

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

DESIGN AND TECHNOLOGY

9705/01

Paper 1

October/November 2006

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 name, Centre number and candidate number on all the work you hand in.
Write in dark blue or black pen.
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.

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.

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.

This document consists of **13** printed pages and **3** blank pages.



Section A

Answer **all** questions.

- 1** Fig. 1 shows a mobile phone.



Fig. 1

- (a) State **two** ergonomic requirements of a mobile phone from the point of view of the user and explain why each is important. [4]
- (b) State **two** aesthetic requirements of a mobile phone from the point of view of the user and explain why each is important. [4]

- 2 Fig. 2 gives details of a point of sale display stand, made from card, for a mobile phone.

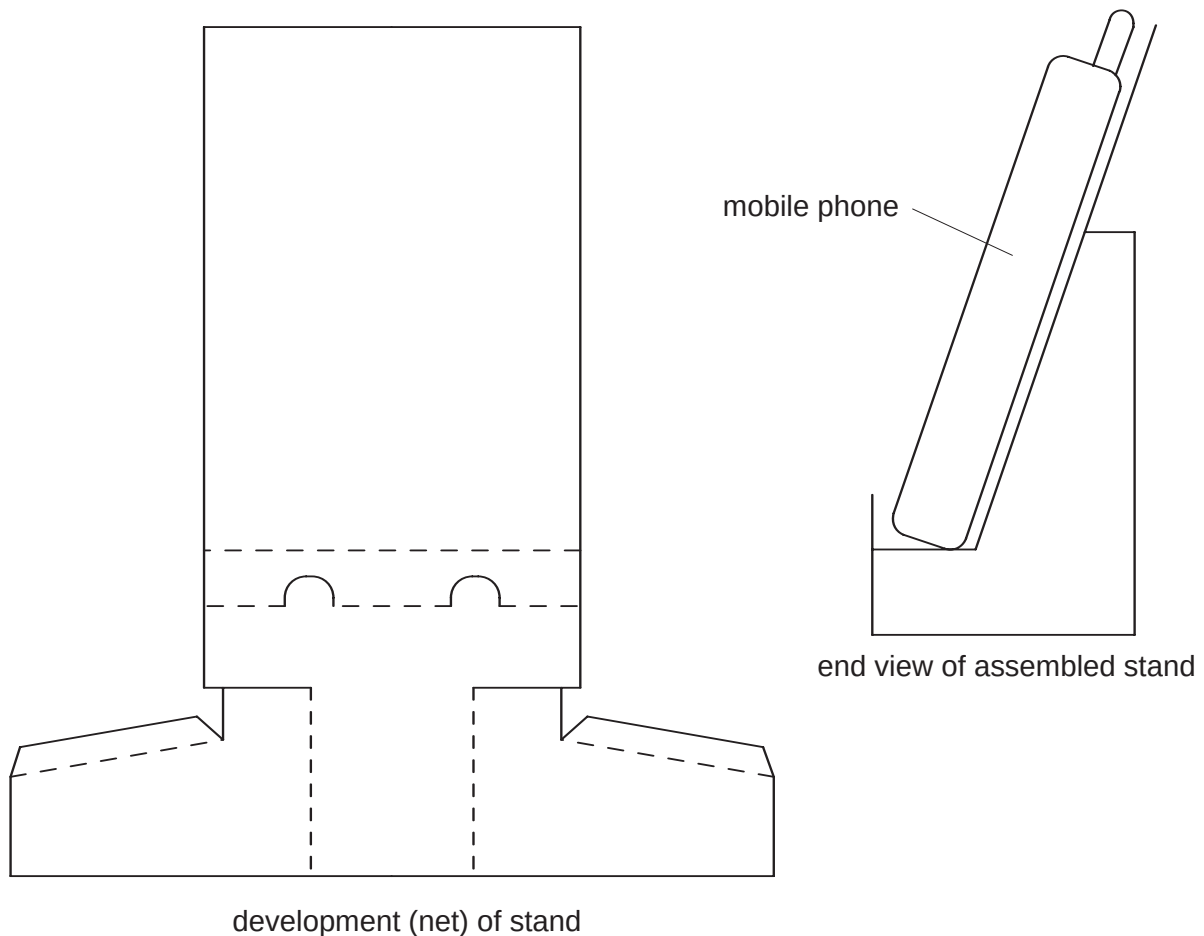


Fig. 2

- (a) State **two** reasons why this type of stand is sent to shops in a flat pack form rather than assembled. [2]
- (b) Sketch a three-dimensional view of the assembled stand. [6]
- 3 Use notes and sketches to explain how a 15 mm square section piece of steel 50 mm long would be held in a centre lathe for turning. [8]
