

CAMBRIDGE INTERNATIONAL EXAMINATIONS
Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level

DESIGN AND TECHNOLOGY

PAPER 1 Technology

6043/1

MAY/JUNE SESSION 2002

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** 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 questions.

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 12 printed pages.



Part A

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

Attempt **all** questions.

- 1 Sketch and name a different fixing device for each of the situations shown in Fig. 1.

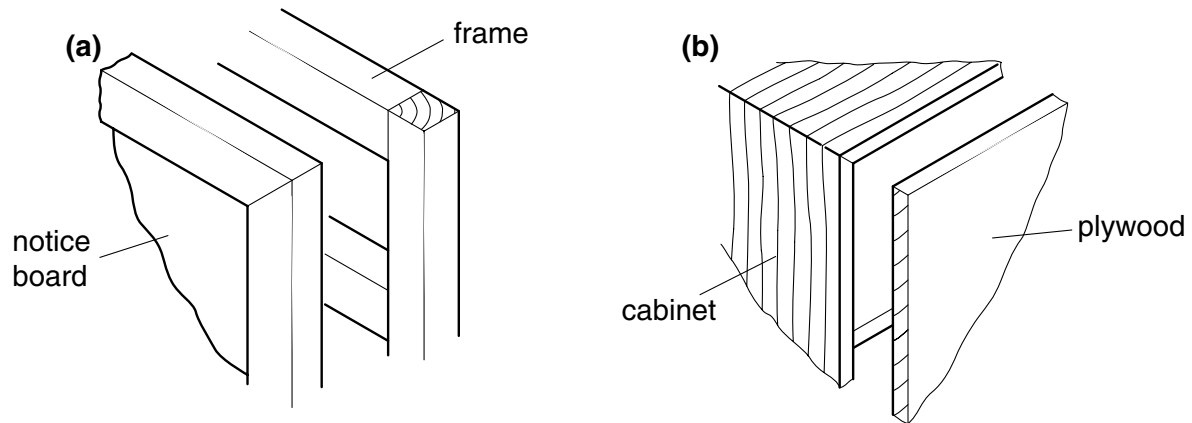


Fig. 1

(a) Fixing a notice board to a timber frame;

(b) Fixing plywood to the back of a cabinet.

[4]

- 2 Give **two** reasons why mild steel is sometimes dip coated with polythene.

[2]

- 3 When soldering with a soldering iron, what is meant by the term 'tinning the bit'?

[2]

- 4 Fig. 2 shows a polyester paperweight.

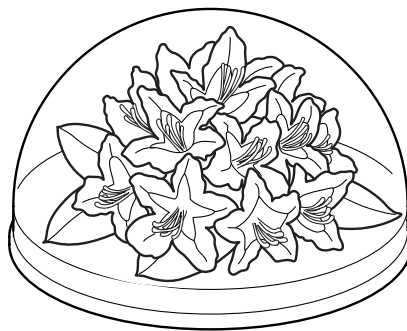


Fig. 2

(a) Name the process used in making the paperweight.

(b) Explain how a catalyst helps in this process.

[3]

- 5 Describe what damage may be caused to acrylic by overheating on a strip heater. [2]
- 6 Give **two** reasons why newly designed products are tested before they are sold to the public. [2]
- 7 Fig. 3 shows part of a frame joined together with mortise and tenon joints. Explain the reasons for using the following tools when making these joints:

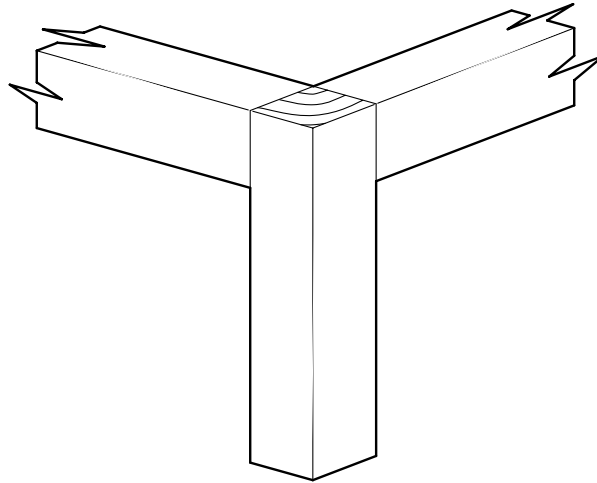
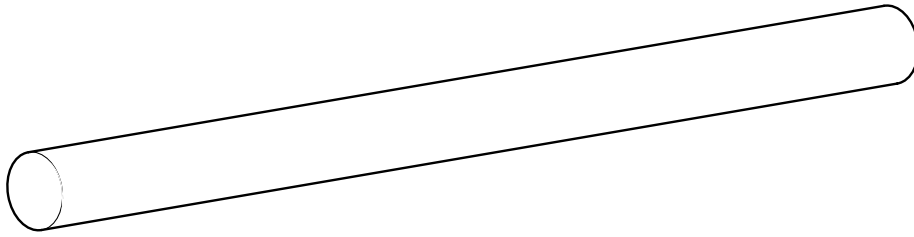


