

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

DESIGN AND TECHNOLOGY

9705/01

Paper 1

May/June 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 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 **11** printed pages and **1** blank page.



Section A

Answer **all** questions.

- 1 Fig. 1 shows a clear acrylic board for playing three-dimensional noughts and crosses.

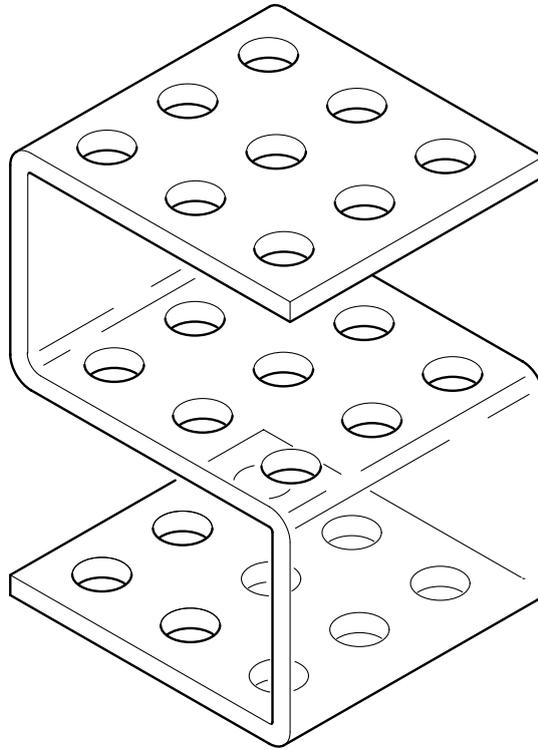


Fig. 1

The bends have been made using a strip heater.

- (a) Identify **two** potential hazards associated with using a strip heater. [2]
- (b) Explain how each of the hazards identified in (a) could be reduced or eliminated. [2]
- (c) Using sketches and notes, explain how the use of a jig or former could aid the manufacture of the acrylic board. [4]
- 2 There are many ways of joining different materials.

For example, riveting is a permanent way of joining two pieces of metal.

Explain what is meant by each of the following terms and give an example of each type of joint.

- (a) temporary joint [4]
- (b) moveable joint [4]

- 3 The picture frame shown in Fig. 2 has been made by riveting together pieces of aluminium.

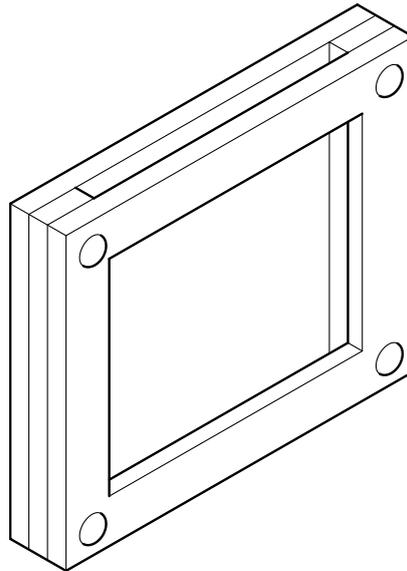


Fig. 2

Use sketches and notes to explain the process of riveting the three pieces of aluminium together using snap head rivets. One of the sketches must be a sectional view through the riveted joint. Include details of the tools and equipment required. [8]

- 4 As part of the process of forming the bowl shown in Fig. 3 the copper needs to be annealed.

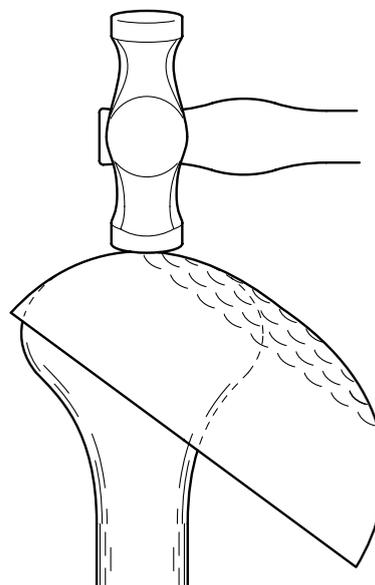


Fig. 3

- (a) Describe the process of annealing copper. [4]
- (b) Explain the purpose of annealing and the effect that it has on the copper. [4]