- 4 Explain why you should **not** use the following procedures and for each explain a safer or more appropriate method.
- (a) Use a 6 mm mortise chisel to lever the lid off a paint tin. [2]
- (b) Use a wooden dowel rod as a pin in a sash cramp. [2]
- (c) File a piece of metal in a woodwork vice. [2]
- (d) Use a screwdriver to take the shavings from the mouth of a blocked smoothing plane. [2]

- 5 (a) Name **three** different types of energy source used in the kitchen shown in Fig. 3. In each case state which product uses the energy source. [3×2]
- (b) Name a specific material that could be used for kitchen worktops and give **one** reason for your choice. [2]

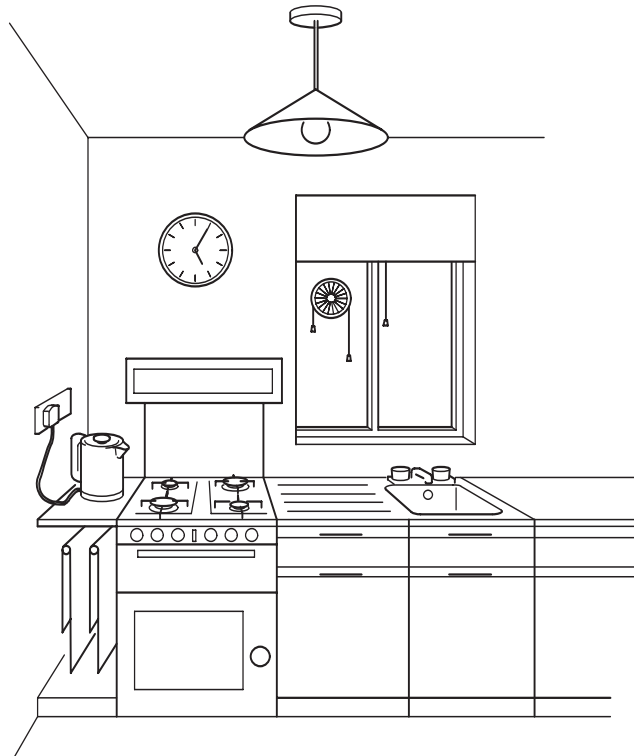


Fig. 3

Section B

Answer **two** questions from this section.

- 6 Fig. 4 gives details of a child's swing. The hollow plastic seat has been made using blow moulding.

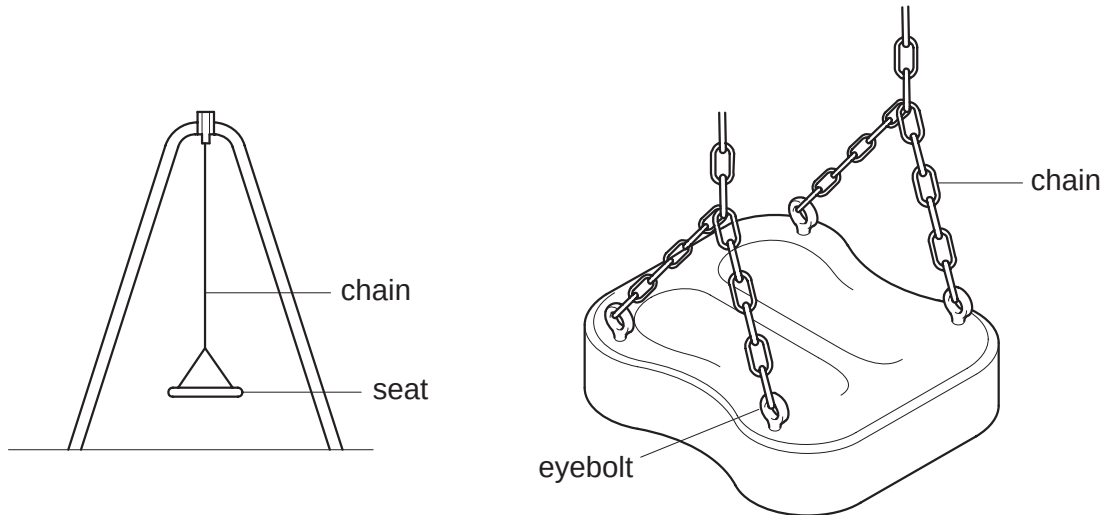


Fig. 4

- (a) Name a suitable plastic for the seat and give **two** reasons for your choice. [3]
- (b) Use notes and sketches to explain the blow moulding process. [5]
- (c) The chain is attached to the swing seat using eyebolts and nuts. Destructive testing has shown that this method of fixing has resulted in the seat cracking. The four nuts are to be replaced by two metal plates into which the eyebolts screw. This proposed modification is shown in Fig. 5.