Fig. 3

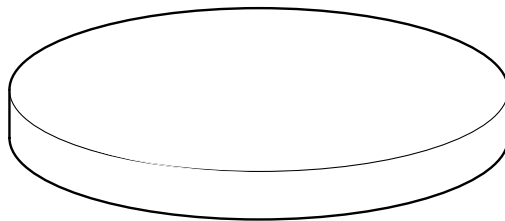
- (a) mortise gauge;
- (b) mortise chisel. [4]
- 8 State **two** safety precautions that should be taken when casting metal. [2]
- 9 Give **three** reasons why expanded polystyrene is an ideal material for packaging. [3]

10 Fig. 4 shows different shaped material. State what method would be used to hold each shape on a lathe.

(a) long round bar $\text{Ø}15 \times 300$.



(b) large flat disc $\text{Ø}100 \times 20$.



(c) short square block $35 \times 35 \times 80$.

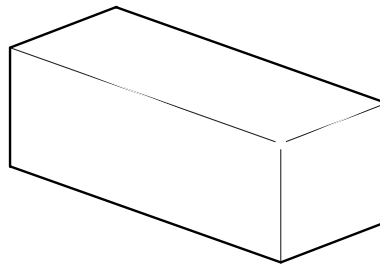


Fig. 4

[3]

Part B

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

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

All questions carry equal marks.