- 5 Make an annotated sketch of a mechanical system that could be used to change the rotary motion of the arm into the oscillating movement of the windscreen wipers shown in Fig. 4. [8]

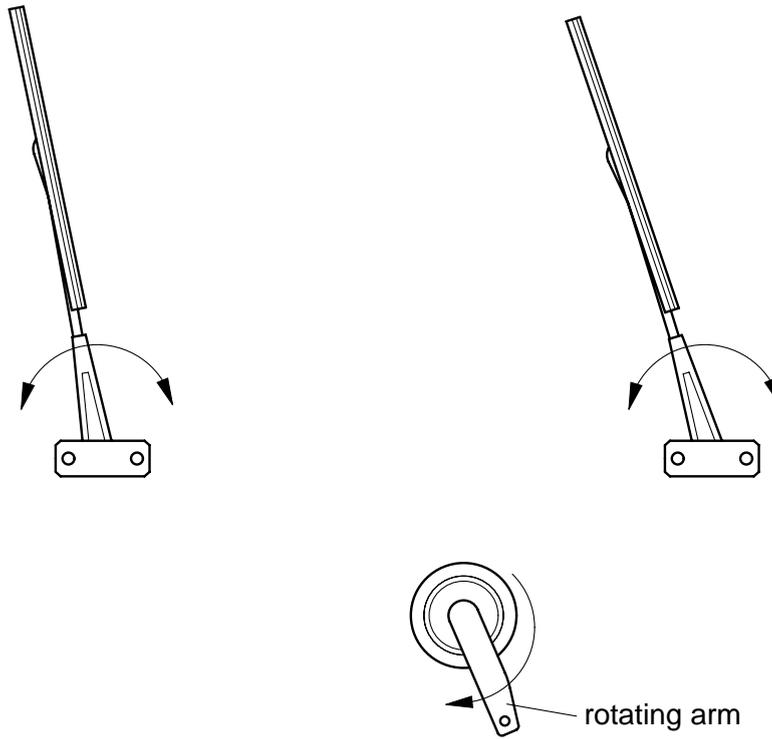


Fig. 4

Section B

Answer **two** questions in this section.

6 Fig. 5 shows a table lamp.

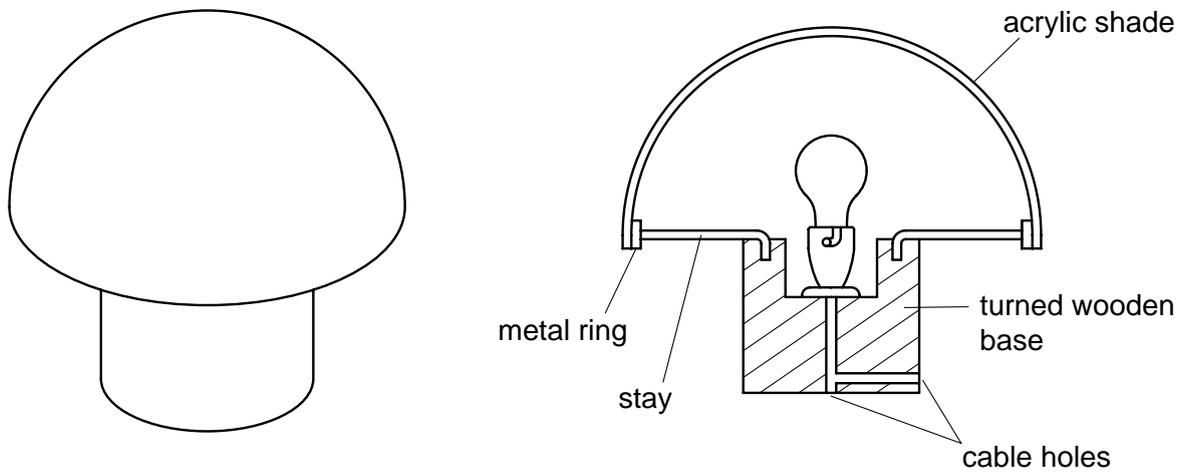


Fig. 5

Use sketches and notes to describe:

- (a) how the wooden base would be made; [10]
- (b) how the acrylic shade would be made. [10]

Your answer must show:

- the main stages of manufacture;
- the tools and machinery required;
- any health and safety issues.

