

Candidate Name

Centre Number

Candidate
Number

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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS****General Certificate of Secondary Education****D&T: Resistant Materials Technology****D&T: Resistant Materials Technology
(Short Course)****1956/2
1056/2**

PAPER 2 HIGHER TIER

Thursday

26 MAY 2005

Morning

1 hour 15 minutes

Candidates answer on the question paper.
No additional materials are required.**TIME** 1 hour 15 minutes**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

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

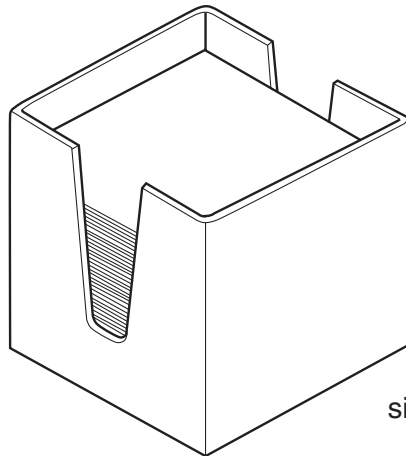
Dimensions are given in millimetres unless stated otherwise.

Total marks for this paper is **50**.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
TOTAL	

This question paper consists of 11 printed pages and 1 blank page.

- 1 Fig. 1 shows a plastic notelet holder. The notelet holder is produced in quantity by injection moulding.



size: 100 x 100 x 100

Fig. 1

- (a) Explain why injection moulding is only cost-effective when products are manufactured in large quantities.

[2]

- (b) Quality control is an important part of manufacturing. Describe **two** quality control checks that could be carried out during the manufacture of the injection moulded notelet holder.

1 _____

[1]

2 _____

[1]

- (c) The notelet holder could also be made from a single piece of 3 mm thick sheet plastic. Fig. 2 shows the development [net] for a notelet holder to be made from sheet plastic.

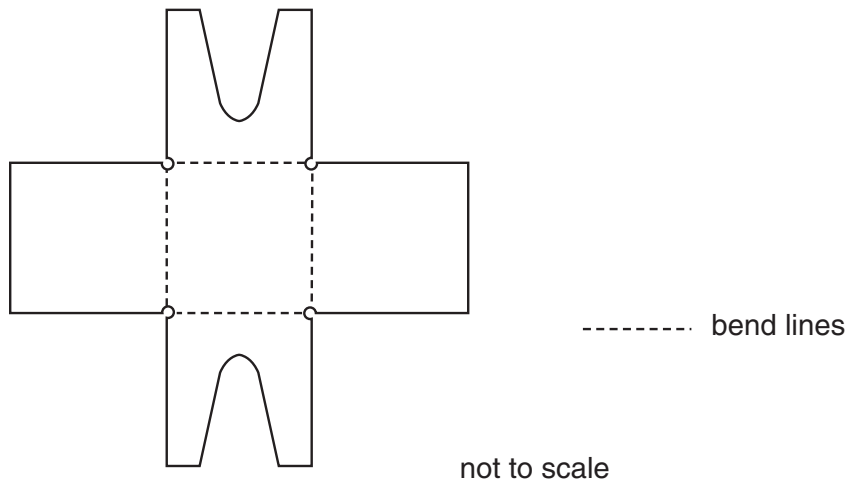


Fig. 2

- (i) Describe how CAD/CAM could be used to help in the design and manufacture of this notelet holder.

[2]

- (ii) Name the software and computer-controlled machine you would use.

Software _____ [1]

Computer-controlled machine _____ [1]

- (d) Both designs of notelet holder are to be manufactured in quantity. Explain why injection moulding is a more environmentally-friendly process than making the notelet holder from sheet plastic.

[2]

- 2 Fig. 3 shows a tray that is used in a care home for elderly people.

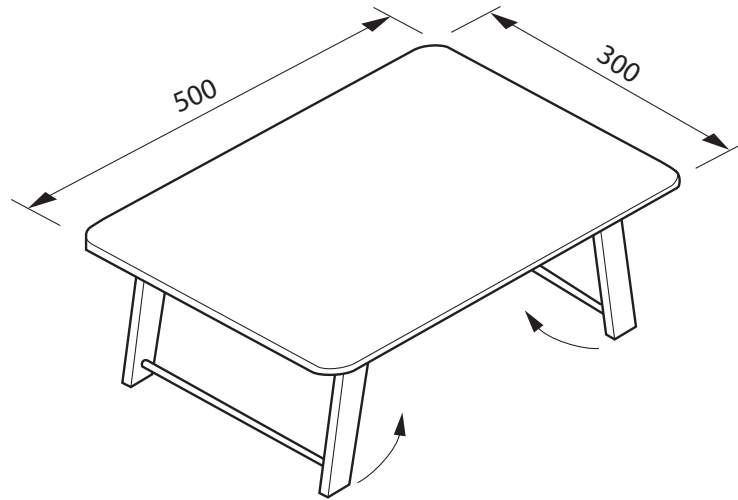


Fig. 3

- (a) Explain how the designer has used anthropometric data in the design of the tray.

