

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

DESIGN AND TECHNOLOGY

6043/01

Paper 1 Technology

October/November 2004

2 hours 30 minutes

Additional Materials: Answer Booklet/Paper
Plain paper
Sketching equipment

READ THESE INSTRUCTIONS FIRST

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.

Part A

Answer **all** questions

Part B

Answer **four** questions.

Answer **one** question from Section 1, **two** questions from Section 2, and **one** other question from either Section.

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.
Use sketches where appropriate to help answer any question.
You are advised to spend no longer than 45 minutes on Part A and 1 hour 45 minutes on Part B.

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

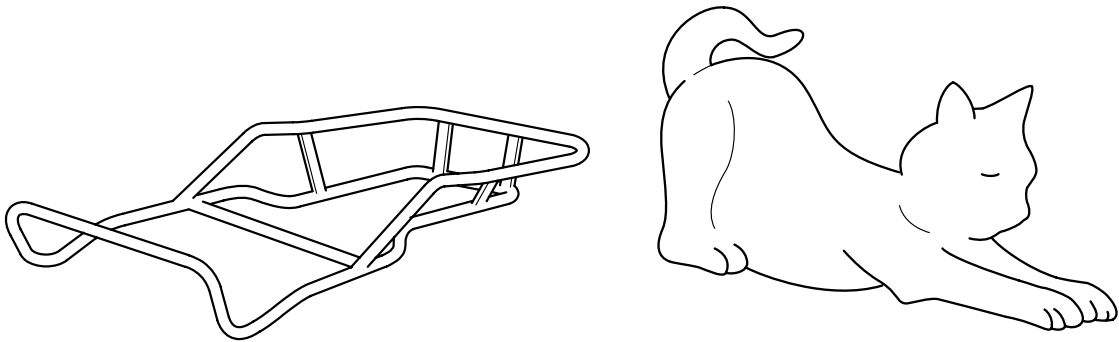


Part A

You are advised to spend no more than 45 minutes on this part.

Attempt **all** questions.

- 1 State **two** reasons why you would reject a piece of timber for use when making a piece of furniture. [2]
- 2 Sketch a tenon saw and state the reasons for its stiffened blade. [4]
- 3 Name a suitable material for each of the items in Fig. 1.



(a) Go-kart frame

Fig. 1

(b) Small garden statue

[2]

- 4 Plastics come in different forms. State processes that use each of the following forms:
 - (a) plastics powder;
 - (b) plastics sheet;
 - (c) plastics granules. [3]
- 5 Explain **three** ways that clothing and personal adornment could create a hazard in a workshop. [3]
- 6 Explain briefly the reason for using each of the following:
 - (a) soluble oil when drilling metal;
 - (b) flux when soft soldering. [4]

- 7 Give **two** reasons why expanded polystyrene is used for food containers as shown in Fig. 2. [2]

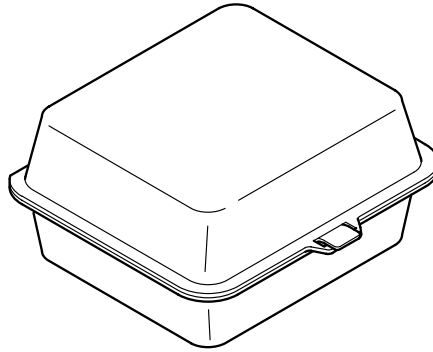


Fig. 2

- 8 Explain the term 'prototype' when used in design work. [2]
- 9 Fig. 3 shows a softwood toy. State **three** possible protective finishes that could be applied to it. [3]

