

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**DESIGN AND TECHNOLOGY**

**6043/01**

Paper 1 Technology

October/November 2006

**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.  
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.

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.

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 **11** printed pages and **1** blank page.



## Part A

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

Attempt **all** questions

- 1 Name the two forms of woodwork construction shown in Fig. 1. [2]

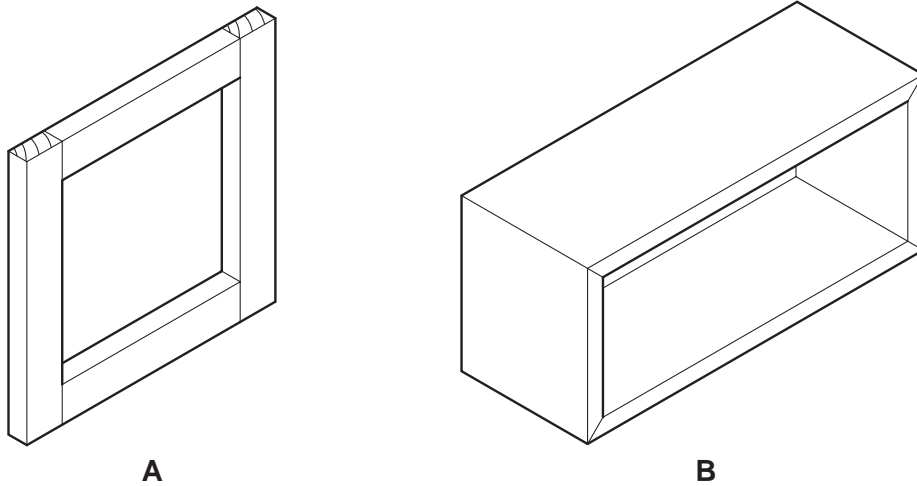


Fig. 1

- 2 Sketch a hand file and state the reason for it having one smooth edge. [3]
- 3 Give **two** reasons why evaluation is important in design [2]
- 4 Fig. 2 shows a cooking pan made entirely from metal.

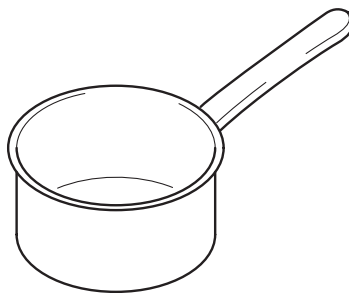
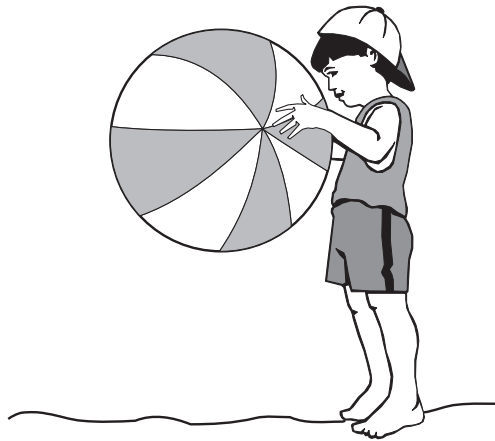


Fig. 2

- (a) State a suitable metal for the pan and give a reason.
- (b) Why could the metal handle be a problem? [4]

- 5 State **two** precautions you should take when working with glass reinforced plastic [GRP]. [2]
- 6 Sketch cross-sections of the following processed boards.
- (a) Plywood
  - (b) Chipboard
  - (c) Blockboard
- [3]
- 7 Give **two** reasons why PVC plastic would be a suitable material for the beach ball shown in Fig. 3. [2]



**Fig. 3**

- 8 State **two** properties that can help to identify a timber. [2]
- 9 Sketch the following fixings.
- (a) wing nut
  - (b) panel pin
- [4]
- 10 Explain the term 'fluidization' as applied to plastics. [3]

## Part B

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

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

All questions carry equal marks.