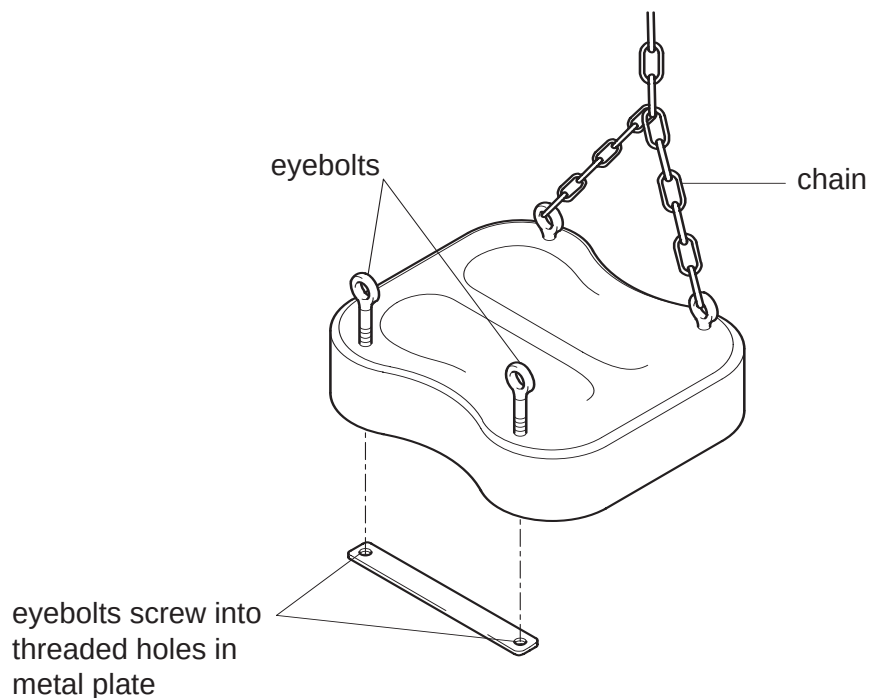


Fig. 5

- (i) Explain what is meant by the term 'destructive testing'. [2]
- (ii) Explain why the modification would stop the seat cracking. [2]

(d) Fig. 6 shows details of the metal plate.

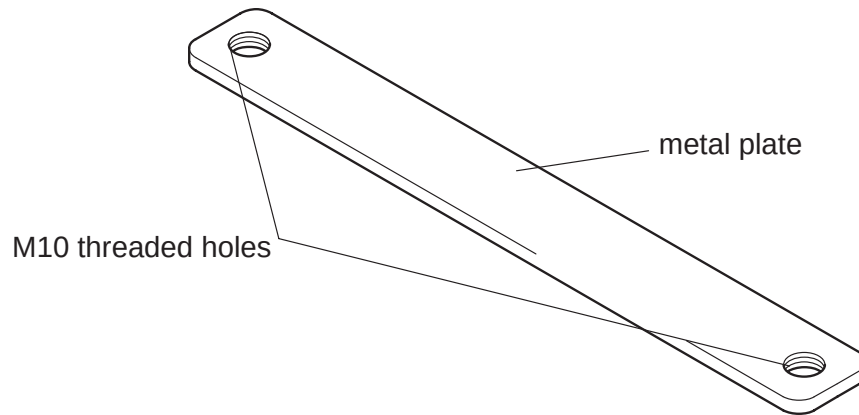


Fig. 6

- (i) Use notes and sketches to describe the stages in marking out and shaping the radius on a corner of the metal plate shown in Fig. 6. [4]
- (ii) Use notes and sketches to describe the stages in making the threaded holes in the metal plate shown in Fig. 6. [4]

- 7 Fig. 7 shows a folding chair which is to be used outside. The frame of the chair is made from wood with a cross-section of 50 mm × 25 mm.