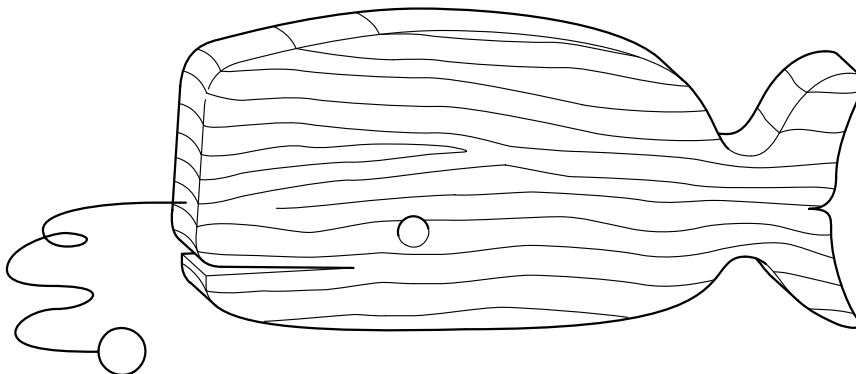


Fig. 3

- 10 Name a tool or material that would be used on acrylic for each of the following: [2]
- (a) removing scratch marks from the edges;
 - (b) producing a high gloss finish to the edges.

Part B

You are advised to spend at least 1 hour 45 minutes on this part of the examination.

Answer **four** questions including **one** from Section 1, **two** from Section 2 and **one** further question from either section.

Section 1 – Tools and Materials

- 11** Fig. 4 shows three different devices used in the workshop.

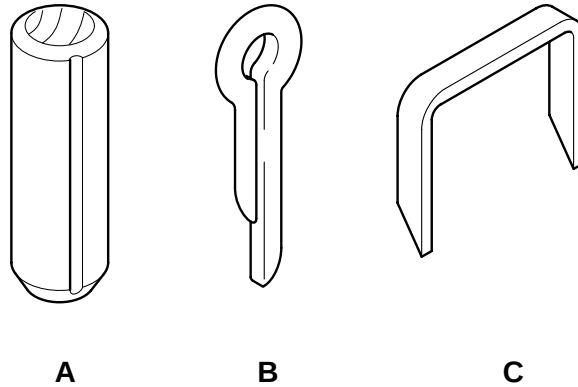


Fig. 4

- (a) (i) Name each device. [3]
 (ii) With the aid of sketches, explain how each is used. [9]
 (b) Giving examples, explain the difference between temporary and permanent fixings. [5]

- 12** Some materials present particular safety hazards when being worked.

- (a) Explain the safety hazards relating to each material in the following situations:
 (i) machine sanding a piece of teak;
 (ii) laminating a shape with GRP;
 (iii) turning a piece of mild steel on a lathe. [9]
 (b) State what special protection or equipment could be used to overcome the hazards raised in each of your answers to part (a). [6]
 (c) Explain how the incorrect storage of materials can present safety hazards. [2]