## Section 1 – Tools and Materials

11 Many measuring devices and testing methods are used to check work. Three are shown in Fig. 4.

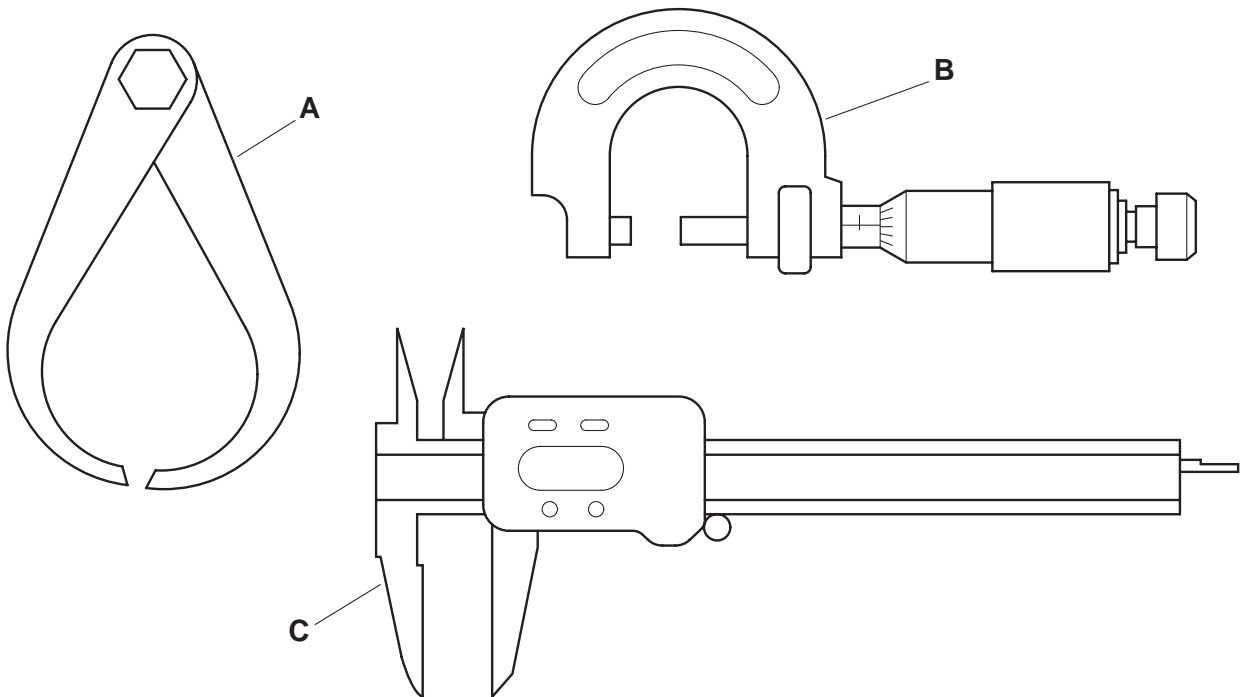


Fig. 4

- (a) Identify each of the measuring or testing devices shown in Fig. 4 and explain the purpose of each. [6]
- (b) Explain:
- (i) how device **A** is used to take a measurement;
  - (ii) how device **B** measures an item and what system stops it being over-tightened;
  - (iii) how device **C** has ease of reading and what makes it multi purpose. [9]
- (c) Explain why device **A** is the least accurate. [2]

**12** Many projects fail because the designer does not consider the environment in which the material is to be used.

**(a)** Explain the effect of the following.

**(i)** salt water on a softwood boat ladder

**(ii)** a too high a wattage [or high power] light bulb on an acrylic shade

**(iii)** a leaking lead acid battery on a mild steel support [6]

**(b)** Using examples, explain how

**(i)** water,

**(ii)** heat,

**(iii)** acid

can each be used to advantage on materials. [6]