- 7 Fig. 6 shows a storage unit to hold cassette tapes and books.

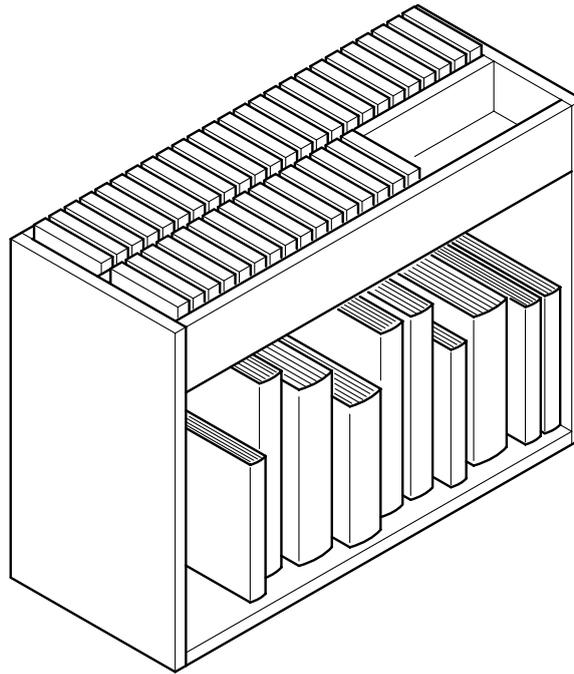


Fig. 6

The unit is to be made from MDF to which a painted finish will be applied.

The unit should be capable of holding fifty cassette tapes each 110 mm x 70 mm x 15 mm and books up to a maximum height of 200 mm.

- (a) Use sketches and notes to describe the method that would be used to join the base and sides. [7]
- (b) Produce a cutting list which details the size of seven pieces required to make the unit. [7]
- (c) Describe how the painted finish would be applied to the MDF. Give details about the working environment and how the equipment would be cleaned after use. [6]

- 8 Fig. 7 gives details of a container and its lid.

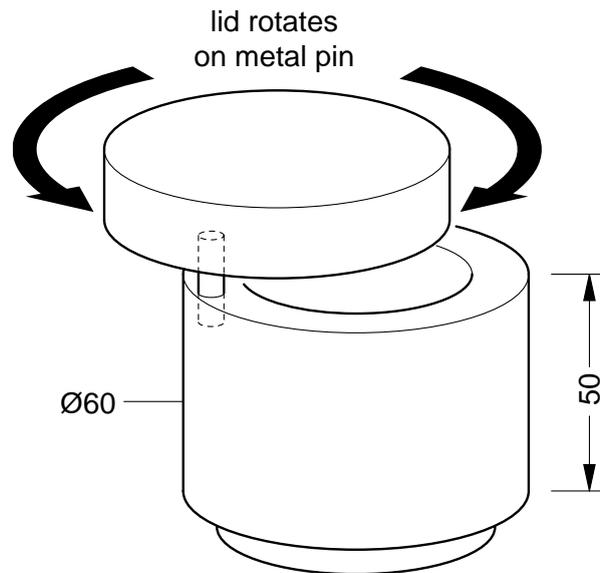


Fig. 7

The container has been turned from a solid piece of aluminium bar and the lid made from acrylic.

- (a) Use sketches and notes to describe how the aluminium container would be made on a centre lathe. [10]
- (b) Use sketches and notes to describe how the edge of the acrylic would be finished and polished. [5]
- (c) Use sketches and notes to describe how the lid and container would be joined together. Your answer must give the main stages involved in the process and the tools and machinery required. [5]

Section C

Answer **two** questions in this section.

