

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

DESIGN AND TECHNOLOGY

9705/01

Paper 1

October/November 2004

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 name, Centre number and candidate number 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 **9** printed pages and **3** blank pages.



Section A

Answer **all** questions.

- 1 Fig. 1 shows a drawer front made from 15 mm thick softwood.

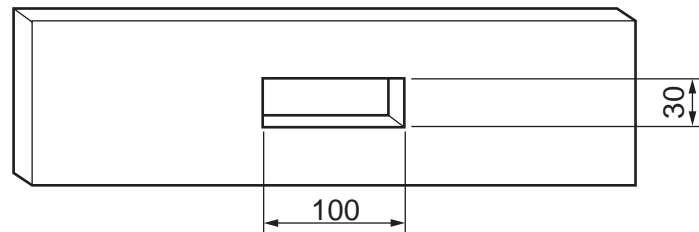


Fig. 1

Use sketches and notes to describe:

- (a) how you would mark out the hole; [4]
- (b) how the hole would be cut out. [4]

You must include details of the tools and equipment required.

- 2 Manufactured products often need energy to make them work.

- (a) This energy may originate from non-renewable sources such as fossil fuels. Name **three** fossil fuels. [3]
- (b) Renewable sources of energy are becoming increasingly important. Name **three** renewable sources of energy. [3]
- (c) Electrical energy can easily be changed into other forms of energy such as light. Name **two** other forms of energy that electricity can be changed into. [2]

- 3 When you join two pieces of hardwood by using screws you need to drill clearance and pilot holes.

Use sketches and notes to describe how this is done and how you would decide on the size of holes required. One of the sketches must show a cross-section through the two holes. [8]

- 4 The chocolate box tray shown in Fig. 2 has been produced by vacuum forming.

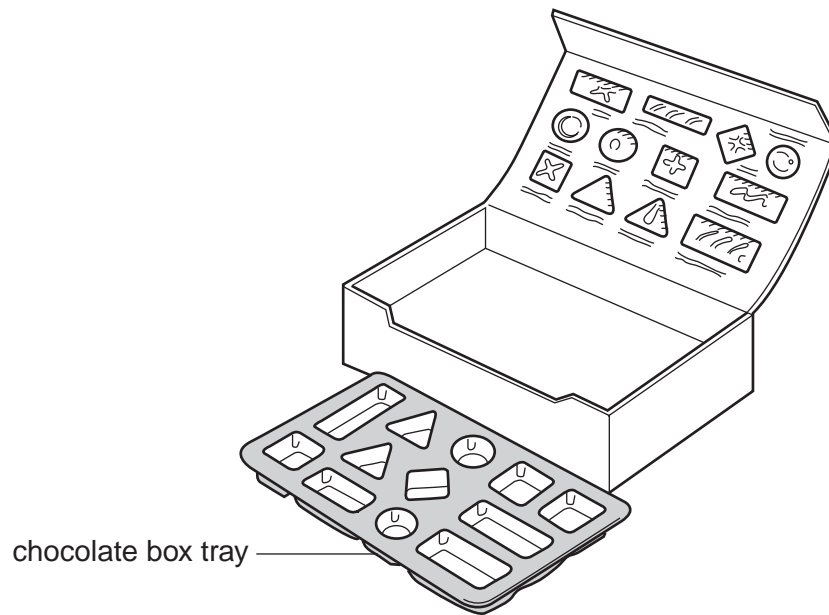


Fig. 2

- (a) Use sketches and notes to describe the process of vacuum forming. [5]
- (b) Use sketches and notes to show **two** key features that any former, to be used for vacuum forming, must have. [3]
- 5 Ductility is a property of aluminium which makes it suitable for manufacturing drink cans of the type shown in Fig. 3.



Fig. 3

- (a) Explain what is meant by ductility. [3]
- (b) Use sketches and notes to describe a simple test that could be used to compare the ductility of different metals. [5]

Section B

Answer **two** questions from this section.

- 6 The sides of the chair shown in Fig. 4 are made from laminated wood.

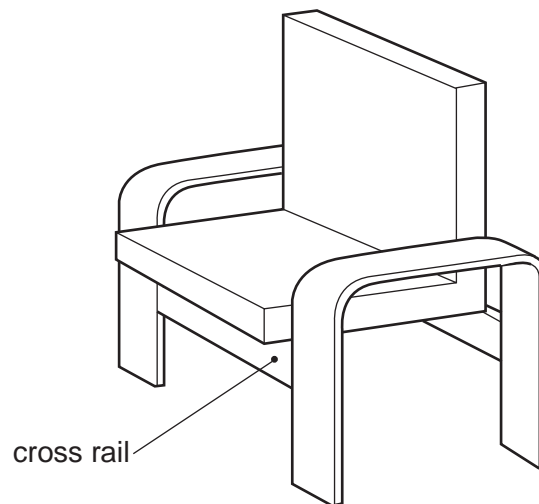
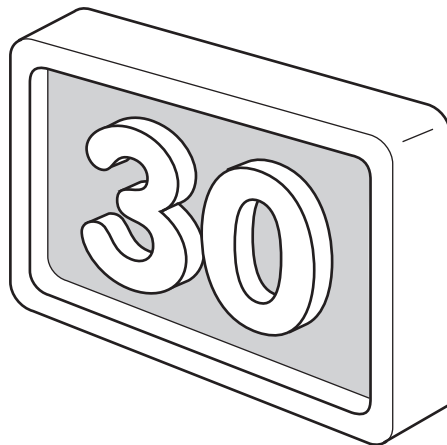