Section 1 – Tools and Material

11 Fig. 5 shows three different types of cutting tool.

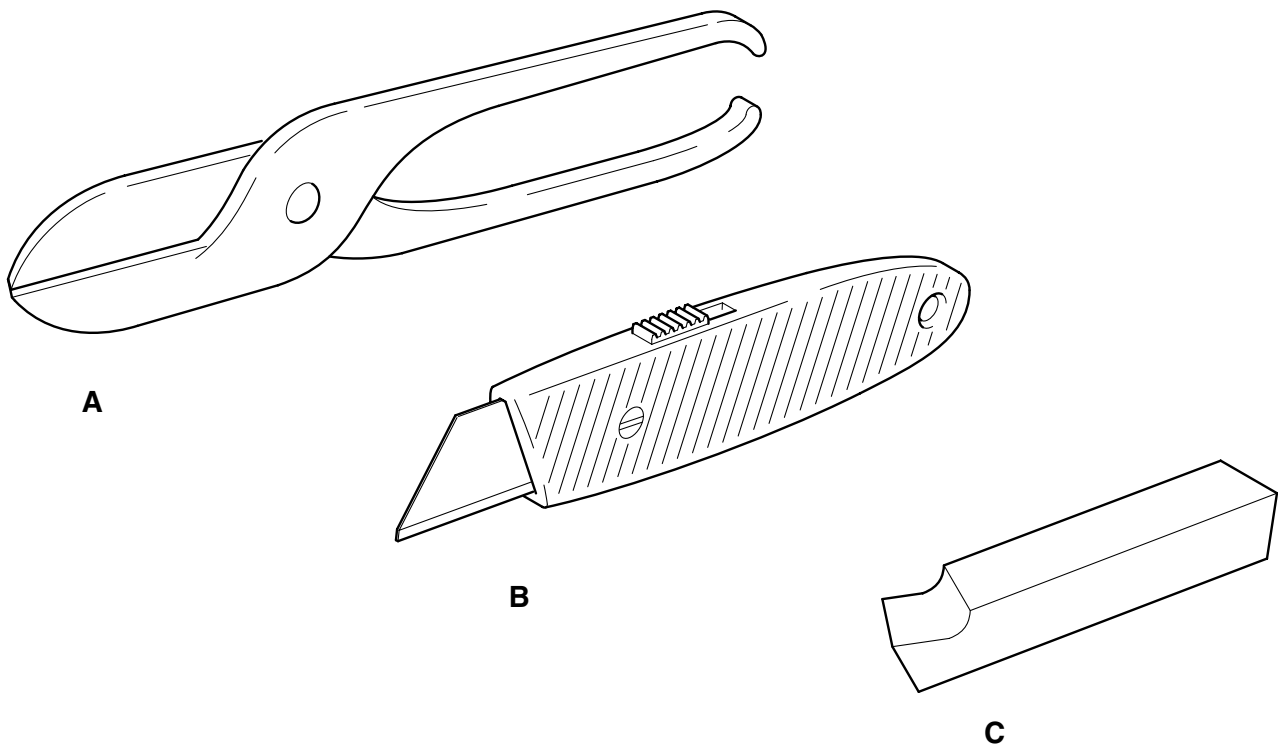


Fig. 5

- (a) Name each tool and state its purpose. [6]
- (b) Explain the reason for:
- (i) sometimes using tool **A** with part of its handle held in a vice;
 - (ii) only using tool **B** together with a metal straight edge or steel rule;
 - (iii) the two different angles at the tip of tool **C**. [6]
- (c) State the purpose of:
- (i) a grindstone;
 - (ii) an oilstone. [3]
- (d) Explain why water is used with a grindstone and oil is used with an oilstone. [2]

- 12 Fig. 6 shows an idea for a puzzle that is made up of 6 interlocking pieces that when joined together form a disc.

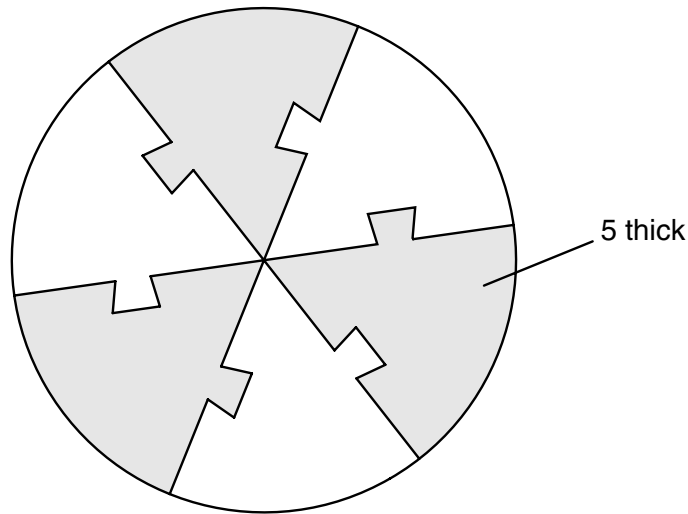


Fig. 6

- (a) Some possible materials being considered for the puzzle are shown in the table below. Copy and complete the table.

Material	Reason for selection	Reason for rejection
Plywood		
Aluminium		
Acrylic		

[6]

- (b) Each material named in (a) requires different tools and methods for marking out the puzzle shape.
- (i) State the tools used to mark the outline shape of the puzzle on the surface of each of the materials given in (a).
 - (ii) Describe methods that can be used to make marking out lines show more clearly. [5]
- (c) Give **three** reasons for using abrasives on materials and identify a suitable abrasive for each of the materials stated in (a). [6]

13 Two important factors that contribute to workshop safety are keeping tools maintained and the room clean and tidy.

(a) Explain how the following could be a hazard in the workshop:

- (i)** grease, oil or water spilt on the floor;
- (ii)** careless storage of resins, varnish, paints, etc;
- (iii)** tools piled up on a bench or machine. [6]

(b) Using **three** examples, explain how poorly maintained tools can become dangerous in use. [6]

(c) State what safety equipment should be worn when clearing up the following waste materials and explain the reasons for each:

- (i)** wood dust;
- (ii)** metal swarf. [5]