9 Fig. 8 shows four types of gate that could be used at the entrance to a path at the front of a house.

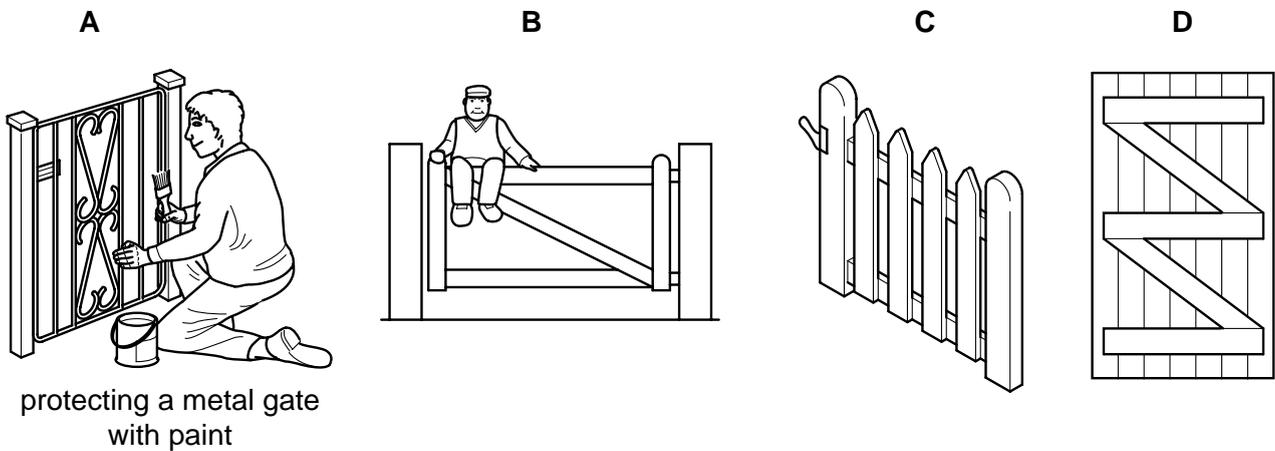


Fig. 8

- (a) For gate **A**, give **two** possible surface treatments, other than paint, to prevent corrosion. [2]
- (b) Explain the purpose of the diagonal bar on gate **B**. [2]
- (c) Identify a potential safety hazard with the design of gate **C** and suggest how this could be overcome. [2]
- (d) Gate **D** has been made from tongue and grooved planks.
 - (i) With the aid of a sketch explain what is meant by 'tongue and grooved'. [3]
 - (ii) With the aid of a sketch show how the planks could be joined to the frame. [3]

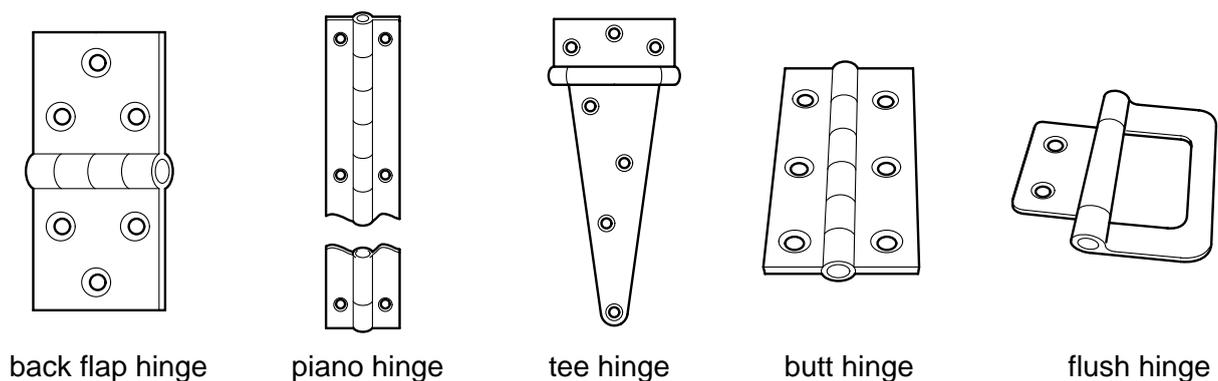


Fig. 9

- (e) Fig. 9 shows a range of hinges.
 - (i) Explain why it would be difficult to use any of these hinges to hang gate **A**. [2]
 - (ii) Select a suitable hinge for hanging gate **D** and discuss the advantages of your choice over the other designs. [6]

- 10 Fig. 10 shows three cartons which are used to hold fruit juice. The cartons are made from card which has been laminated with polythene.