Fig. 4

- (a) Name a suitable wood for making the laminated sides and give **two** reasons for your choice. [3]
- (b) Use sketches and notes to describe:
- (i) the former(s) required to laminate and bend one of the sides; [6]
 - (ii) the process of laminating and bending one of the sides. [6]
- (c) Use sketches and notes to show a method of joining the cross rail to the sides of the chair. [5]

- 7 Fig. 5 shows a house number made from cast metal. The number is to be fixed on the outside wall of a house.



size $200 \times 150 \times 30$

Fig. 5

- (a) Name a suitable metal for casting the number and give **two** reasons for your choice. [3]
- (b) Use sketches and notes to describe:
- (i) how the pattern required for the casting would be made; [6]
 - (ii) the process of casting the house number. [6]
- (c) Use sketches and notes to show a method of attaching the house number to a wall. [5]

- 8 Fig. 6 shows a bathroom fitting made from plastic.

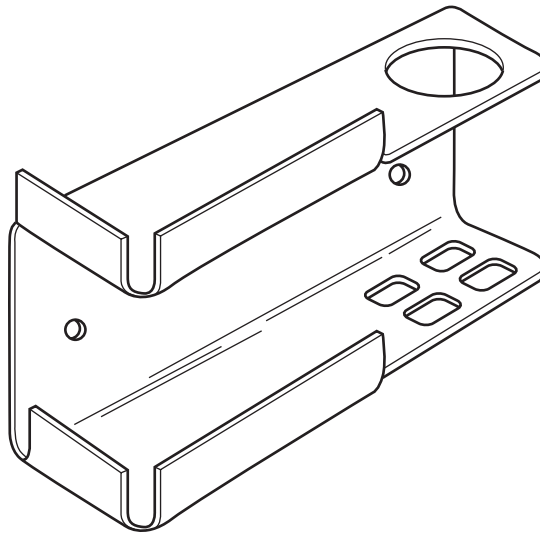


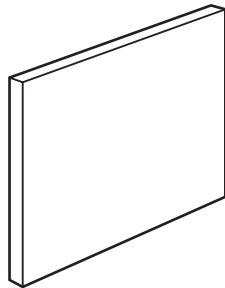
Fig. 6

- (a) Name a suitable sheet plastic for making the fitting and give **two** reasons why plastic is an appropriate material for this type of product. [3]
- (b) List the order in which the various stages in making the fitting would need to be carried out. [5]
- (c) Use sketches and notes to describe:
- (i) how the large circular hole which holds a glass would be cut out; [5]
 - (ii) how one of the bends would be made in the correct place at right angles; [5]
 - (iii) how the two small circular holes would be made. [2]

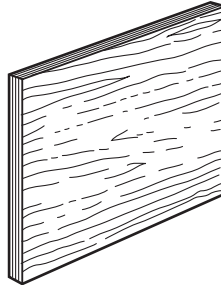
Section C

Answer **two** questions from this section.

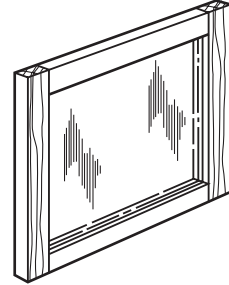
- 9 Fig. 7 shows three types of door which are being considered for use on kitchen cabinets.



MDF



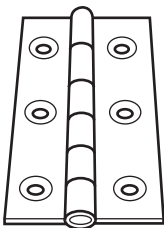
solid pine



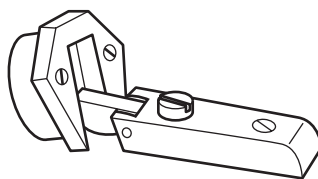
pine frame with
plywood panel

Fig. 7

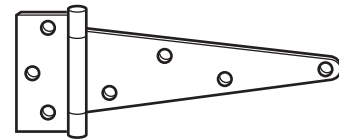
- (a) Explain how MDF could be made to look like solid pine. [2]
- (b) State the name of a joint that could be used to join the corners of the pine frame. [1]
- (c) Explain how the plywood panel could be fixed in the pine frame. [2]
- (d) Discuss, in relation to function, aesthetics and stability, the advantages and disadvantages of the three types of door. [7]
- (e) Fig. 8 shows three types of hinge.
Name **two** specific materials from which hinges are often made. [2]