[1]

- (b) Fig. 4 shows the underside of the tray.
Add sketches and notes to Fig. 4 to show how the legs could be made to fold up against the tray top for ease of storage.

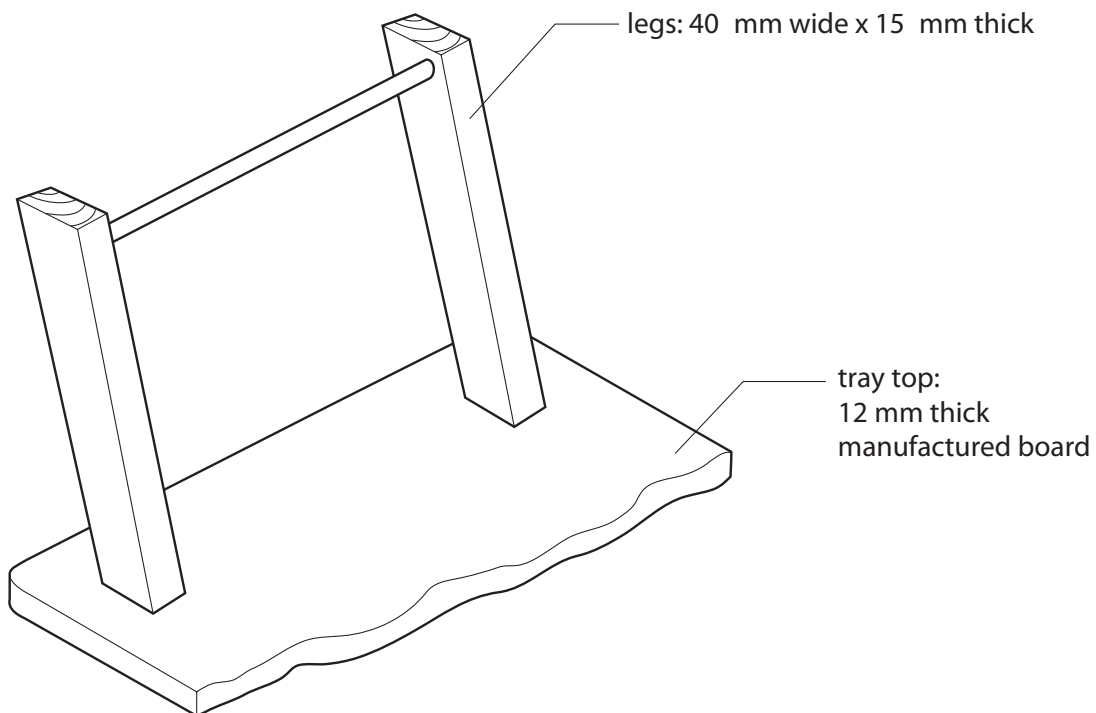


Fig. 4

(c) Use sketches and notes to show **two** functional improvements to the tray.

[4]

(d) The tray top could also be made from plastics material.
State **two** advantages of using a plastics material for the tray top rather than a manufactured board.

1 _____ [1]

2 _____ [1]