Section 2 – Processes

14 Fig. 7 gives details of a bracket.

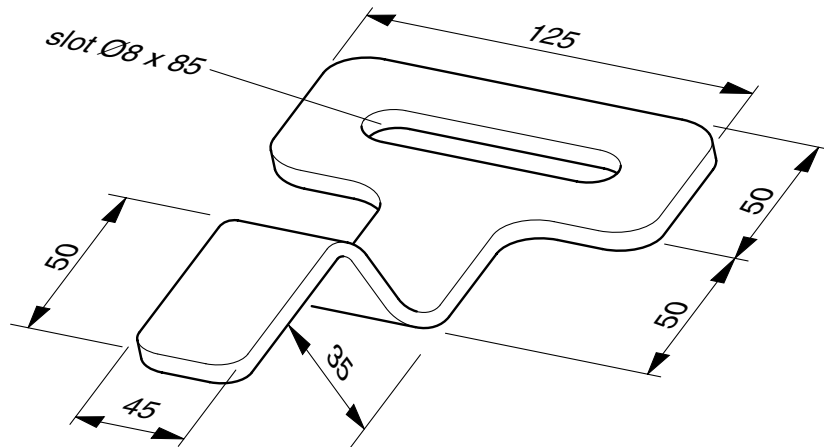


Fig. 7

- (a) For a material of your own choice describe, with the aid of notes and sketches, how the outline shape of the bracket could be produced prior to bending. [8]
- (b) List, in order, the stages necessary for cutting out the slot. [5]
- (c) Suggest **two** possible methods of forming the bends in the bracket and give **one** reason why each would be suitable. [4]

15 The outline design for a chess piece to be made from solid material is shown in Fig. 8.

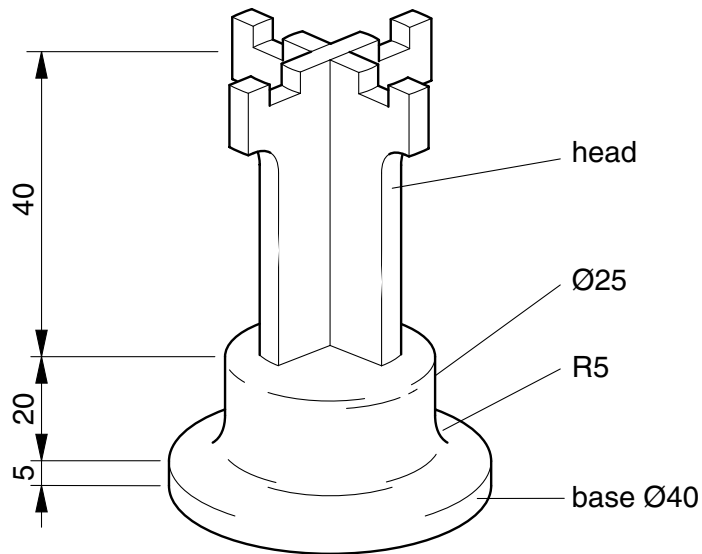


Fig. 8

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

- (i) the base;
- (ii) the head.

[4]

(b) The base will be turned on a lathe from Ø40 bar. Using notes and sketches, explain how the:

- (i) bar would be held;
- (ii) end of the bar would be made flat;
- (iii) bar diameter would be reduced to Ø25;
- (iv) 5 radius would be produced.

[8]

(c) Show with sketches, for the material chosen in (a):

- (i) a method of permanently fixing the head to the base;
- (ii) a way to join the head to the base that will enable disassembly.

[5]

