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DESIGN & TECHNOLOGY

0445/03

Paper 3 Resistant Materials

For examination from 2020

SPECIMEN PAPER

1 hour

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Section A: answer **all** questions.
- Section B: answer **one** question.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Answer in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Blank pages are indicated.

Section A

Answer **all** questions in this section.

1 Fig. 1.1 shows a remote control.

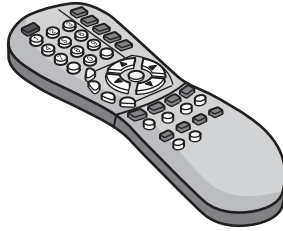


Fig. 1.1

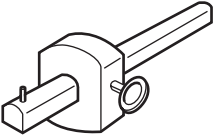
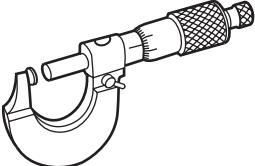
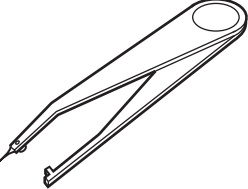
Give **three** ergonomic features in the design of the remote control.

- 1
- 2
- 3

[3]

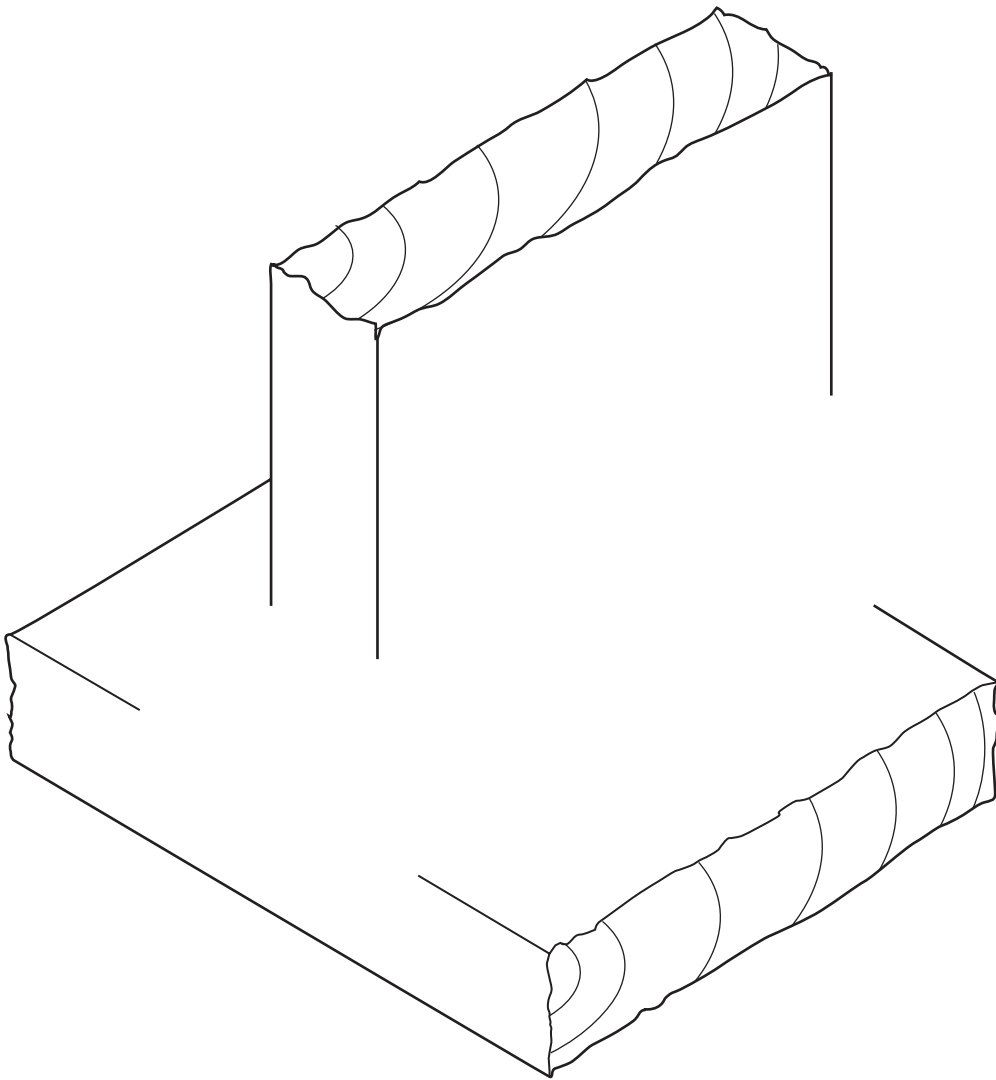
2 Complete Table 2.1 by naming each tool.