6

3 Fig. 5 shows a wall-mounted shelf unit.

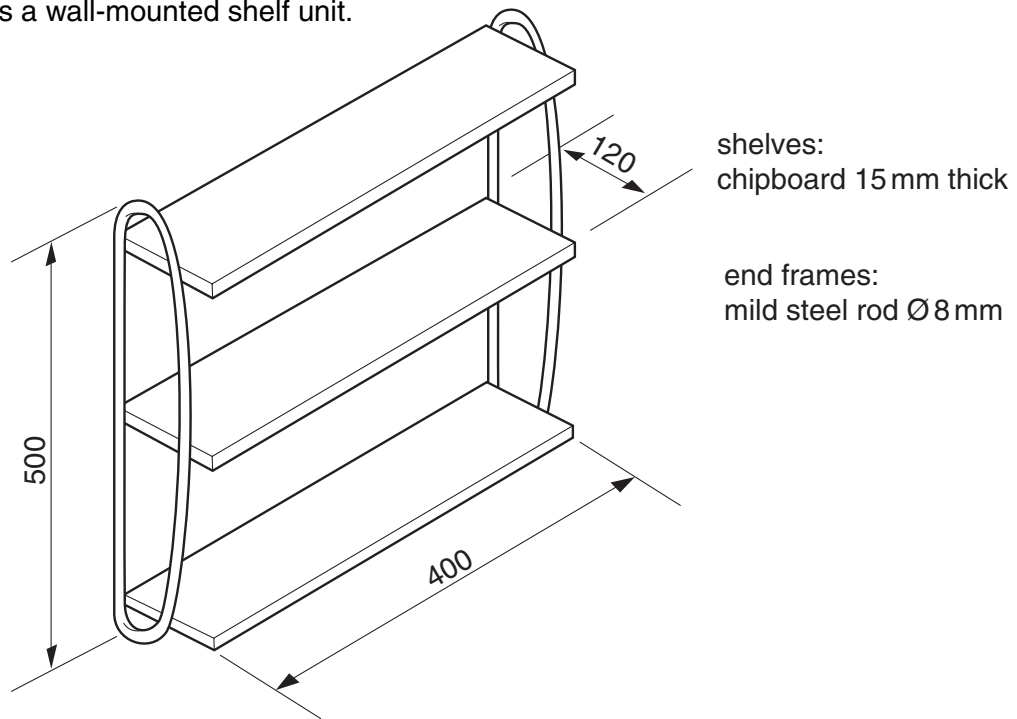


Fig. 5

(a) The end frames of the shelf unit are to be made from 8 mm diameter mild steel rod. The mild steel rod would need to be annealed before bending it to shape.

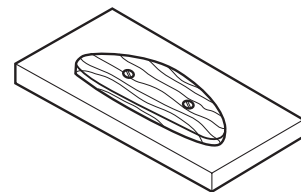
(i) Explain what annealing does to the mild steel rod.

[1]

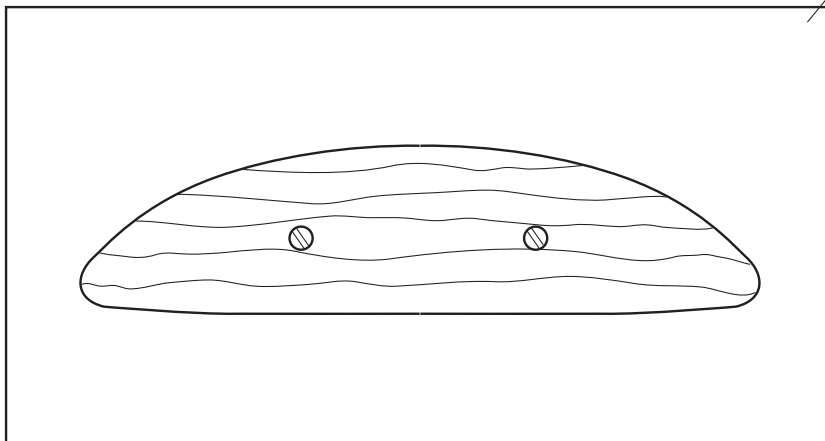
(ii) Describe how the mild steel rod would be annealed.

[1]

(b) Fig. 6 shows a wooden former around which a length of annealed mild steel rod could be bent to the shape of the end frame. The former is fixed to a baseboard. Add sketches and notes to Fig. 6 to show how the annealed mild steel rod could be held in place while it is bent to shape around the former.



baseboard
25 mm thick MDF



[3]

Fig. 6

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- (c) Describe **one** way to improve the appearance of the edges of the chipboard shelves.

[1]

- (d) Use sketches and notes to show how the mild steel end frames could be fixed to the shelves. Additional materials, fittings or fixings may be added.

[4]

- 4 Fig. 7 shows a drilling machine with an incomplete clamping device. The clamping device is used to clamp thin sheet material onto the drilling machine table.