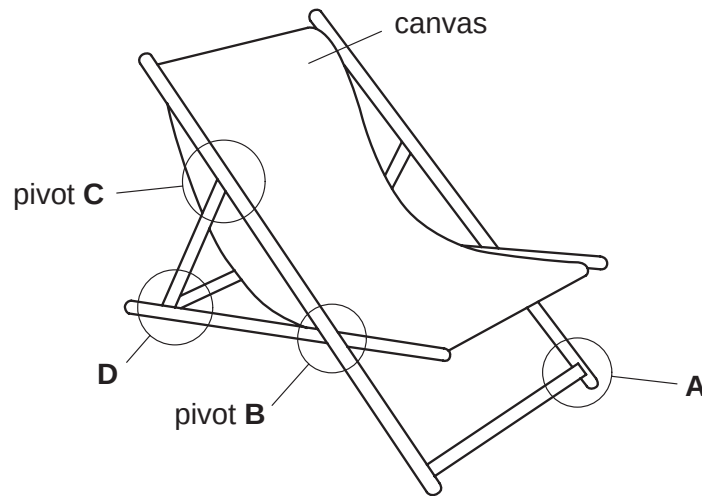


Fig. 7

- (a) Name a suitable wood for the chair and give **two** reasons for your choice. [3]
- (b) Use notes and sketches to describe:
- (i) a joint that could be used at **A**; [4]
 - (ii) how the joint you have identified in **part (i)** would be made; include details of the main stages of manufacture and the tools and machinery required. [5]
- (c) Use notes and sketches to describe a joining method that could be used at pivot points **B** and **C**. [4]
- (d) Use notes and sketches to explain a design feature that could be used at **D** to make the chair adjustable. [4]