Table 2.1

Tool	Name
	
	
	

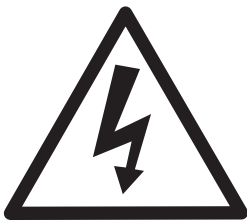
[3]

3 Complete the drawing below to show a through housing joint.



[3]

4 State what is meant by each safety symbol shown below.



.....



.....

[2]

5 Fig. 5.1 shows a toy car and a machine part. Both are made by the die casting process.

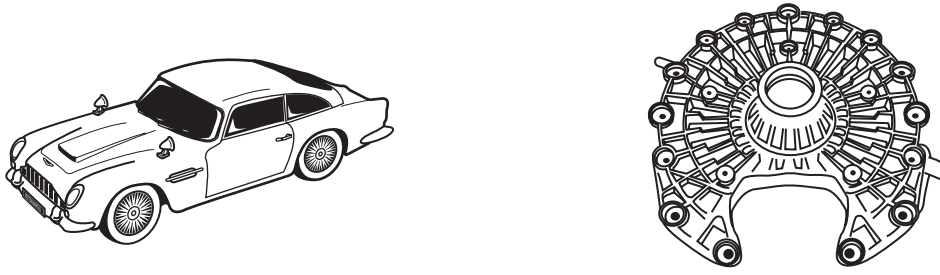


Fig. 5.1

Give **two** benefits of using the die casting process to make products.

- 1
 - 2
- [2]

6 Fig. 6.1 shows a container used in a fast food outlet.

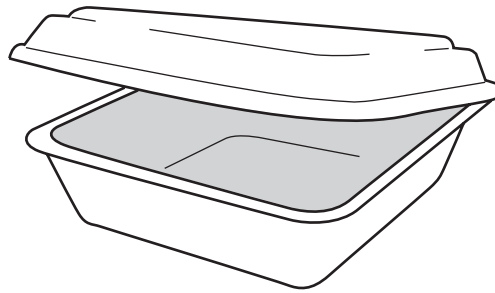


Fig. 6.1

(a) Name a suitable plastic that could be used to make the container.

..... [1]

(b) (i) Give **one** advantage of using a plastic for this type of container.

..... [1]

(ii) Give **one** disadvantage of using a plastic for this type of container.

..... [1]

7 Fig. 7.1 shows a chair made from wood.

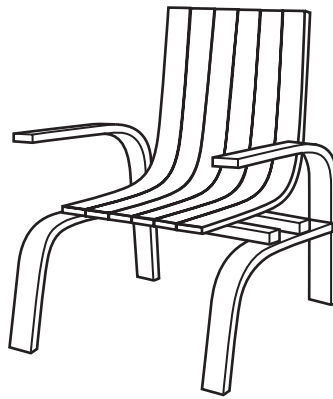


Fig. 7.1

(a) Name the process by which the parts of the chair are shaped.

..... [1]

(b) Give **one** benefit of this type of process when making the chair.

..... [1]

8 Fig. 8.1 shows a car shell made from carbon fibre reinforced plastic (CFRP).

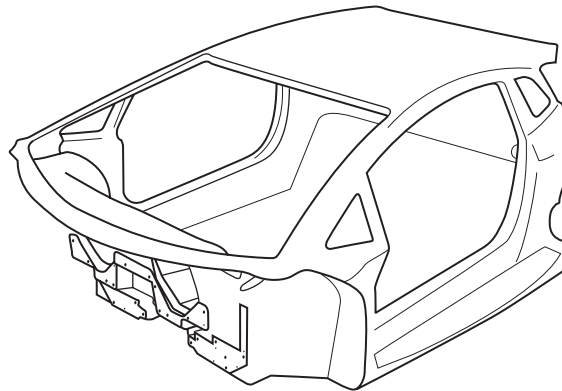


Fig. 8.1

Give **two** advantages of using carbon fibre reinforced plastic (CFRP) rather than steel for the car shell.

1

2

[2]

- 9 Fig. 9.1 shows a symbol found on a product made from a plastic.



Fig. 9.1

- (a) Name the plastic.

