

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level

DESIGN AND TECHNOLOGY

6043/1

PAPER 1 Technology

OCTOBER/NOVEMBER SESSION 2001

2 hours 30 minutes

Additional materials:

Answer paper

Plain paper

Sketching equipment

TIME 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer paper/ answer booklet.

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.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

All dimensions are in millimetres unless otherwise stated.

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 question paper consists of 10 printed pages and 2 blank pages.

Part A

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

Answer **all** questions.

- 1 Fig. 1 shows a circular hearth used in the workshop.

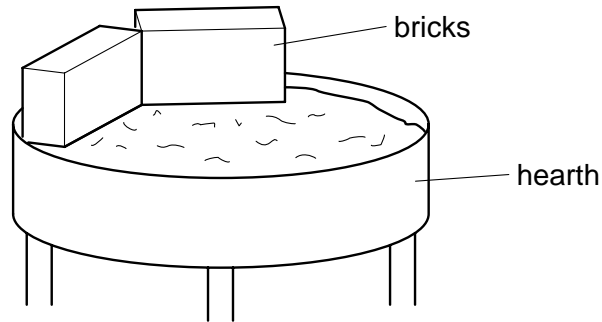


Fig. 1

(a) State the purpose of the hearth.

(b) Explain the function of the bricks.

[4]

- 2 Sketch:

(a) a dovetail joint;

(b) a housing joint.

[4]

- 3 Explain why the following plastics processes could be dangerous:

(a) cutting polystyrene with a hot wire cutter;

(b) G.R.P. work without gloves.

[4]

- 4 Fig. 2 shows a tool used in the workshop.

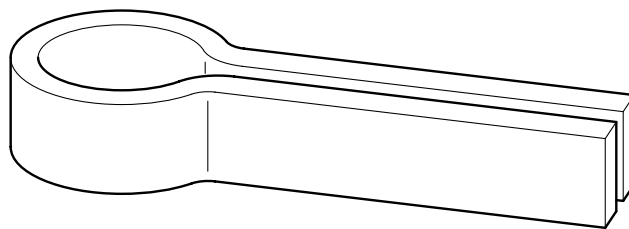


Fig. 2

(a) Name the tool.

(b) Explain its use.

[2]

- 5 What is the purpose of a 'design brief'? [2]
- 6 Name **two** tools that would be used when marking out the shape shown in Fig. 3, on acrylic. [2]

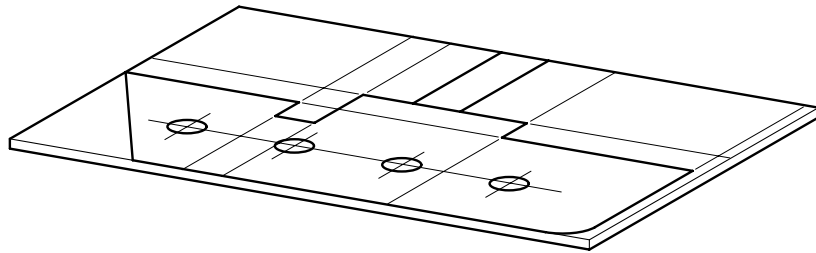


Fig. 3

- 7 State **two** methods of holding wood together while glue sets. [2]
- 8 Fig. 4 shows a copper dish and foot ring that have just been silver soldered together.

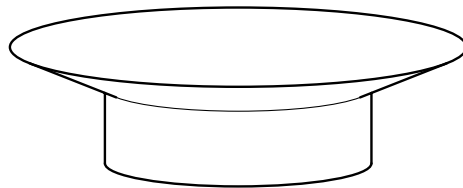


Fig. 4

State what will be used to:

- (a) pickle the surface;
- (b) clean the surface;
- (c) polish the surface. [3]
- 9 When working with plastics, what is meant by the term 'curing'? [2]
- 10 State how timber may be damaged by:
- (a) insect life;
- (b) weather. [2]

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. 5 shows the design for a hair slide.