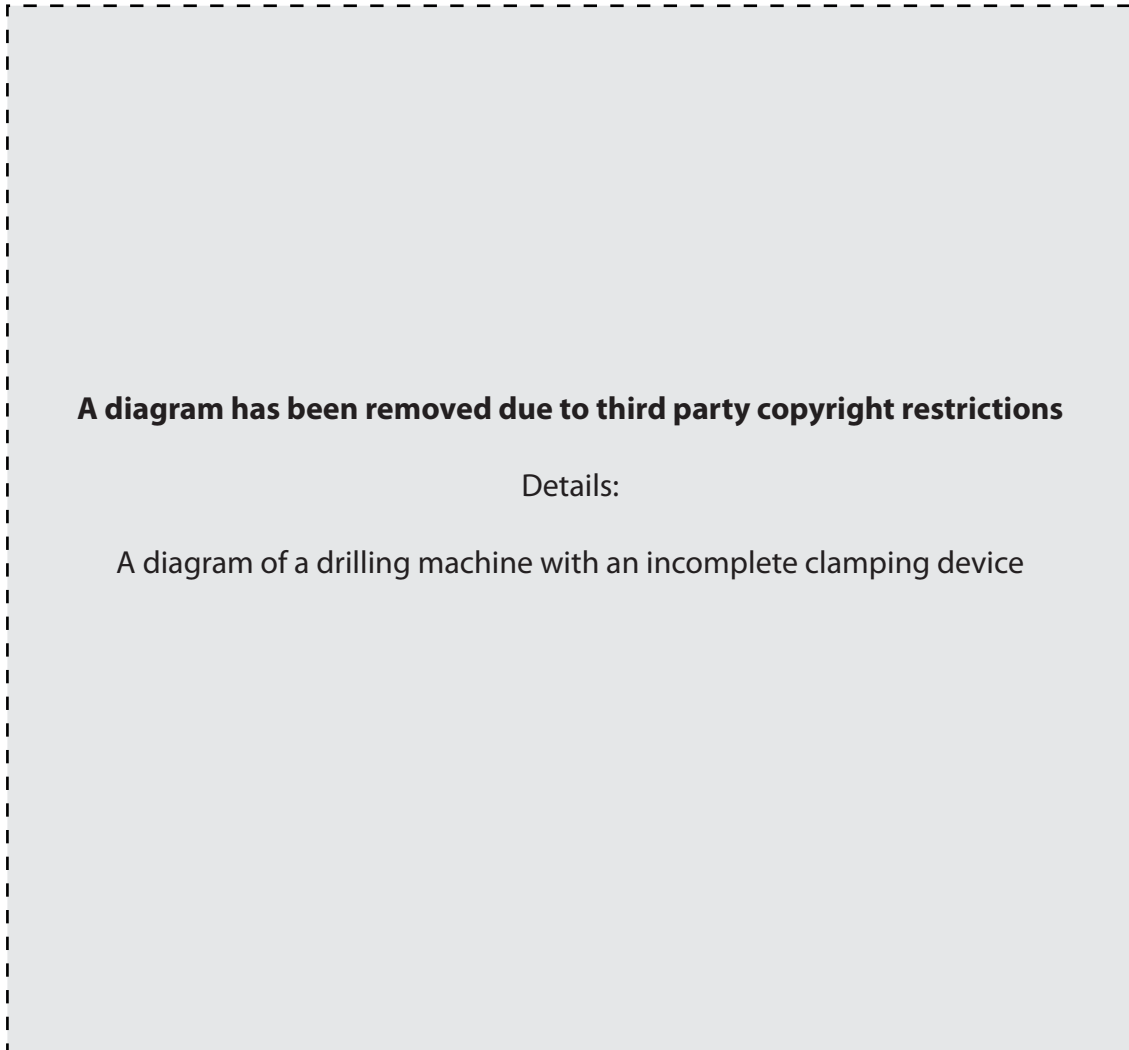


Fig. 7

- (a) State one reason, other than personal safety, why thin sheet material should be clamped down when it is being drilled.

_____ [1]

- (b) Explain why the length of the lever is important to the successful operation of the clamping device.

_____ [1]

- (c) The clamping device is designed to move up and down the pillar of the drilling machine and locked in position when in use.

Use sketches and notes to show how the clamping device can:

- be locked in position on the pillar;
- allow for quick release.

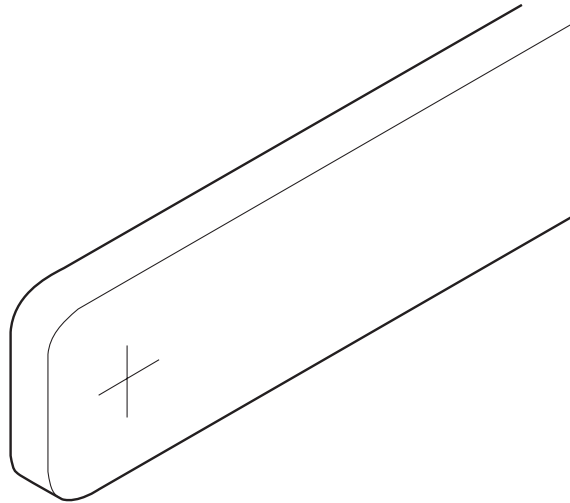
[4]

- (d) Fig. 8 shows part of the arm of the clamping device.
A 'foot' that can pivot is to be fitted to the arm of the clamping device.
In use the 'foot' presses down onto the sheet material.