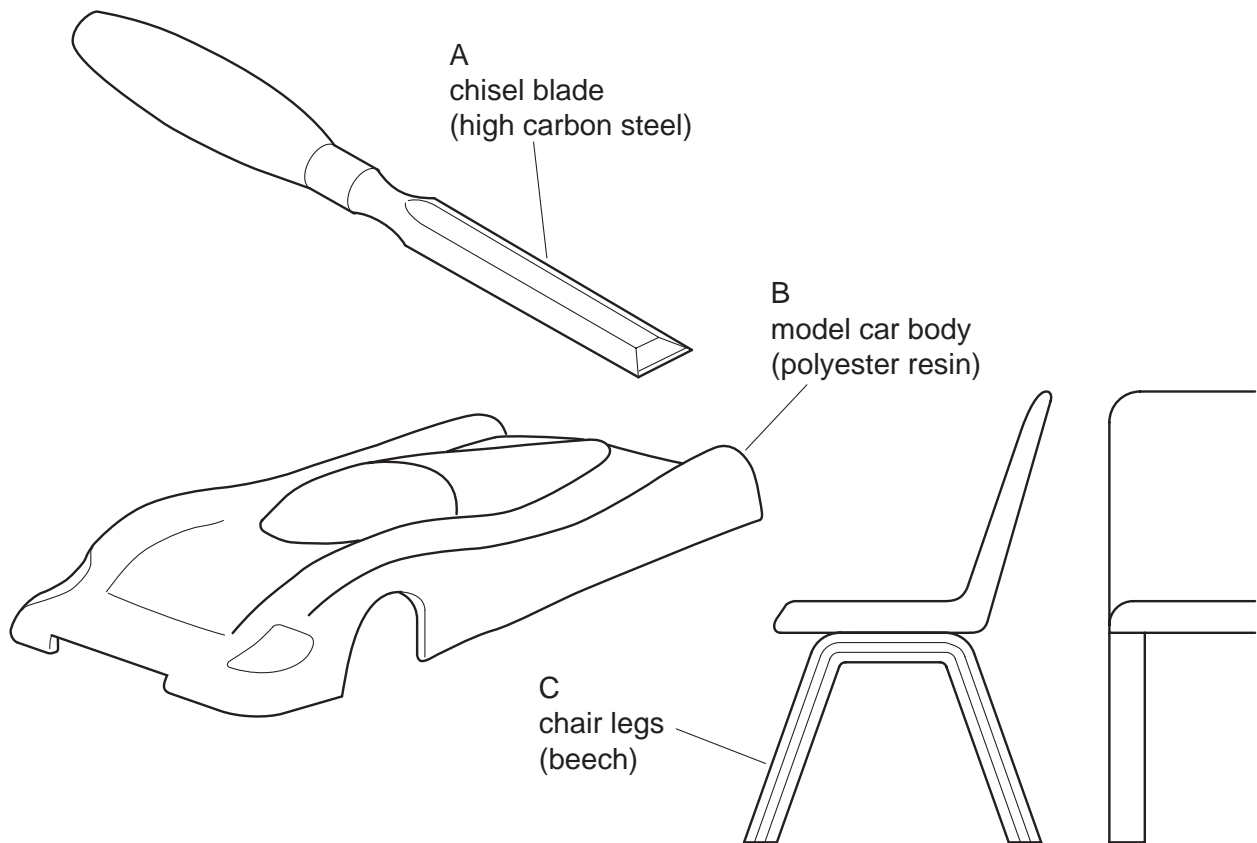
**(c)** Explain how air helps in the following situations.