..... [1]

- (b) State what is meant by the arrowed lines around the number 2.

..... [1]

- 10 Fig. 10.1 shows the end of a piece of wood. Two holes will be drilled at the centres shown. Add to Fig. 10.1 to show a drilling jig that could be used to make sure that the holes are drilled accurately.

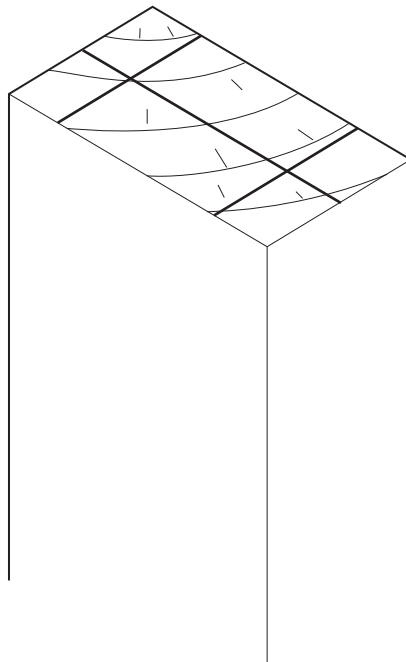


Fig. 10.1

[3]

Section B

Answer **one** question from this section.

- 11 Fig. 11.1 shows a bedside table. The height of the bedside table can be adjusted. The table top is made from veneered manufactured board and the legs and upright from square metal tube.