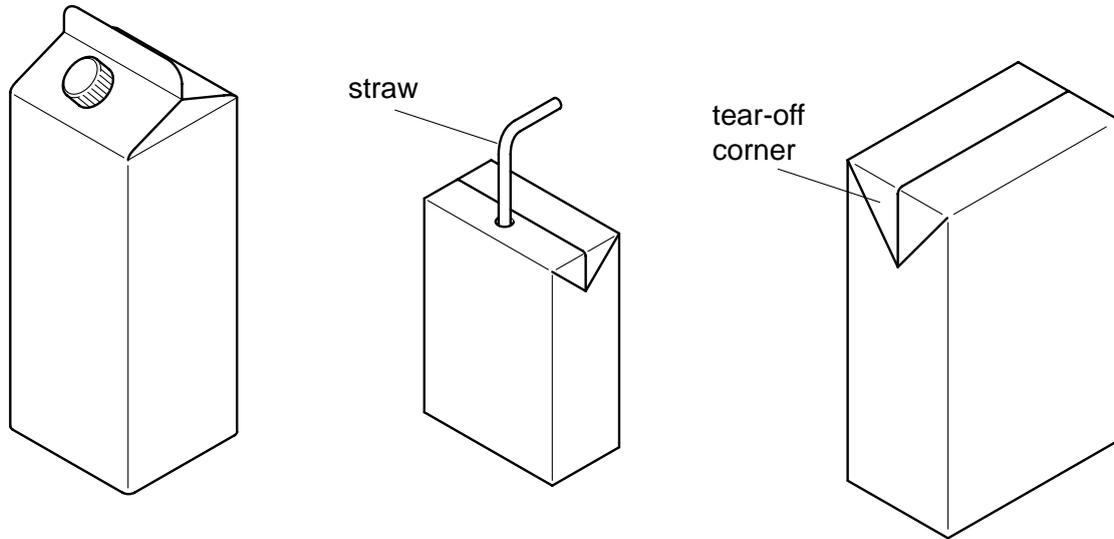
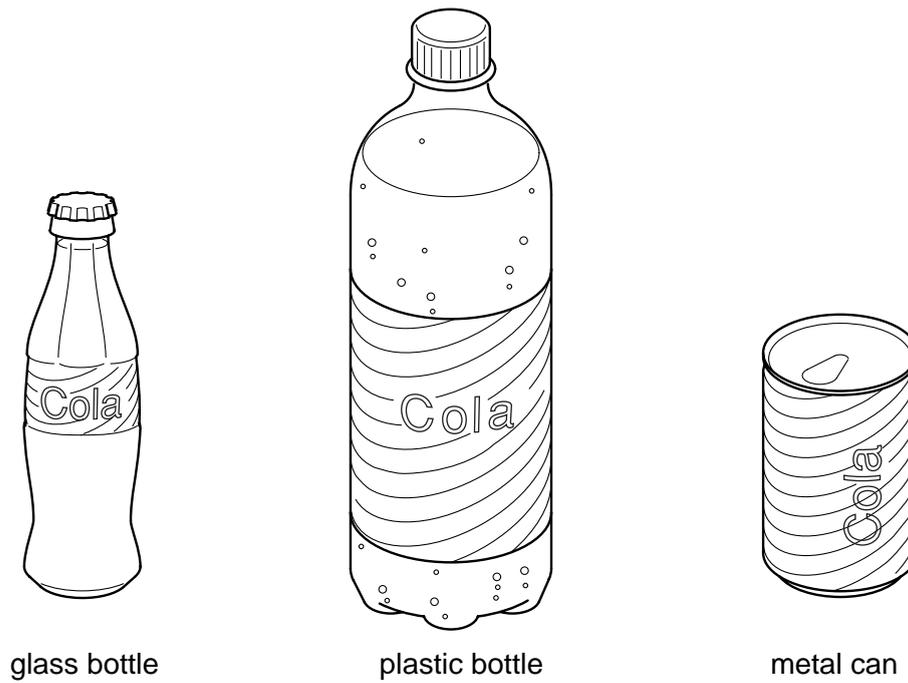


Fig. 10

- (a) Give **two** reasons why these types of carton are rectangular in shape. [2]
- (b) Explain why the card has been laminated with polythene. [2]
- (c) Discuss, in relation to safety and function, the advantages and disadvantages of the three cartons. [6]

Question 10 continues on the next page

**Fig. 11**

(d) Fig. 11 shows three other types of container, used to hold soft drinks.