**(i)** newly cut planks of timber

**(ii)** hot metal casting

**(iii)** making a plastic bottle [5]

13 Fig. 5 shows three products which have had their basic materials modified during manufacture.



**Fig. 5**

- (a) State briefly how each of the materials has been modified to improve strength. [6]
- (b) Explain the following.
- (i) Why regrinding a chisel blade can affect the strength of the cutting edge.
  - (ii) How the smooth outside surface is achieved on the model car body.
  - (iii) How a former is used in the making of the chair legs. [6]
- (c) State briefly how the following materials are improved by the addition of the second material.
- (i) mild steel with carbon powder
  - (ii) polyester resin with an accelerator
  - (iii) blockboard with melamine [5]

## Section 2 – Processes

- 14 Fig. 6 shows details of a control unit for a string puppet that is made up from **two** parts joined together.

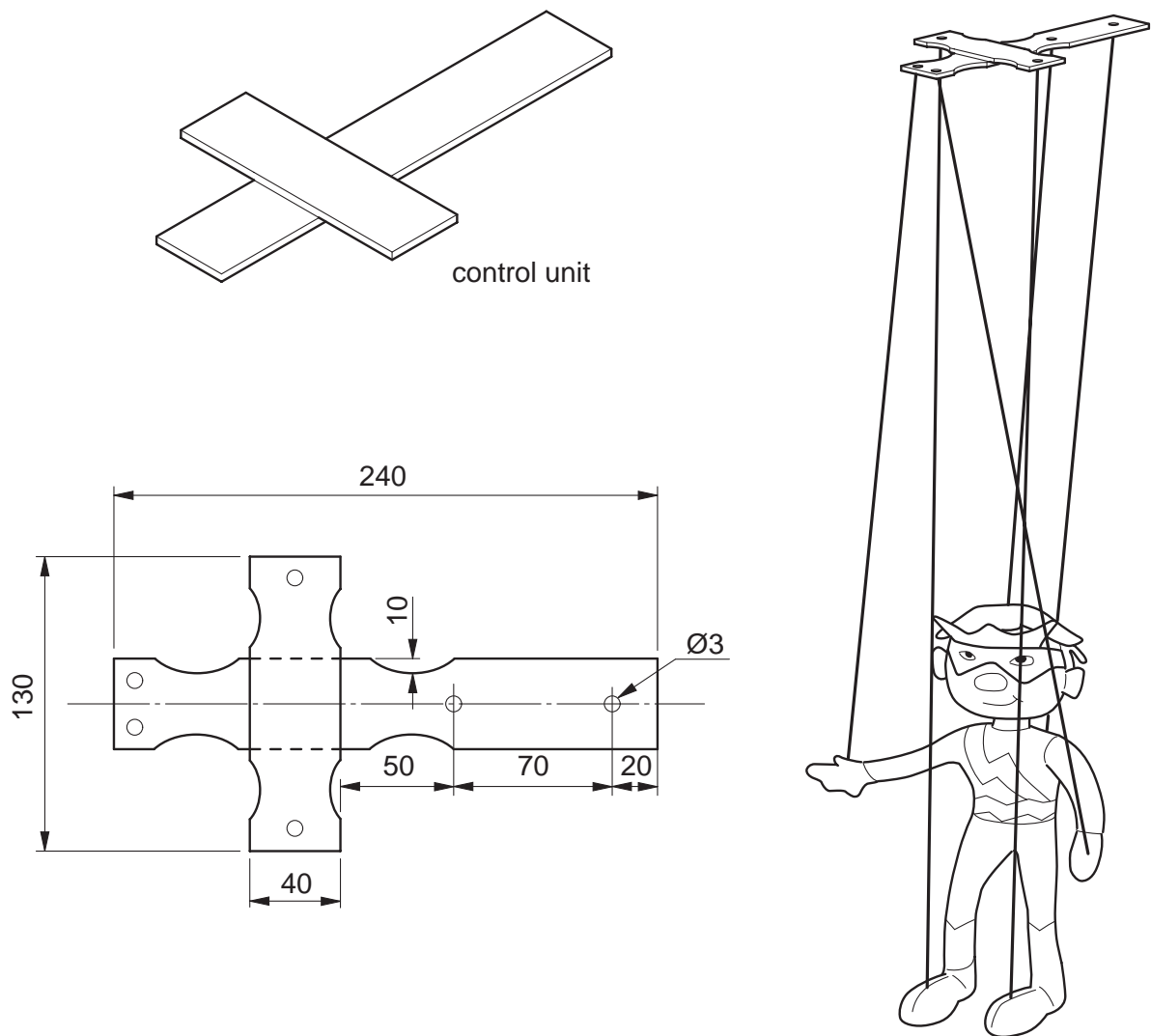
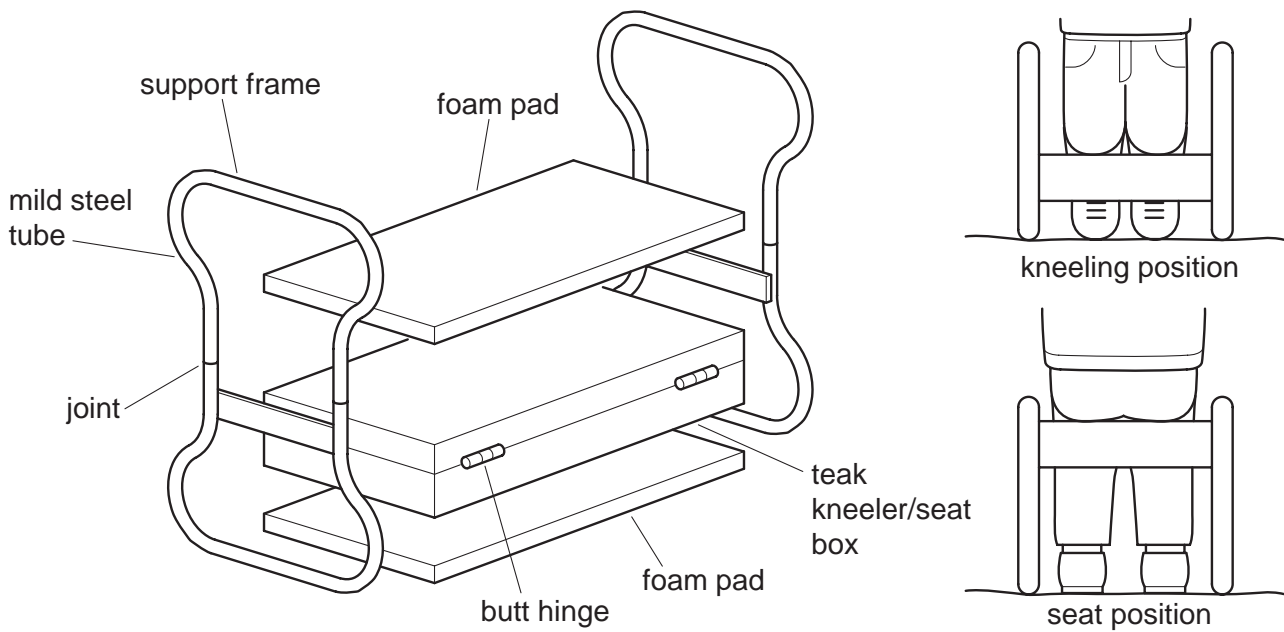