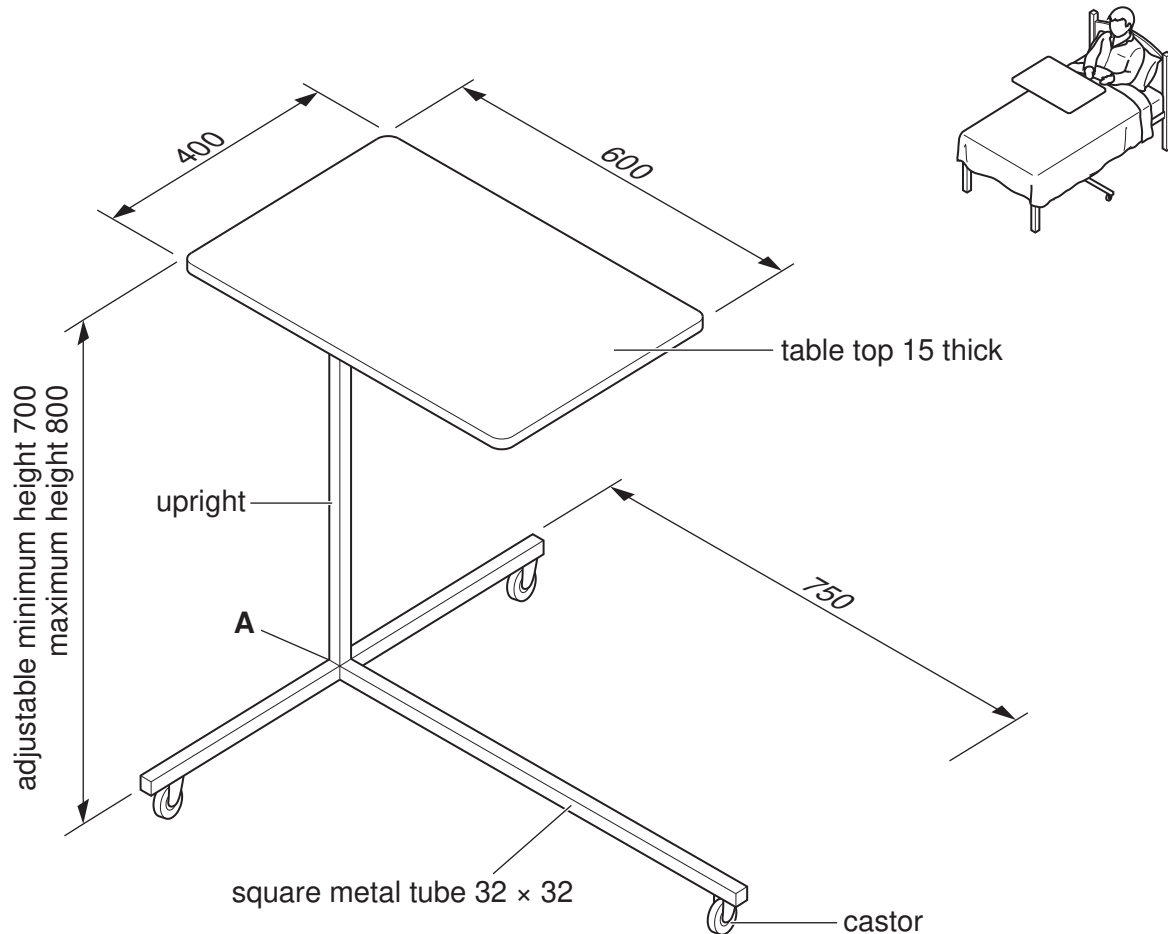


Fig. 11.1

- (a) Name a suitable manufactured board for the table top.

..... [1]

- (b) Give **one** disadvantage of using veneer on a manufactured board rather than solid wood for the table top.

..... [1]

(c) Use sketches and notes to show a modification to the table top that would prevent items from slipping off. Include:

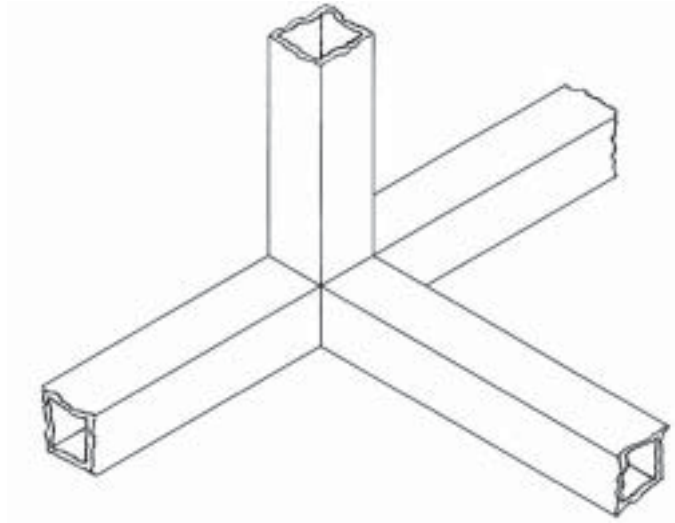
- names of materials used
- methods of construction
- **three** important sizes.

[5]

(d) Use detailed sketches and notes to show how the upright could be fixed securely to the underside of the table top. Additional materials may be used.

[5]

- (e) Fig. 11.2 shows the joint at **A**. Add sketches and notes to Fig. 11.2 showing how the joint could be strengthened using additional materials. Include details of sizes and constructions used.



[4]

Fig. 11.2

- (f) Use sketches and notes to show how the table top could be adjusted and locked at different heights between 700 mm and 800 mm. Include details of materials, sizes and constructions used.

[6]

(g) Explain how a designer would use anthropometric data when designing the bedside table.

.....

.....

.....

..... [3]

12 Fig. 12.1 shows views of a computer desk made from 15 mm thick manufactured board. The computer desk will be sold as flat-pack furniture for self-assembly.