16 Fig. 9 gives details of a house name plate.

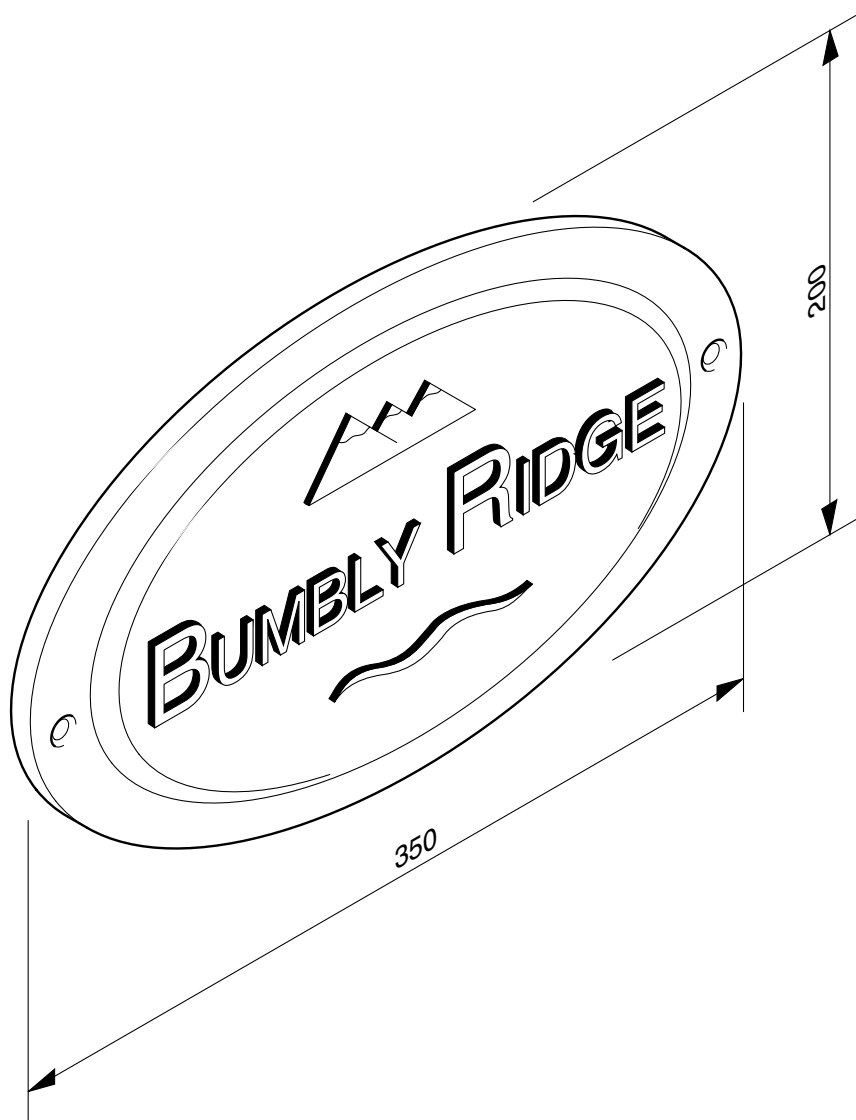
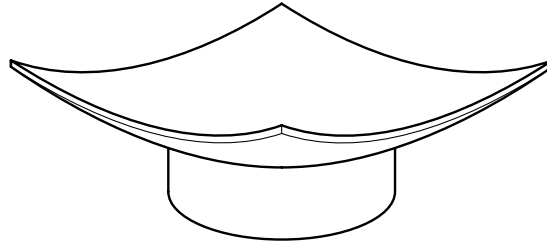


Fig. 9

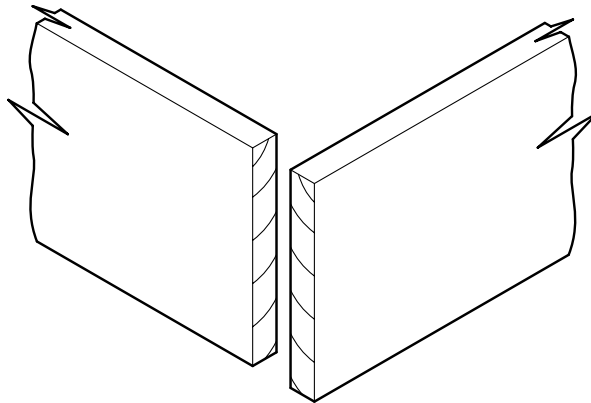
- (a) Suggest, with a reason:
- (i) a suitable material for the nameplate;
 - (ii) a method of manufacture. [4]
- (b) For the material and manufacturing method you suggested in answer to (a), use notes to describe the **major** stages in making the nameplate. [10]
- (c) For the material you have chosen in answer to (a), explain how at least two different colours could be incorporated. [3]

17 A student needs to have a good understanding of processes in order to turn design ideas into products. Choose **two** of the following processes in Fig. 10 below and, using notes and sketches, describe how each is carried out.

(a) Cleaning and polishing a brass dish after soldering.



(b) Cutting a finger joint for the corner of a pine box.



(c) Blow moulding a polythene dome.