Fig. 6

- (a) State a suitable material for the control unit and sketch a method of joining that would allow the two parts to pivot. [3]
- (b) For the construction method you have given in answer to (a), use notes and sketches to fully describe how to:
- (i) mark out the material;
  - (ii) drill the string holes;
  - (iii) cut to shape;
  - (iv) join the two parts together. [14]

15 The outline design of a kneeler / seat for a gardener is shown in Fig. 7.



**Fig. 7**

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

- (i) brazing the two parts of one of the mild steel support frames together
  - (ii) fitting the butt hinges to the teak kneeler/seat box
  - (iii) fitting and fixing one of the foam pads and a P.V.C. covering to the teak kneeler / seat box
- [2 × 7]

(b) Describe the application of a suitable finish for the mild steel support frame.

[3]



- 16 Fig. 8 gives details of a teaching clock. It is made up of three main parts, a clock face, removable number discs and a support stand.

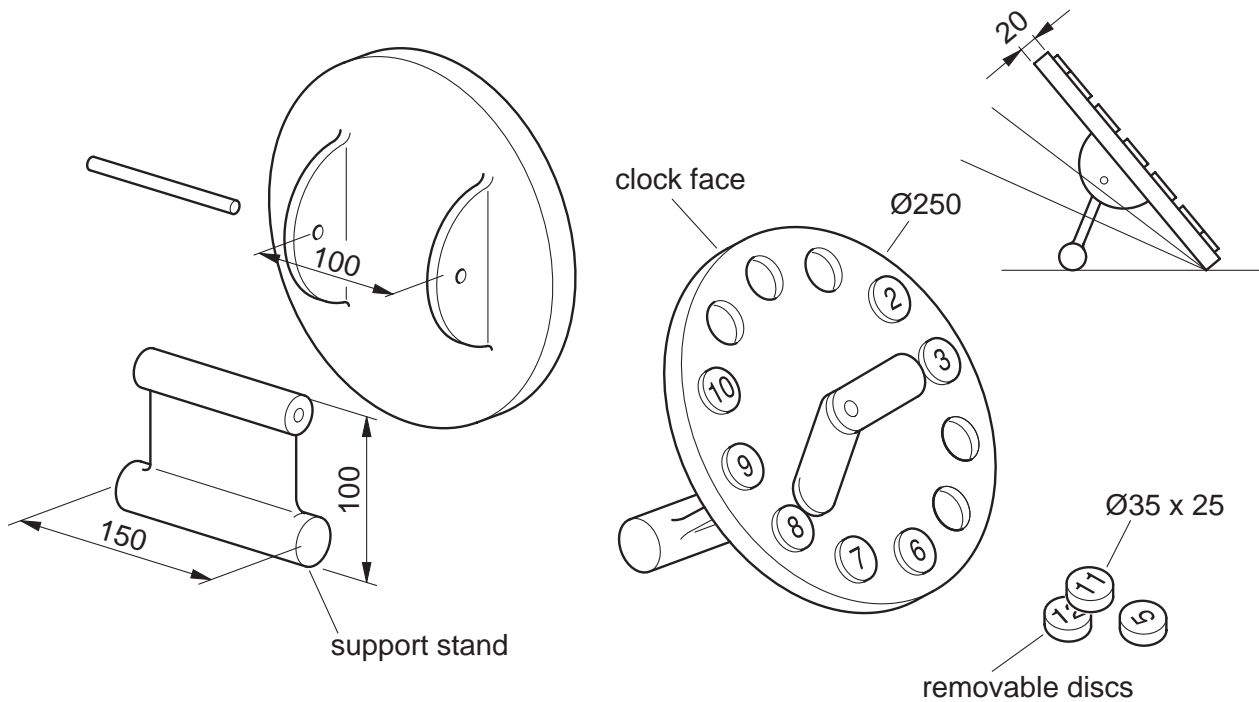


Fig. 8

- (a) Suggest a suitable material for the clock face and state the reason for your choice. [2]
- (b) Using notes and sketches, describe a method of manufacturing the clock face using the material given in answer to (a). [8]
- (c) Using a material of your own choice, describe a simple method of producing the removable discs. [The numbers are not required] [3]
- (d) With the aid of sketches, show how the support stand could be made to support the clock face at different angles. [4]