8 Fig. 8 shows a full-size chair made from corrugated cardboard.

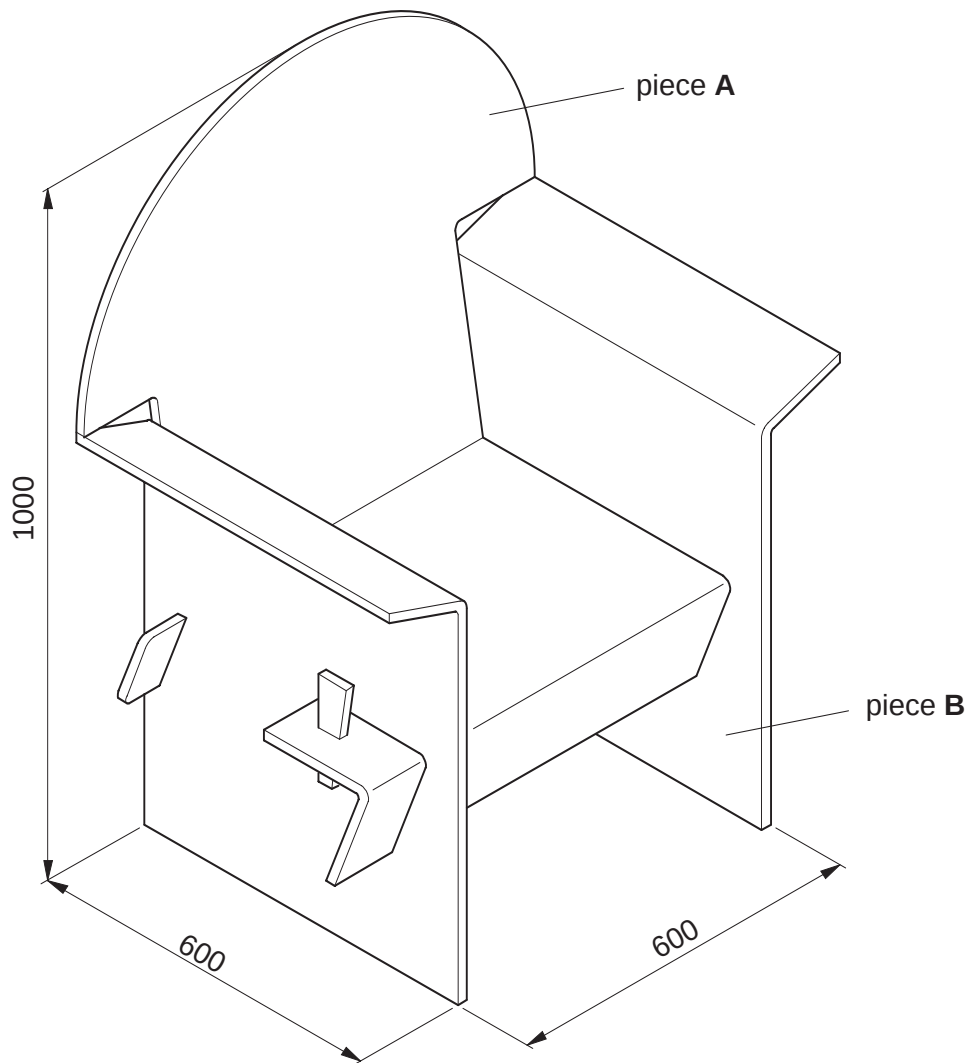


Fig. 8

- (a) Make an annotated sketch showing the cross-section of a piece of corrugated cardboard. [2]
- (b) Explain why corrugated cardboard has been used to make the chair rather than card. [3]
- (c) A design will be printed on plain corrugated card before the card is cut and folded to make the chair. Name the printing process that would be used. [1]
- (d) The chair has been made from two pieces of corrugated cardboard.
Piece **A** forms the seat and backrest while piece **B** folds round to form the two sides and back of the chair.

Sketch, to an appropriate scale:

- (i) the development (net) required to make piece **A**; [4]
- (ii) the development (net) required to make piece **B**. [4]
- (e) Pieces **A** and **B** slot together without the use of glue.
Use notes and sketches to explain how the chair would be assembled. [6]

Section C

Answer **two** questions from this section.

9 Fig. 9 shows different designs for packaging audio cassette tapes.

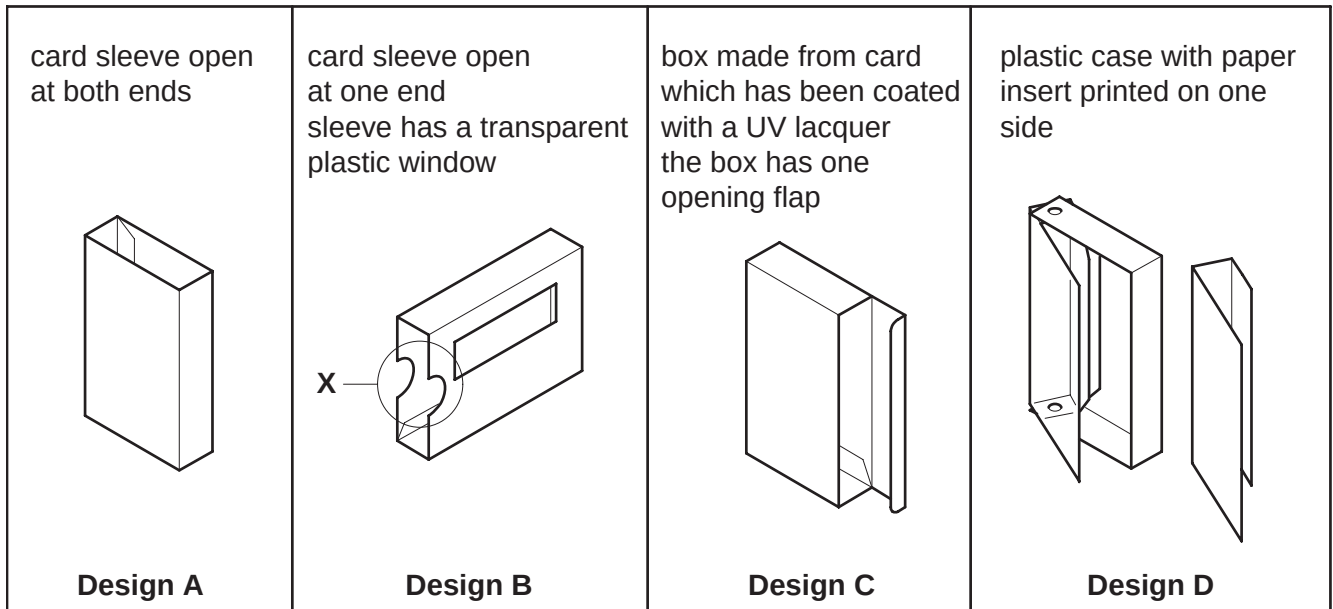


Fig. 9

- (a) Explain the purpose of the feature shown at X on design B. [2]
- (b) The two symbols shown in Fig. 10 have been printed on the back of designs A, B and C. State what each symbol is and explain what information each one communicates. [4]



