Give a specific situation in which each light could be used. [4]
- (b) Name a suitable plastic and production method that could be used to manufacture the body of light **B**. [2]
- (c) Select **one** of the lights and discuss how each of the following factors has influenced its design:
- (i) the light's specific intended use;
 - (ii) ergonomics;
 - (iii) the light's power source.

You should make use of sketches where appropriate. [9]

- (d) The plastic body of light **B** is made in two parts joined vertically as shown.

Using notes and detailed sketches show how the two parts could be joined together. The given method must allow for easy access to the inside of the light for maintenance purposes. [5]

- 11 Fig. 9 shows a toy car made in the 1930s. Pieces of tinplate were pressed and fabricated to make the car. Detail was added to the surface of the tinplate using a lead based paint.

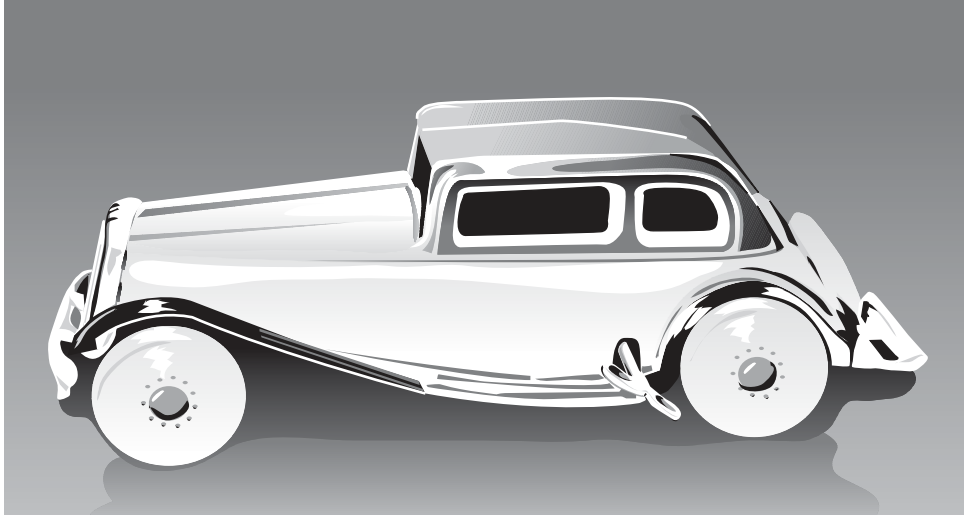


Fig. 9

- (a) Explain what is meant by the following terms:
- (i) tinplate; [2]
 - (ii) pressed; [2]
 - (iii) fabricated. [2]
- (b) State a method that is commonly used to join pieces of tinplate. [1]
- (c) Identify and explain **three** safety hazards linked with tinplate toys of the type shown in Fig. 9. [9]
- (d) Many modern toys are made from polypropylene. Discuss, with the aid of examples, the properties of polypropylene that make it a suitable material for children's toys. [4]