13 Fig. 5 shows the design for a bookend.

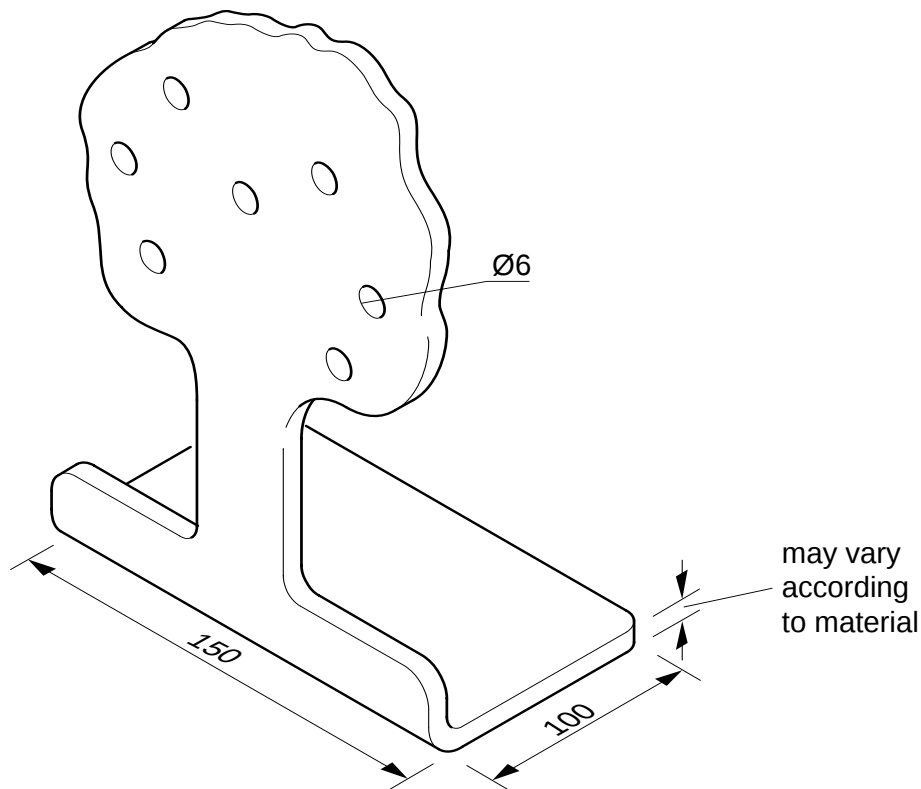


Fig. 5

- (a) Suggest **one** specific material, from each of the following groups, that would be suitable for the bookend. In each case give reasons.
- (i) Metal
 - (ii) Plastic
 - (iii) Wood
- [6]
- (b) Choose **one** of the specific materials you have named in part (a), then name and sketch the tools or equipment that would be used to:
- (i) cut out the shape of the bookend;
 - (ii) form the bend in the bookend.
- [8]
- (c) With the aid of sketches show how the bookend would be held and supported when drilling the holes.
- [3]

Section 2 – Processes

- 14 A designer has to have knowledge of the many different methods of joining materials. Choose **two** of the following situations and, using notes and sketches, describe how each joint is produced.

(a) Joining a wooden chair rail to a wooden leg with a mortise and tenon joint.

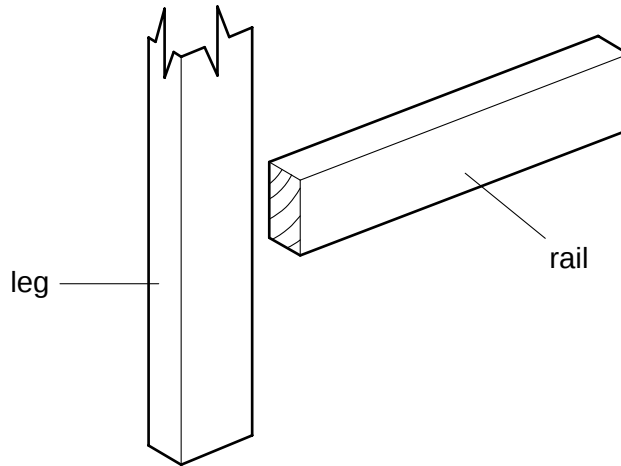


Fig. 6

(b) Joining melamine sheet to a blockboard top with a contact adhesive.

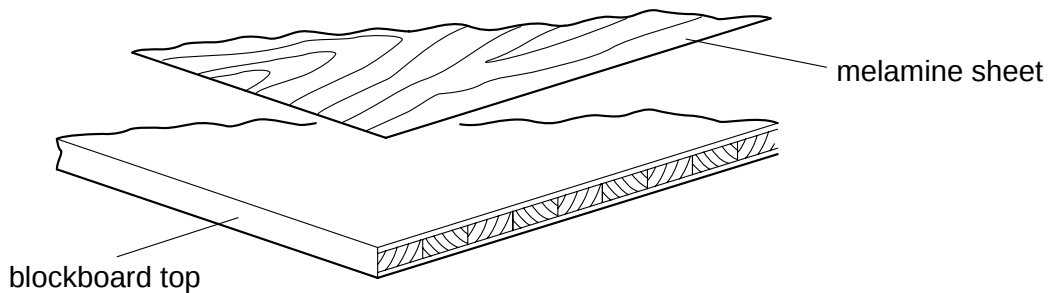


Fig. 7

(c) Joining a mild steel bracket to a mild steel sheet with a round head rivet.