Fig. 10

- (c) Explain why an ultraviolet (UV) lacquer has been applied to design C. [2]
- (d) Give **two** reasons why design B would be more expensive to manufacture than design A. [2]
- (e) Discuss, in relation to durability and product protection, the advantages and disadvantages of the four methods of packaging. [10]

10 Fig. 11 shows three systems for storing CDs.

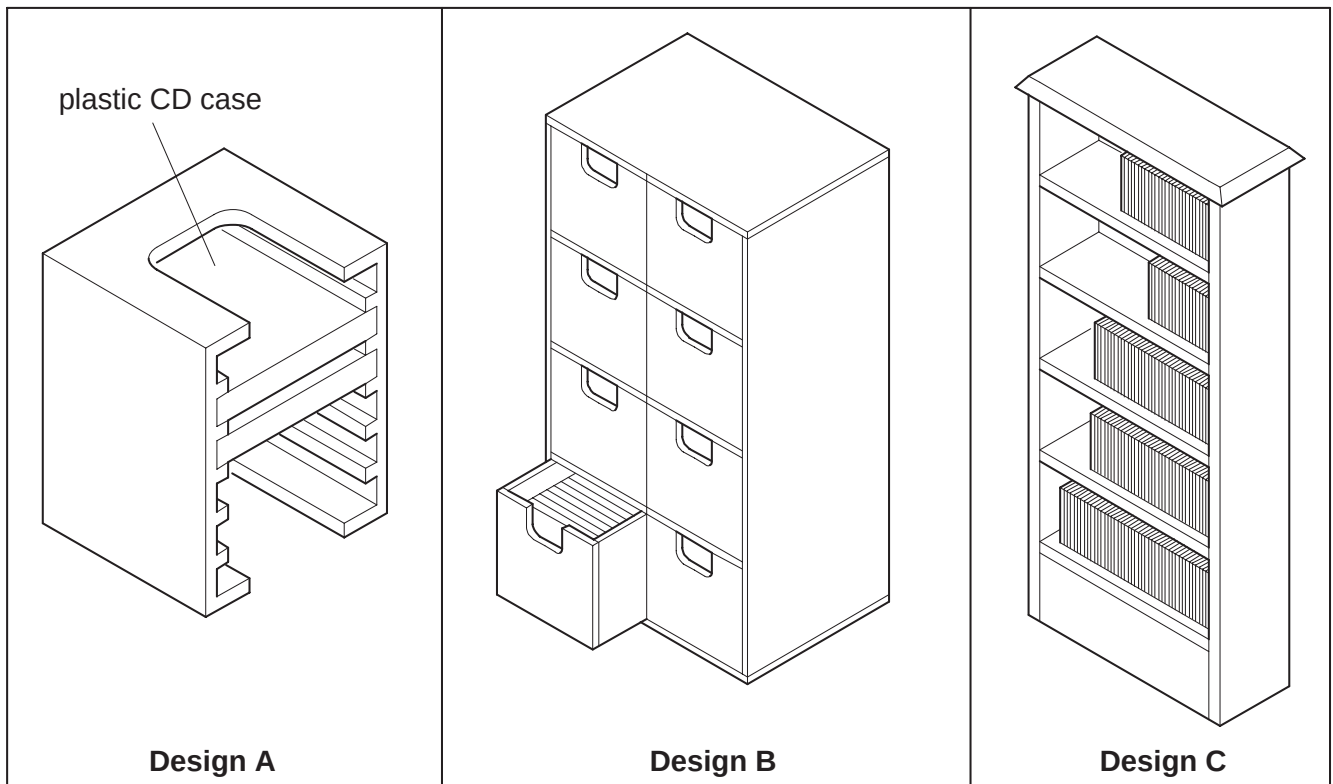


Fig. 11

- (a) Design A has been formed from one piece of plastic.
Name the industrial process that would be used to manufacture the design. [1]
- (b) Design A is part of a modular storage system.
Explain what is meant by the term 'modular storage system'. [2]
- (c) With reference to safety, explain why Design B needs to be modified before the manufacturer could market the product as a 'stackable unit'. [2]

(d) Details of design **B** and a CD are given in Fig. 12.