17 Fig. 9 shows three blanks and the resulting items to be produced by lathe work.

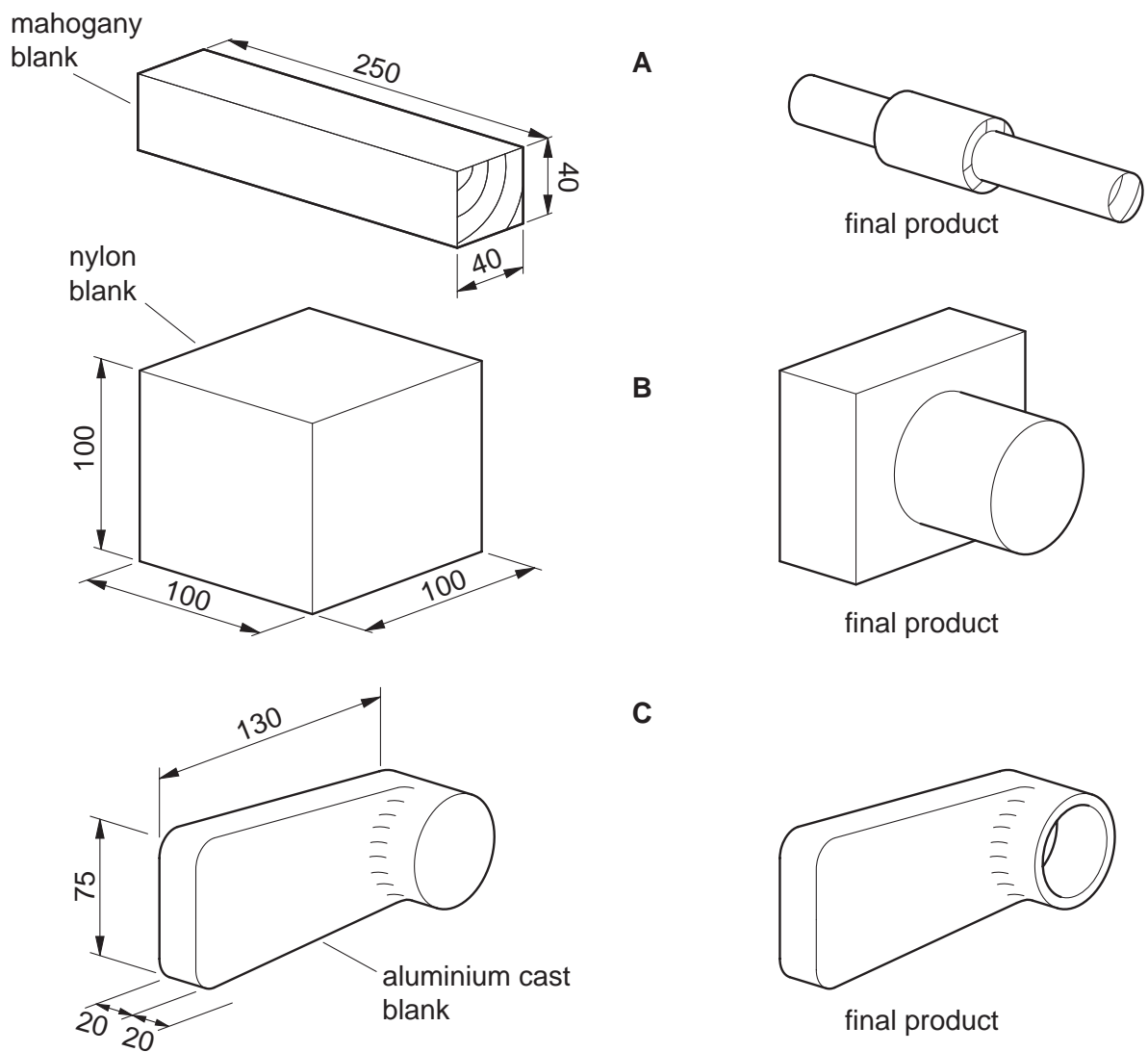


Fig. 9

- (a) State a suitable method of holding **each** blank on a lathe. [3]
- (b) With the aid of notes and sketches, describe **two** of the following stages in making the final shapes.
- (i) preparing the mahogany blank **A** ready for holding
  - (ii) setting the nylon blank **B** at centre height for turning
  - (iii) holding and balancing the aluminium cast blank **C** ready for boring [14]