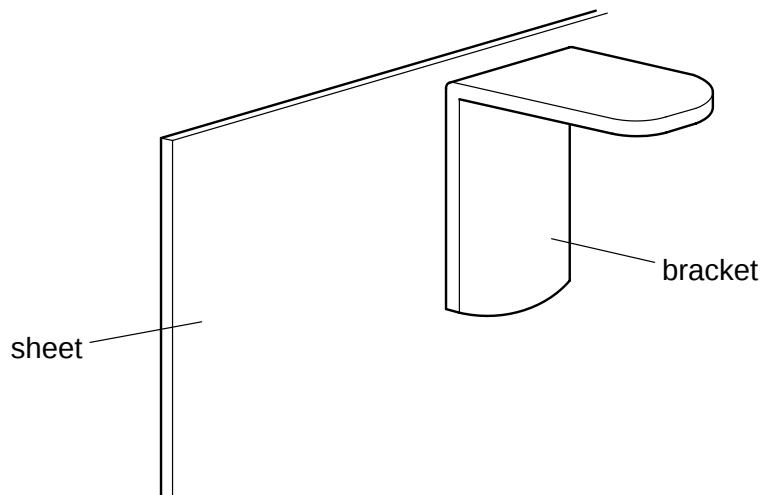


Fig. 8

15 The outline design for a musical chime frame is shown in Fig. 9.

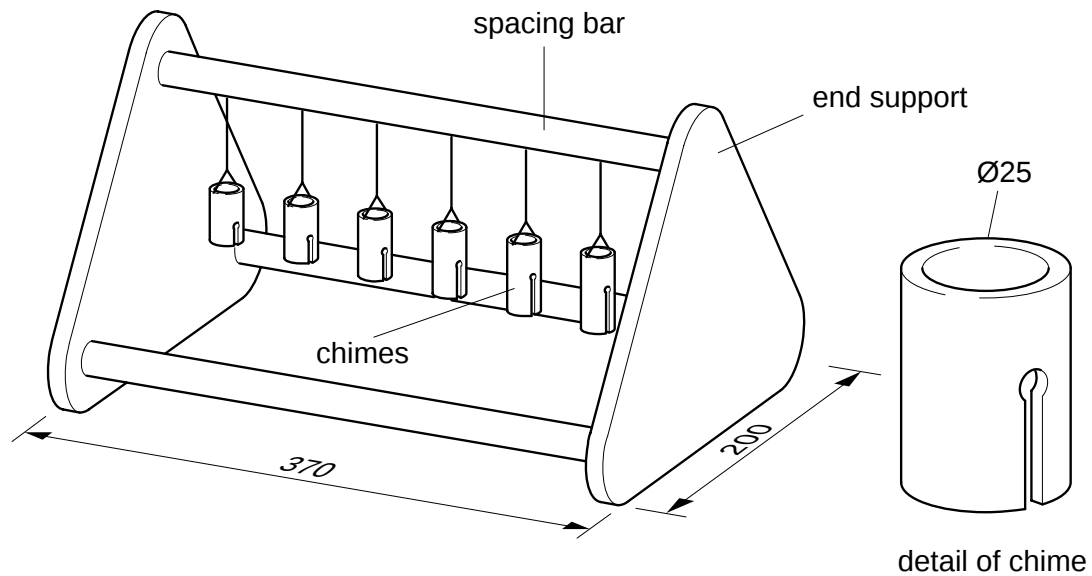


Fig. 9

(a) Suggest, with reasons, a suitable material for the:

- (i) chimes;
- (ii) end supports;
- (iii) spacing bars.

[6]

(b) Explain, with the aid of notes and sketches, how you would:

- (i) join the spacing bars to the end supports;
- (ii) hold, drill and cut the slots in the chimes;
- (iii) suspend the chimes from the top spacing bar.

[11]