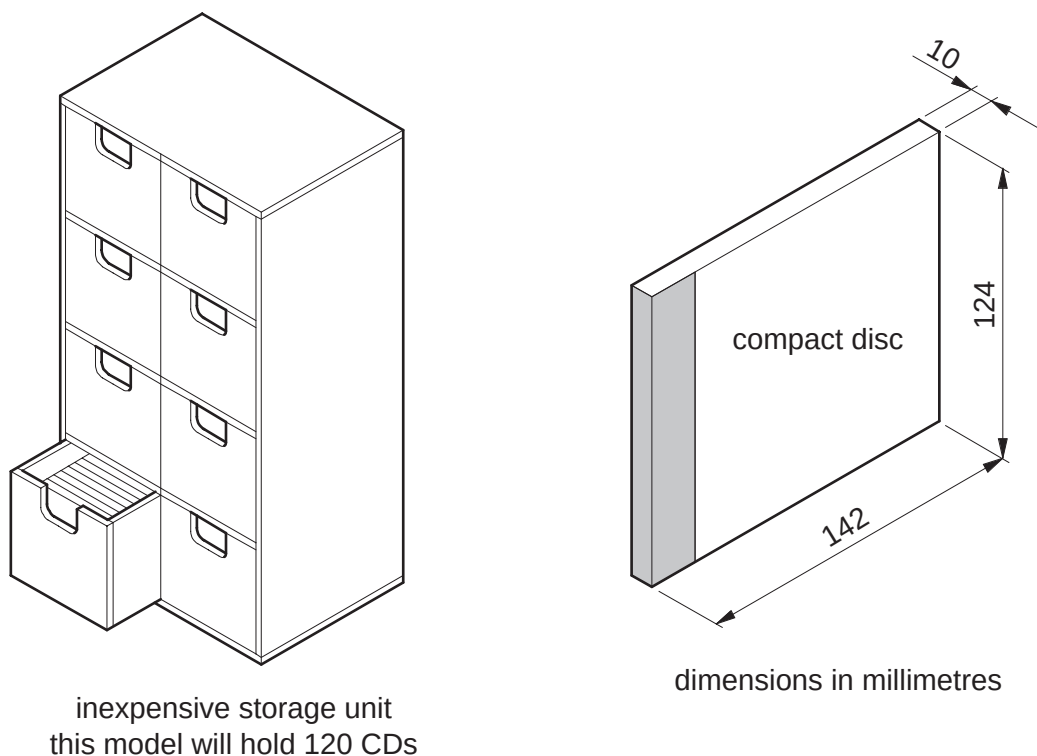


Fig. 12

State the internal dimensions of one of the eight drawers and explain how you have determined these dimensions. [4]

(e) The company that makes design **C** uses the term 'mahogany effect' in its advertisements for the product.

(i) Use notes and sketches to explain what is meant by the term 'mahogany effect' and how it differs from solid mahogany. [5]

(ii) Discuss the advantages and disadvantages to the manufacturer of using 'mahogany effect wood' rather than solid mahogany in the manufacture of the design. [6]

- 11 Fig. 13 shows an athletics hurdle made from mild steel tube and wood. The hurdle is to be used outside.