butt hinge



concealed hinge

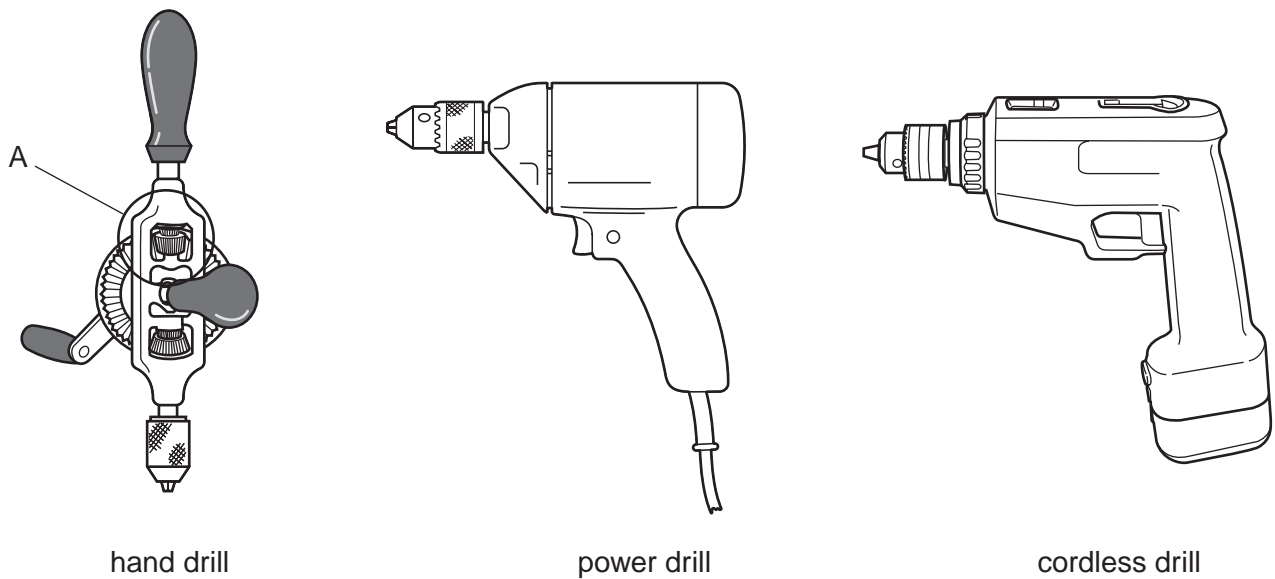


tee hinge

Fig. 8

- (f) In order to select the best type of hinge to use to attach the doors to the kitchen cabinets, discuss, in relation to function and aesthetics, the advantages and disadvantages of the three types of hinge. [6]

10 Fig. 9 shows three types of drill.



hand drill

power drill

cordless drill

Fig. 9

- (a) Name the type of mechanism shown at A on the hand drill. [1]
- (b) Name the power source that would be used for the cordless drill. [1]
- (c) The casing of the power drill is made from a thermoplastic.
- (i) Explain the properties of a thermoplastic. [2]
- (ii) Name a specific thermoplastic that would be suitable for making the casing of the power drill. [1]
- (d) Discuss, in relation to function, ergonomics and safety, the advantages and disadvantages of using:
- (i) a hand drill; [5]
- (ii) a power drill; [5]
- (iii) a cordless drill. [5]

11 Fig. 10 shows a toy tractor which young children can ride on.

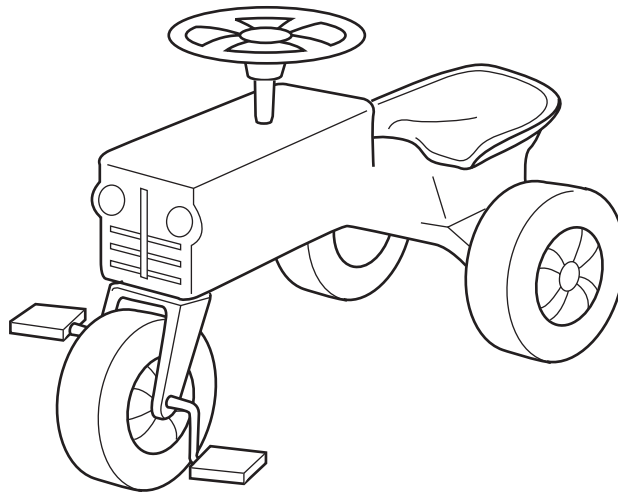


Fig. 10

- (a) Name a suitable plastic and process for making each of the hollow wheels. [2]
- (b) Discuss the advantages and disadvantages of using hollow wheels rather than solid wheels on a toy of this type. [4]
- (c) There are many potential safety hazards associated with 'ride on toys'. Identify **three** such hazards and discuss if and how they have been considered in the design of the toy tractor. [6]
- (d) Discuss, with the aid of diagrams, the ergonomic factors that the designer would have needed to consider when designing the toy tractor. [8]