16 Fig. 10 shows the design for a leg exerciser.

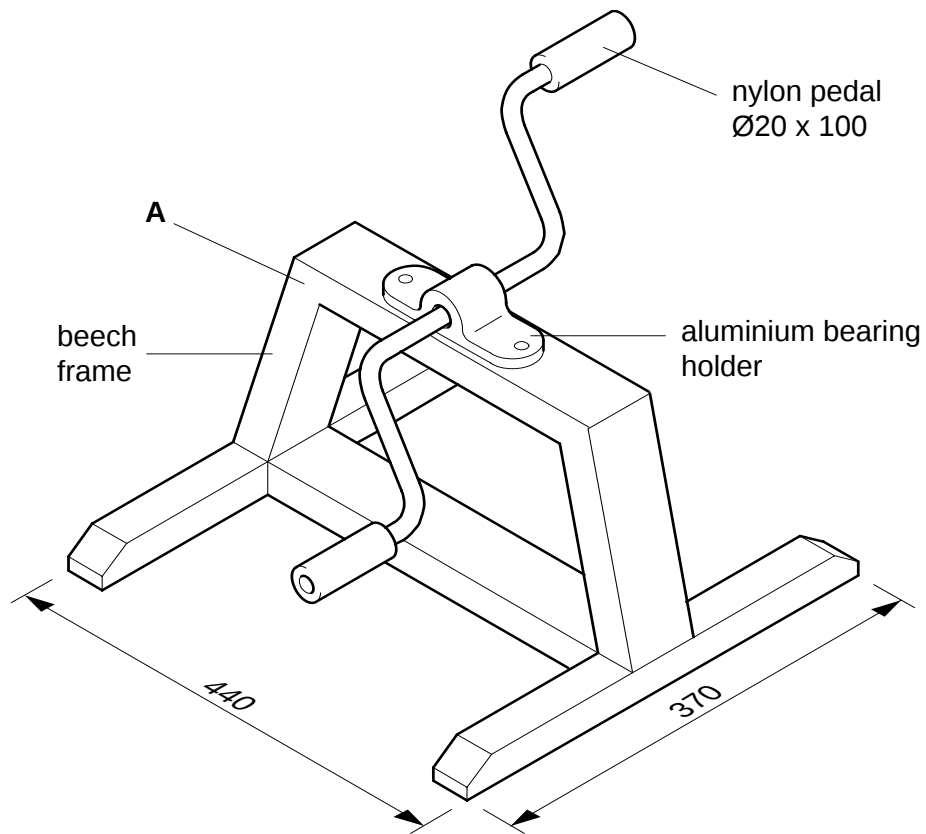


Fig. 10

Describe, with the aid of notes and sketches, **two** of the following processes.

- (a) Turning and drilling a $\text{Ø}25 \times 120$ nylon blank for the pedal.
- (b) Casting the aluminium bearing holder.
- (c) Making a finger joint at point **A** on the beech frame.

[17]

17 Fig. 11 shows details of a CD holder.

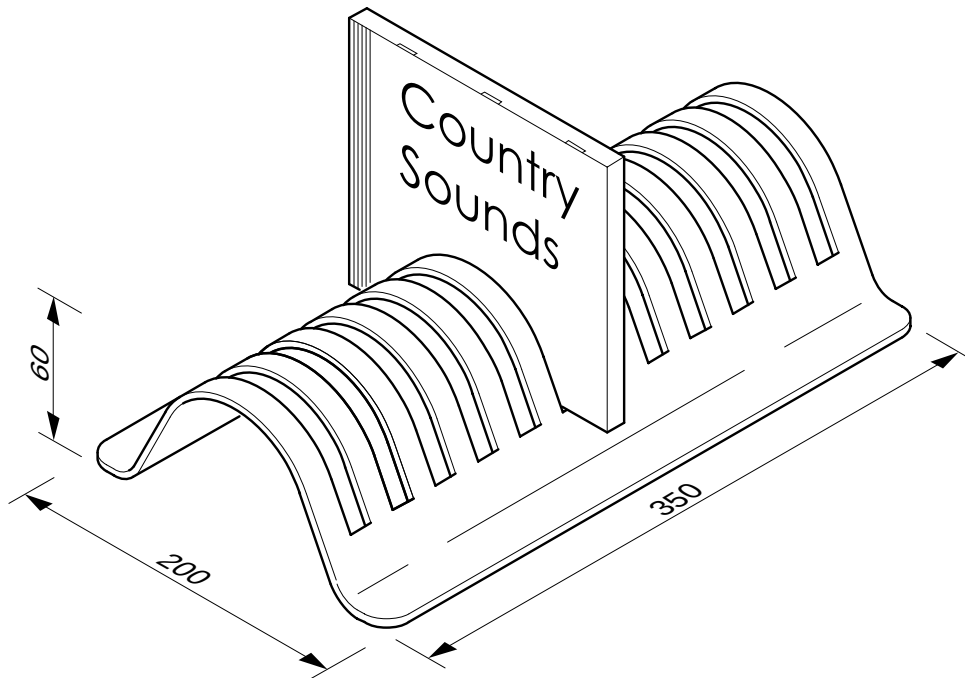


Fig. 11

- (a) Suggest **two** possible methods of producing the holder and give the advantages of both. [4]
- (b) Describe, with the aid of notes and sketches, **one** of the methods of producing the holder given in answer to (a), using a material of your choice. [8]
- (c) Explain in detail how the CD holder would be given its final finish appropriate to the material you have chosen for (b). [5]