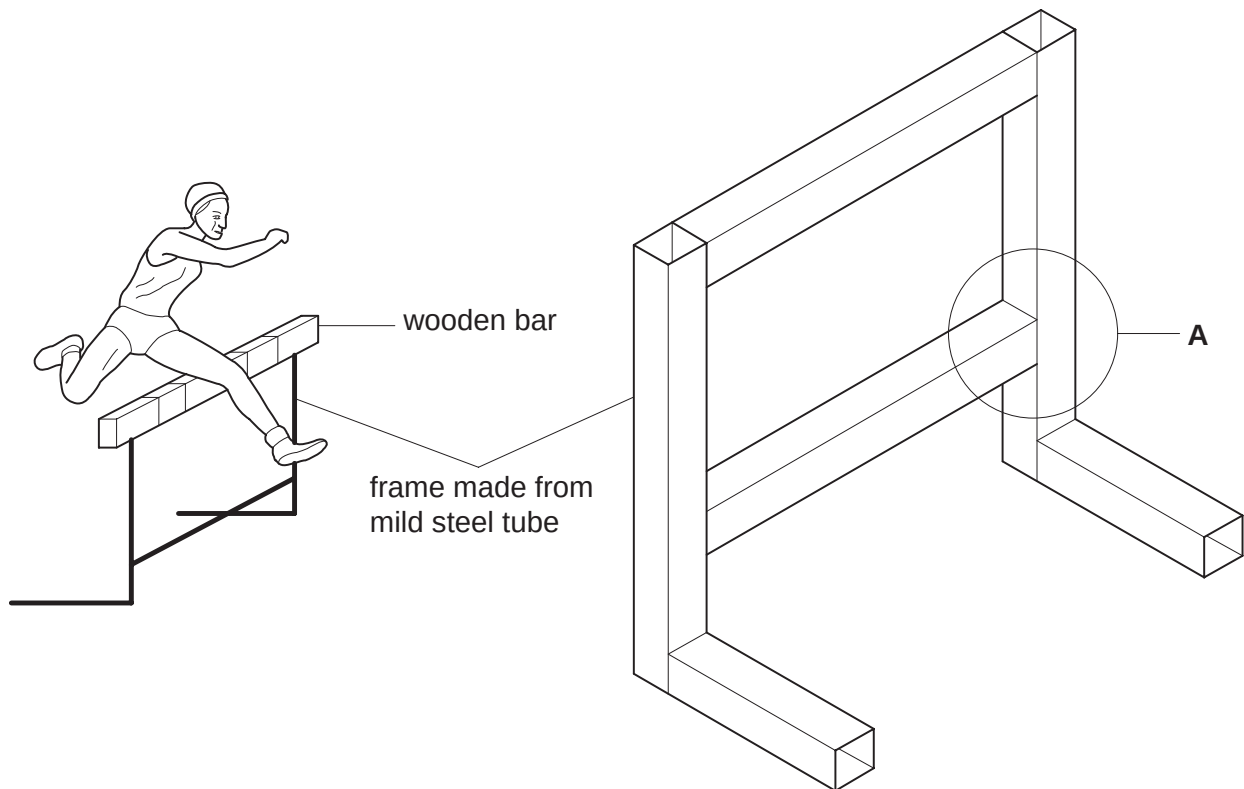


Fig. 13

- (a) Give **two** reasons why a surface finish should be applied to the mild steel frame. [2]
- (b) Paint and plastic coating have been identified as two possible surface finishes for the metal frame.
- (i) Explain what is meant by the term 'plastic coating'. [2]
- (ii) Name a finish, other than paint and plastic coating, that could be used for the mild steel frame. [1]
- (iii) Name a finish, other than paint, that could be used on the wooden bar. [1]
- (c) Discuss, in relation to cost, ease of application and maintenance, the advantages and disadvantages of using paint or plastic coating on the metal frame. [6]
- (d) Knock down (KD) fittings will be used at **A** to join the pieces of tube together.
- (i) Explain what is meant by the term 'knock down fitting'. [2]
- (ii) Identify **one** advantage and **one** disadvantage of using KD fittings in this situation. [2]

- (e) The ends of the metal tube are to be sealed using plastic inserts as shown in Fig. 14.

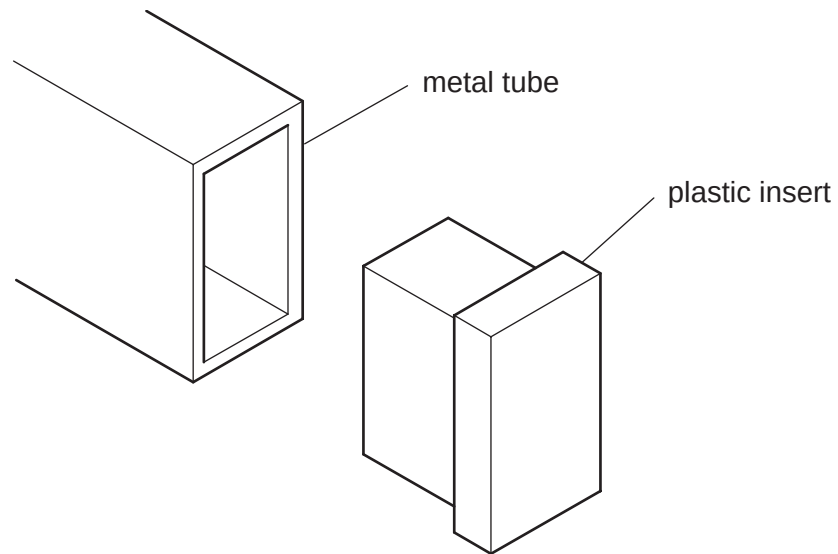


Fig. 14

Explain **two** reasons why these inserts are used in this situation.

[4]

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.

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