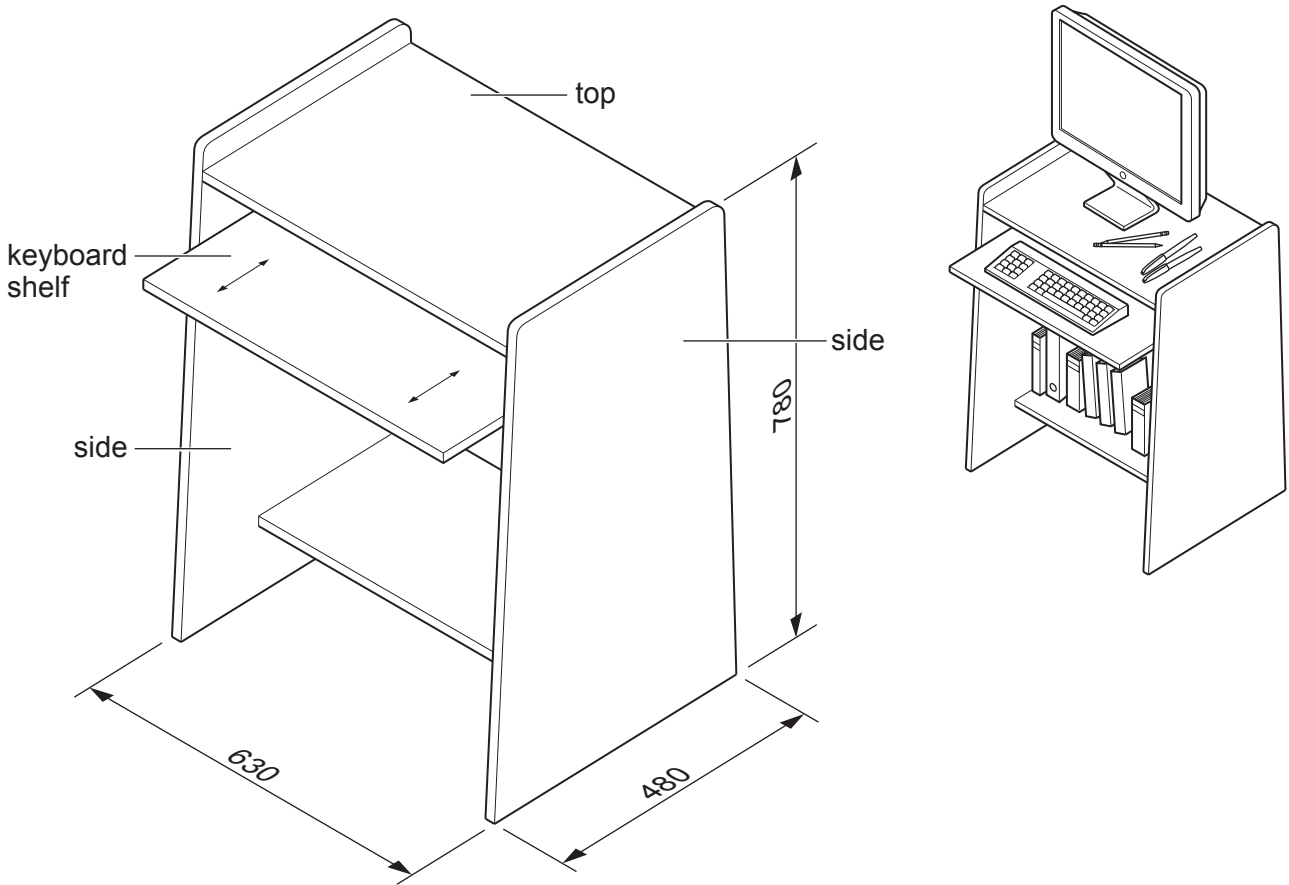


Fig. 12.1

(a) Give **two** benefits of flat-pack furniture for:

(i) the consumer

1

2

[2]

(ii) the manufacturer.

1

2

[2]

- (b) Use sketches and notes to show how knock-down (KD) corner blocks could be used to join the top to **one** side of the computer desk.

[4]

- (c) Use sketches and notes to show how the keyboard shelf could be made to move in and out as shown in Fig. 12.1. Include details of materials and constructions used.

[4]

(d) The sides and shelves will be spray painted.

(i) Give **two** advantages of spray painting rather than applying paint with a brush.

1

2 [2]

(ii) Describe **two** safety precautions you would take when spray painting.

1

2 [2]

(e) Evaluate the design of the computer desk in terms of:

(i) safety

.....

..... [2]

(ii) appearance

.....

..... [2]

(iii) materials used.

.....

..... [2]

(f) Explain why the computer desk could be considered to have a limited lifetime.

.....

.....

.....

..... [3]