Using sketches and notes add to Fig. 8 to show a design for a pivoting 'foot' that can be fitted to the arm.

Include in your design:

- the method of fitting the 'foot' to the arm;
- the materials from which the 'foot' is made.



[4]

Fig. 8

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[Turn over

- 5 Fig. 9 shows details of a 'cross-head' water tap. Some people find difficulty applying enough grip to turn the tap on or off.

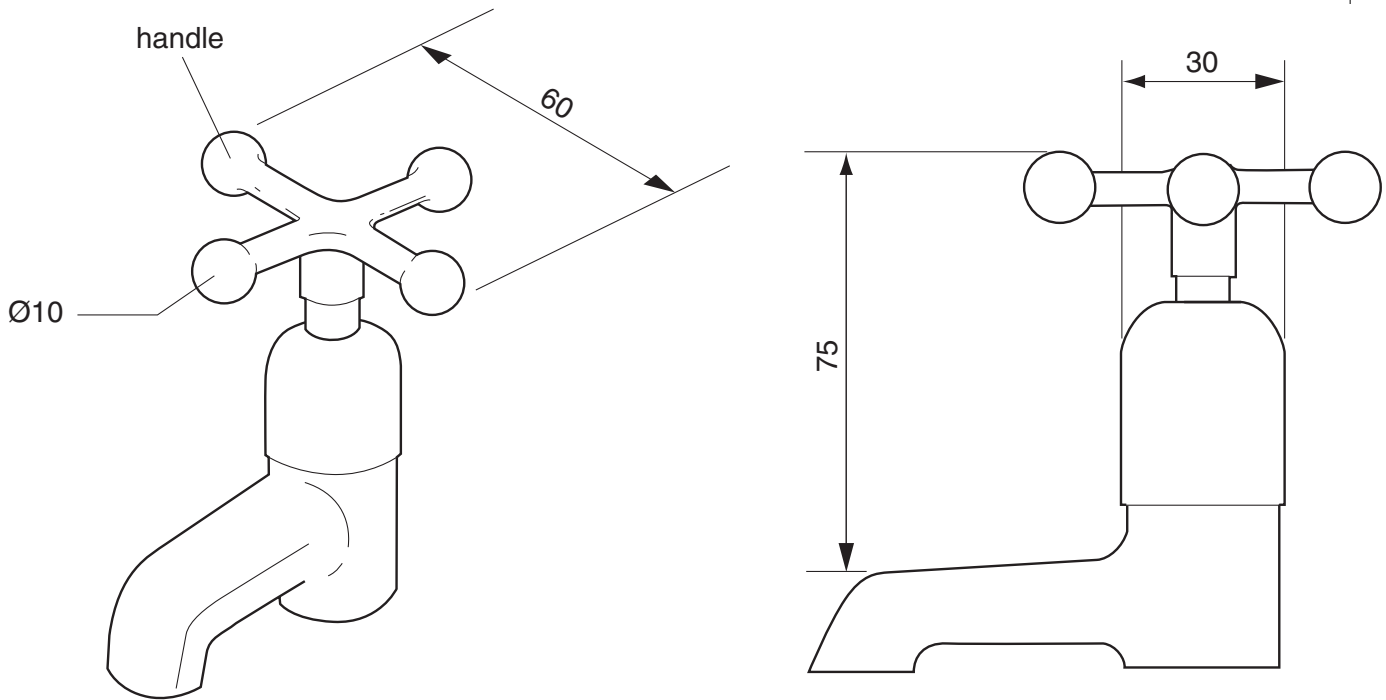


Fig. 9

- (a) Use sketches and notes to develop a prototype design for a device that would make it easier for the tap to be turned on or off. The prototype device must fit either over, under or across the handle of the 'cross-head' water tap.

- (b) Explain why ergonomic considerations are important to the success of your prototype device.

[2]

- (c) The prototype device would need to be trialled before the product is manufactured in quantity.
Describe how trials of the prototype could be carried out.

[2]

- (d) The final design of the device is to be produced in quantity.
Name the material from which your design could be made and the manufacturing process used.

Material _____ [1]

Manufacturing process _____ [1]

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