Name a specific material and production method that could be used to manufacture:

(i) plastic bottles; [2]

(ii) metal cans. [2]

(e) Discuss the relative merits of these different packaging materials in relation to the issues of conservation of resources and the role of recycling. [6]

11 Four different types of table are shown in Fig. 12.

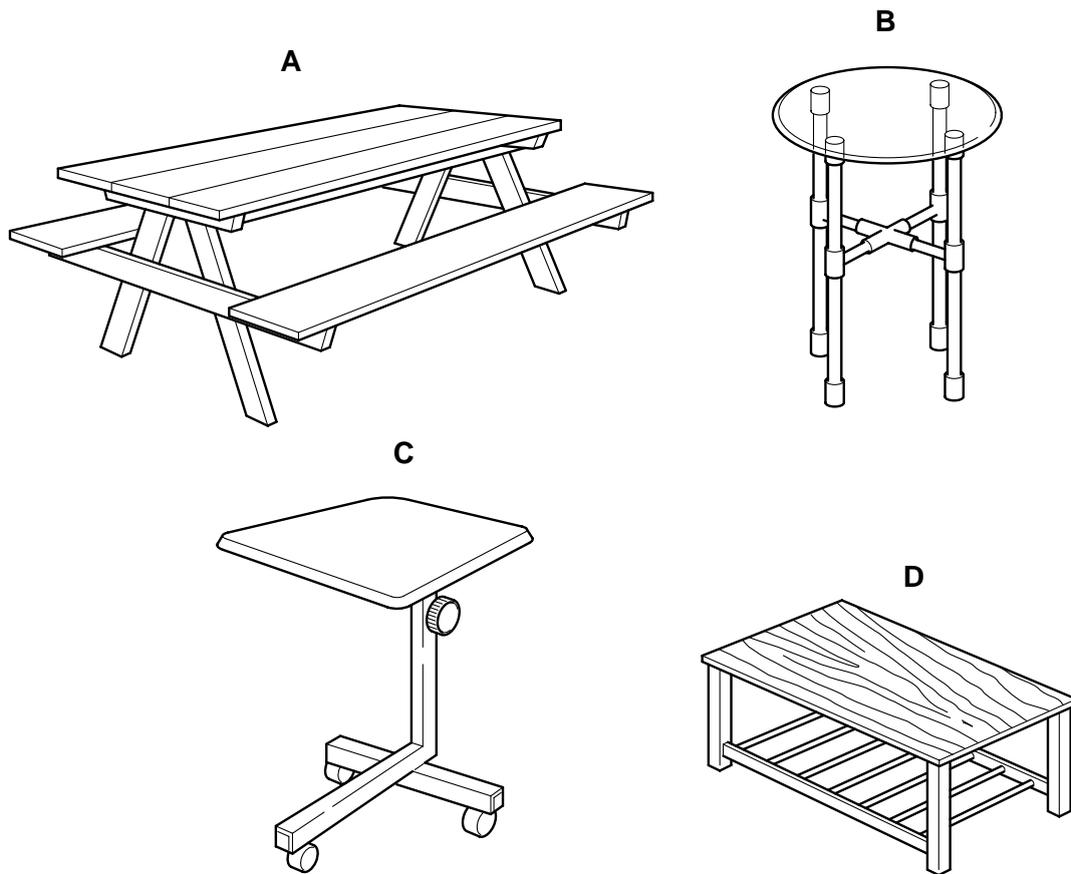


Fig. 12

- (a) State a specific situation for which each table would be the most suitable. [4]
- (b) Select **one** of the tables and discuss how each of the following factors has influenced its design and the materials from which it would be made:
- (i) the table's specific intended use;
 - (ii) ergonomics. [6]
- (c) Table **A** is sold in flat pack form.
- (i) Explain what is meant by the term 'flat pack'. [2]
 - (ii) Discuss the advantages and disadvantages to the customer of buying flat pack furniture. [4]
- (d) Discuss the advantages and disadvantages of making large, one piece, table tops from:
- (i) solid wood;
 - (ii) manufactured boards. [4]