13 Fig. 13.1 shows an incomplete design for a desk tidy made from acrylic. The base is not shown.

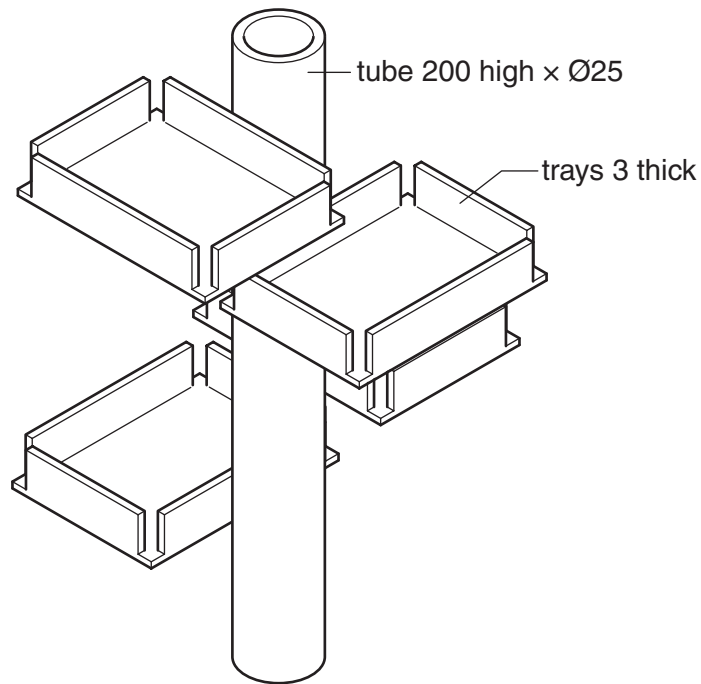


Fig. 13.1

(a) Give **two** benefits of making the desk tidy from acrylic.

1

2

[2]

(b) Fig. 13.2 shows details of one tray marked out on acrylic sheet.

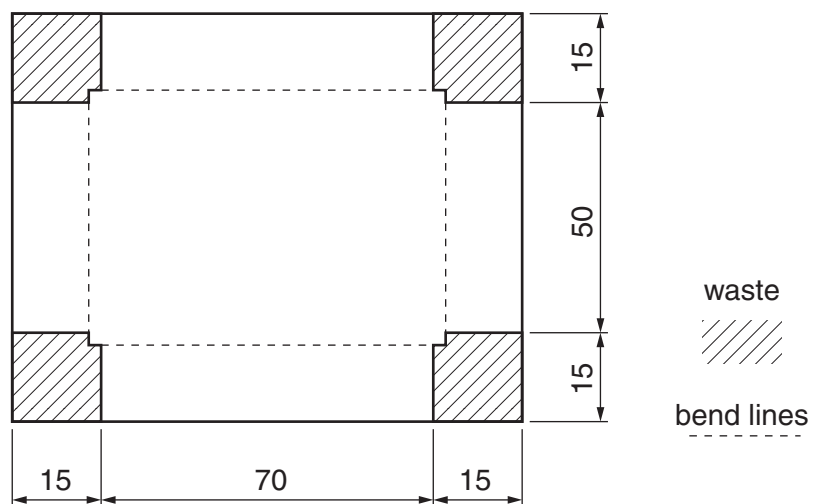


Fig. 13.2

Use sketches and notes to show how the tray could be cut out by hand and the edges made flat and smooth. Show how the acrylic would be held securely during the process.

[4]

(c) Describe how CAM (computer-aided manufacturing) could be used to cut out the shape of the trays rather than cutting them out by hand.

.....

.....

.....

..... [3]

- (d) Use sketches and notes to show how the sides of the tray could be bent to shape. Include the following details:
- the method of heating the acrylic
 - use of a former
 - the method of holding the acrylic while it cools.

[4]

- (e) Fig. 13.3 shows a cross-sectional view of an extrusion machine used to produce the tube for the desk tidy.

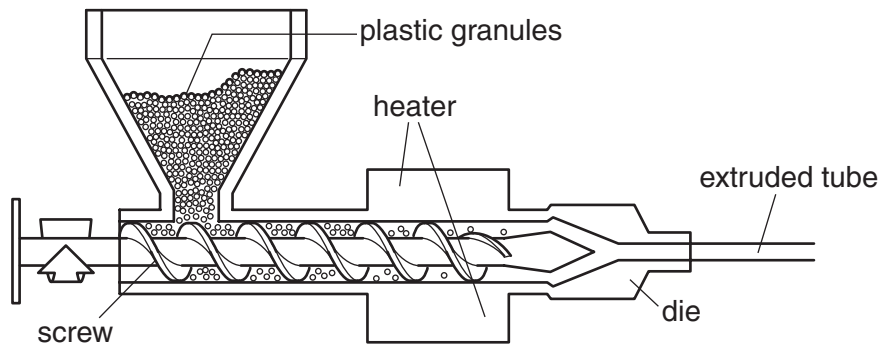


Fig. 13.3

Complete Table 13.1 to show the stages in producing the extruded tube.

Table 13.1

Stage	Process
1	
2	
3	
4	The extruded tube cools.

[3]

- (f) Use sketches and notes to show how **one** of the trays could be attached to the tube. Your method must allow the tray to be removed quickly and must include fittings made only from acrylic.

[5]

- (g) Use sketches and notes to show a design for a base into which the tube will fit permanently. Include details of materials, sizes and construction.

[4]

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