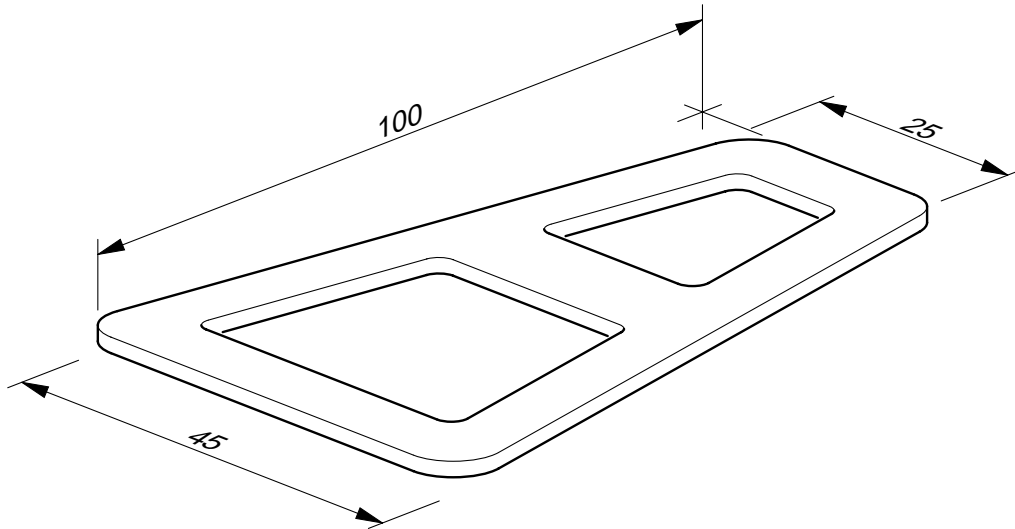


Fig. 5

- (a) Compare the following materials that could be used for the hair slide and state the advantages and problems associated with each.
- (i) Copper.
 - (ii) Acrylic.
 - (iii) Birch plywood. [6]
- (b) Using **one** of the materials stated in part (a) sketch the tools that would be used to:
- (i) cut out the inside shapes after drilling a starting hole;
 - (ii) smooth the inside edges after cutting. [6]
- (c) Explain how **each** of the materials in part (a) could be finished to make it more attractive. [5]

12 Fig. 6 shows a range of different fixings used in design work.

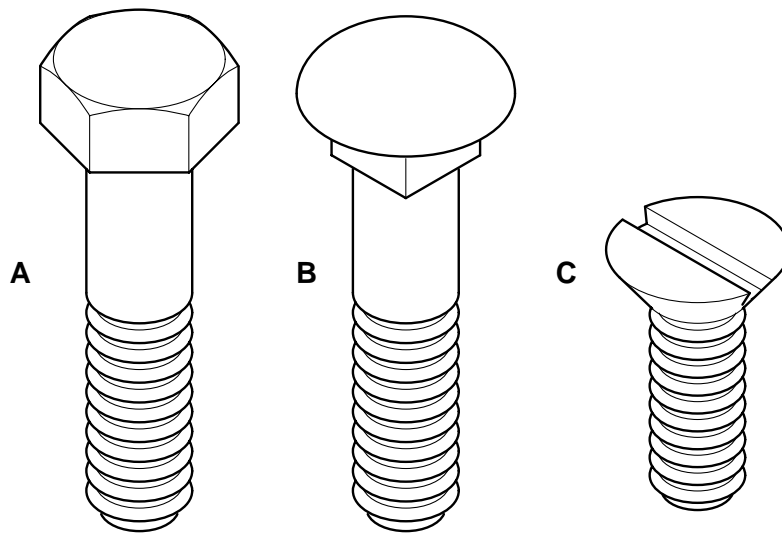


Fig. 6

- (a) Name the fixings **A** and **B** and give the reasons for their differing head shapes. [4]
- (b) The fixings shown in Fig. 6 may be used with **nuts**.
 Show by means of sketches the type of **nut** which can be tightened by:
- (i) hand;
- (ii) tool. [4]
- (c) Sketch the tools used to apply a turning force to the heads of **A** and **C**. [6]
- (d) Explain the purpose of **plain washers** when used, with nuts, on the fixings of the type shown in Fig. 6. [3]

13 Methods and techniques have been developed which increase the range and uses of materials.

(a) Explain why the following materials have been developed.