18 Fig. 12 shows the outline design for a crocodile snapping toy.

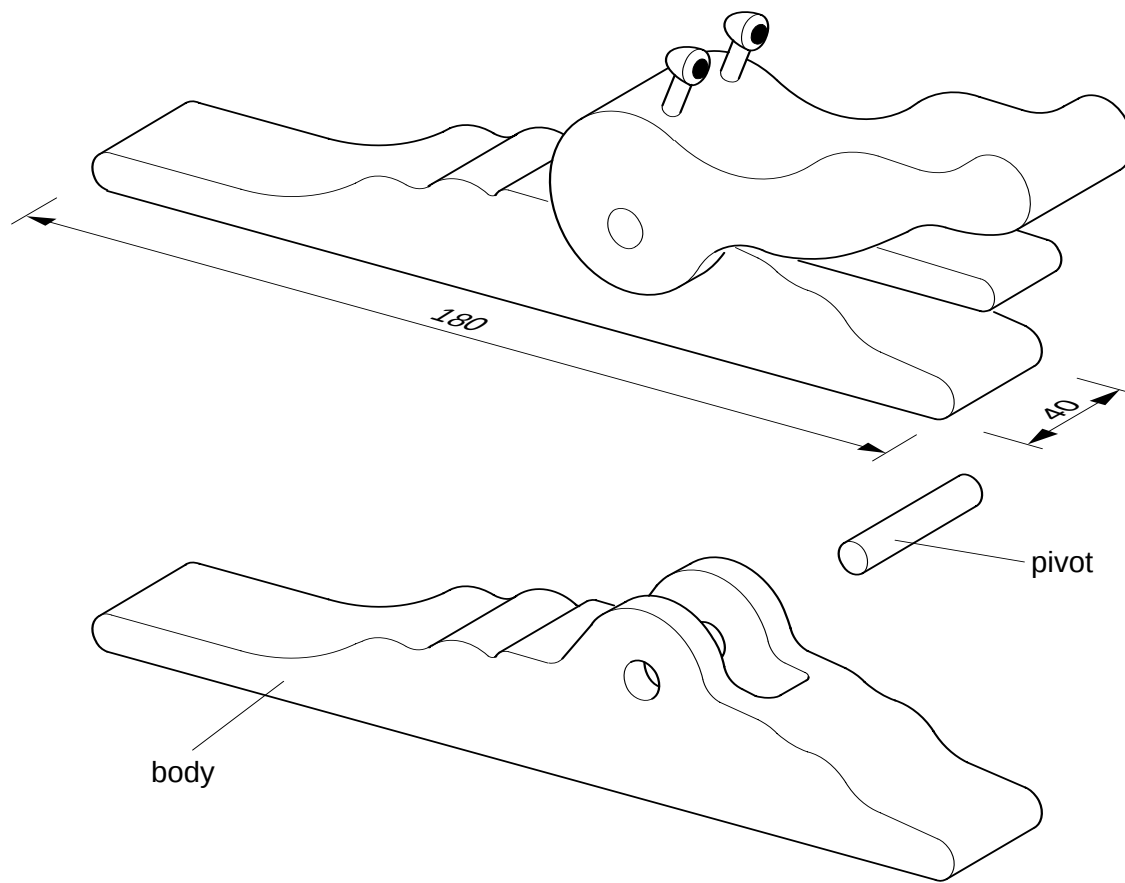


Fig. 12

- (a) State **two** properties that a material should have to be suitable for the toy. [2]
- (b) Using materials of your choice, describe, with the aid of notes and sketches, making the crocodile body by:
- (i) a hand process;
 - (ii) an industrial process. [12]
- (c) Explain with the aid of sketches how the pivot could be held in place, yet allow for the parts to be replaced. [3]