18 Fig. 10 shows the outline design for a scissor storage rack.

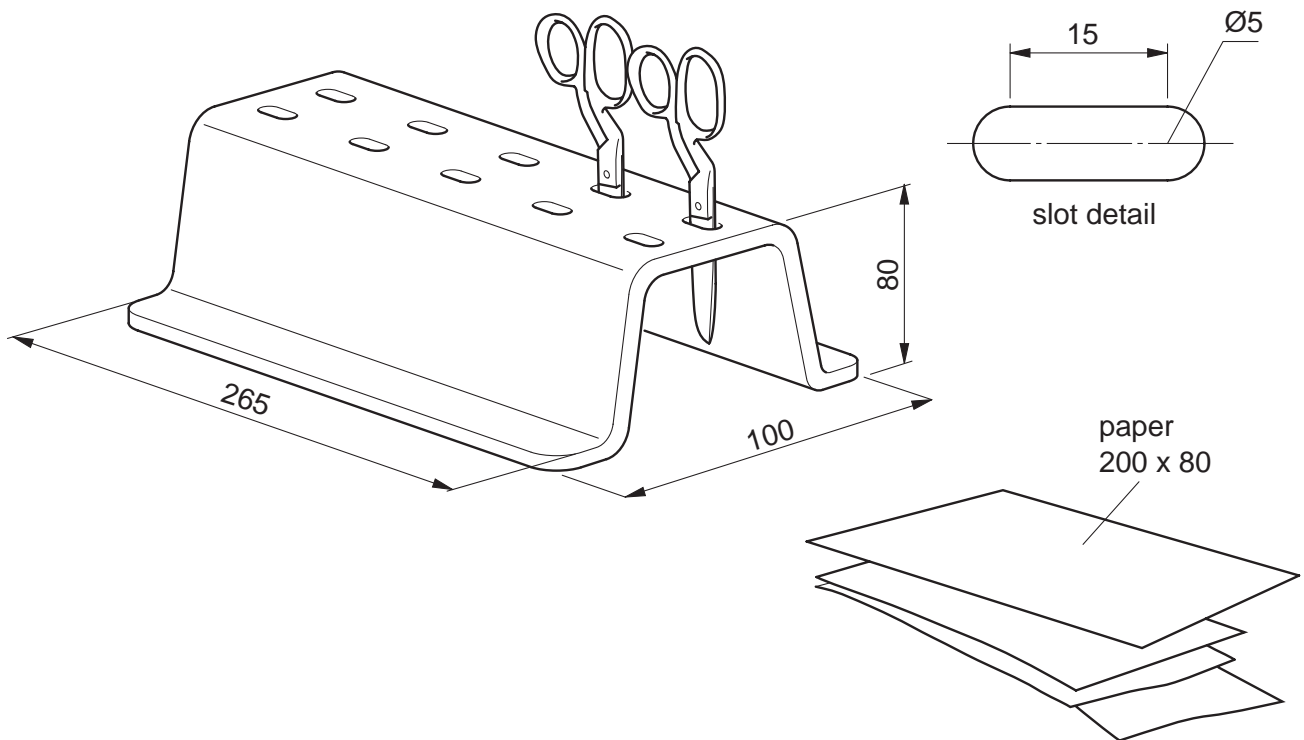


Fig. 10

- (a) State **two** properties of a suitable material for the scissor rack. [2]
- (b) Sketch the outline flat shape of the rack, after marking out, prior to cutting and shaping. [3]
- (c) Using notes and sketches describe how, from a flat material of your own choice,
- (i) the scissor slots are cut out,
  - (ii) the final shape is formed. [10]
- (d) Show by means of a design sketch, how the rack could be modified to hold the sheets of paper shown. [2]

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