(i) Plywood.

(ii) G.R.P.

(iii) Duralumin.

[6]

(b) Using notes and sketches explain how the following materials can be made to act in the way stated and, for each, give a practical reason for this action.

(i) Polythene powder to act like a fluid.

(ii) Beech to bend without breaking.

(iii) Tool steel to be harder.

[9]

(c) State **two** possible ways in which a material may be protected by adding another material to its surface.

[2]

Section 2 – Processes

14 The outline design for a kite line winder is shown in Fig. 7.

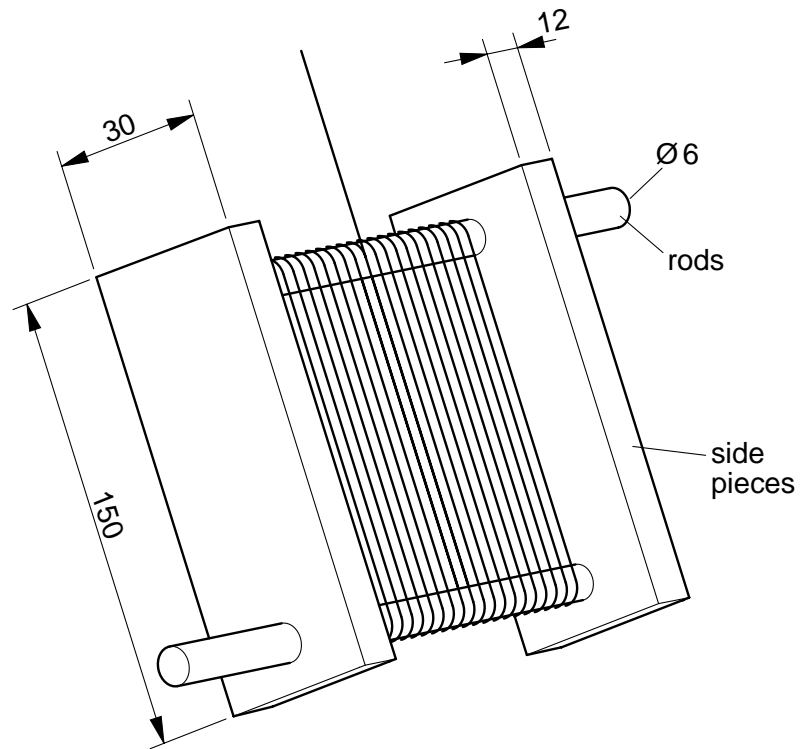


Fig. 7

- (a) (i) Identify **three** areas of weakness in this design. [3]
- (ii) For each weakness you have identified in part (i) suggest how improvements could be made. [6]
- (b) For a material of your own choice, describe with notes and sketches how the side pieces would be:
- (i) marked out;
- (ii) held and drilled. [8]