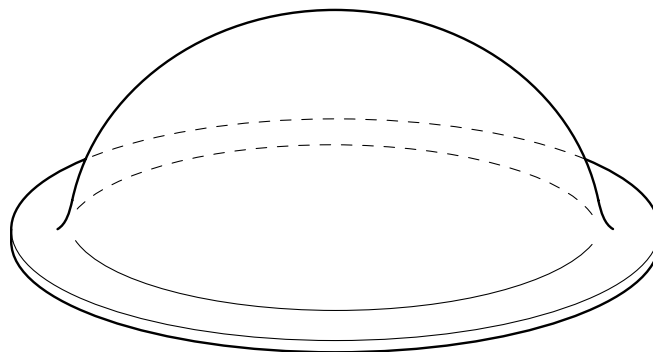


Fig. 10

[17]

18 Fig. 11 shows the outline design for a child's coat hook and wall bracket.

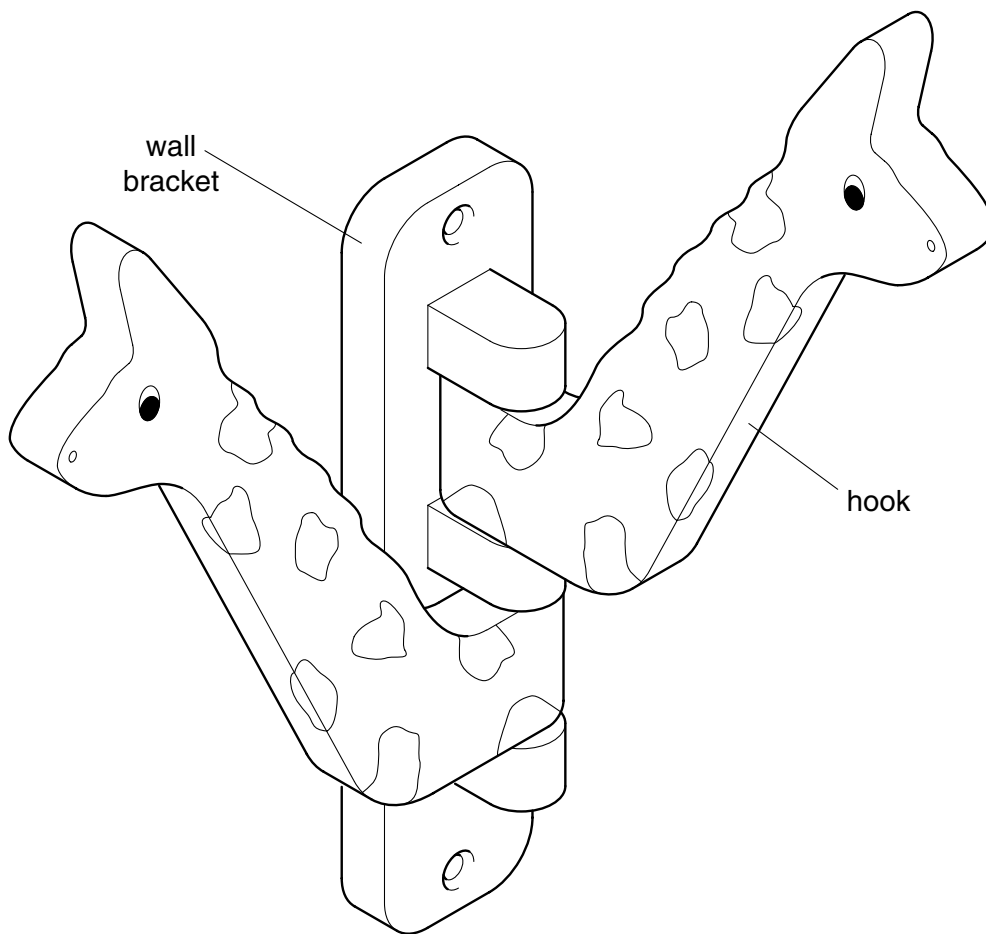


Fig. 11

- (a) Name **two** properties of a material that would make it suitable for the coat hook and wall bracket. [2]
- (b) Suggest a suitable material for the wall bracket and, using notes and sketches, describe the stages of how it would be made. [8]
- (c) Suggest a suitable material for the hook and, using notes and sketches, describe the method of making the pivoting joint between hook and wall bracket. [7]