15 Fig. 8 shows an outline design of a mirror frame for a child's bedroom.

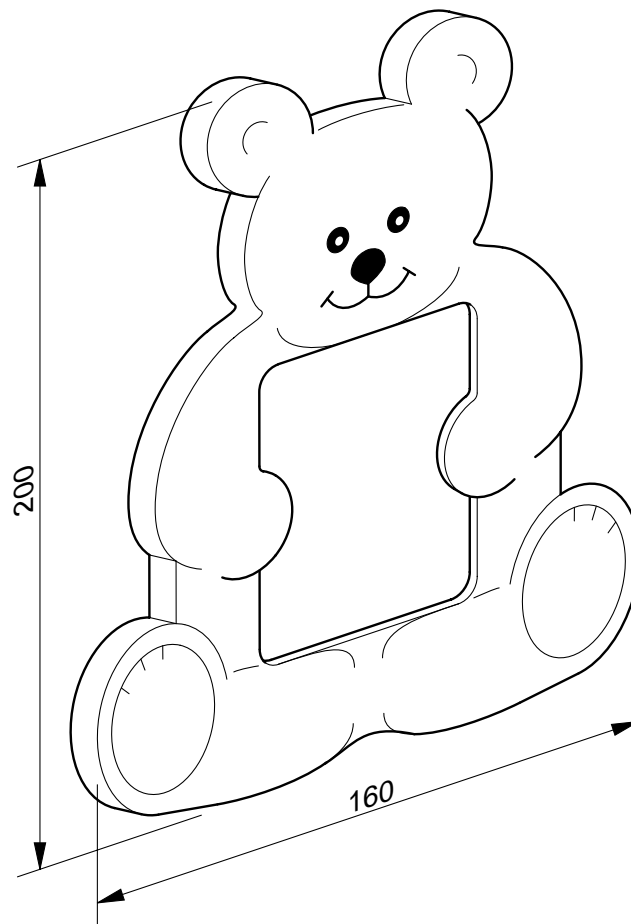


Fig. 8

- (a) State **two** important qualities that the mirror frame should have. [2]
- (b) State a material suitable for making the frame and describe with the aid of sketches how the frame could be produced. [8]
- (c) Using sketches show:
- (i) a convenient method of making the frame freestanding;
 - (ii) a hidden method of fixing the frame onto a wall. [7]

16 An idea for a desk tidy is given in Fig. 9.

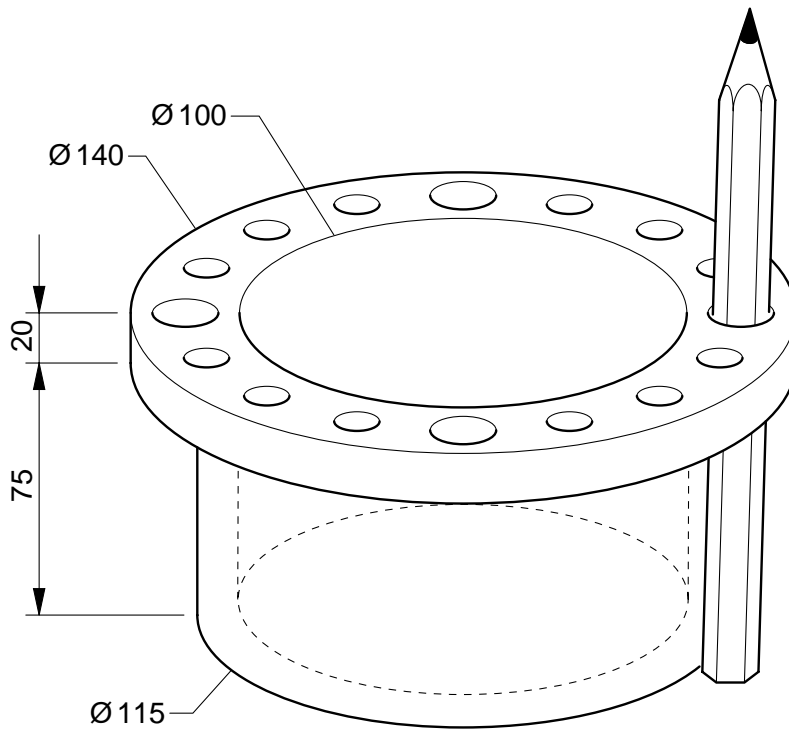


Fig. 9

- (a) Suggest a suitable material for the desk tidy and give a reason for your choice. [2]
- (b) Using notes and sketches describe the main stages in making the tidy (without the holes) by **one** of the methods listed below.
- (i) Turning.
 - (ii) Casting.
 - (iii) Injection moulding. [8]
- (c) Describe in detail how a high quality finish could be achieved on the desk tidy. [5]
- (d) Show by means of an outline sketch how the design can be improved to stop the pens and pencils from slipping out of position. [2]
- 17 Many different processes are used in joining materials. Choose **two** of the following processes and, using notes and sketches, describe how they are carried out.
- (a) Solvent bonding two pieces of acrylic at right angles.
 - (b) Silver soldering two pieces of copper tube together.
 - (c) Making a mortise and tenon joint between the leg and rail of a teak table. [17]

18 Fig. 10 shows an idea for a set of four egg holders.

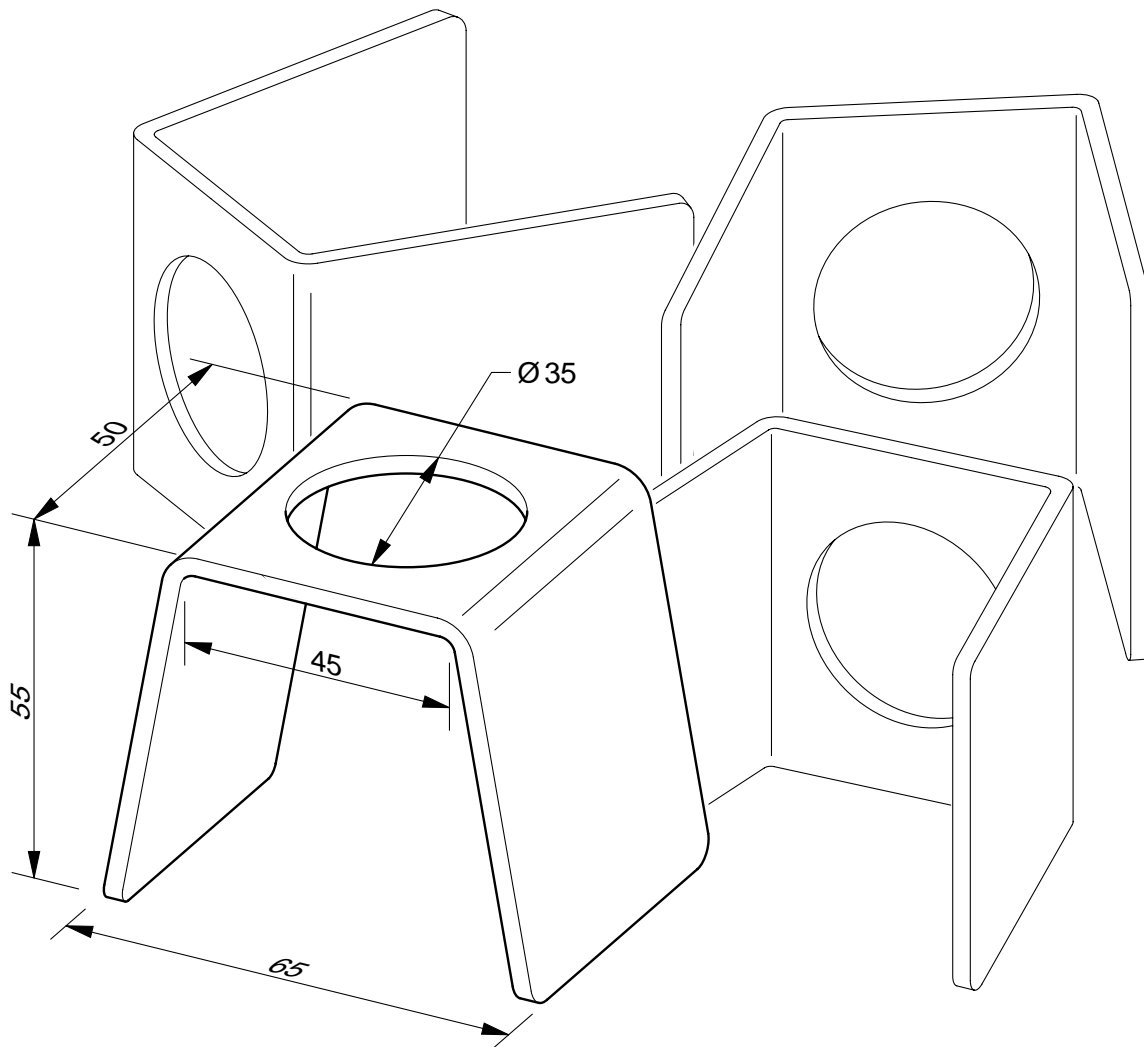


Fig. 10

- (a) Suggest **two** possible methods of construction and explain why one method may be preferable for mass production techniques. [4]
- (b) Using a material of your own choice describe, with notes and sketches, the stages in making one egg holder, including the hole. [10]
- (c) Design a simple holder for the set of four egg holders. [3]

