FOR OFFICIAL USE

C

Total Mark

0600/403

NATIONAL QUALIFICATIONS 2007

THURSDAY, 10 MAY
2.55 PM – 3.55 PM

CRAFT AND DESIGN
STANDARD GRADE
Credit Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

1 Answer all the questions.

2 Read every question carefully before you answer.

3 Write your answers in the spaces provided.

4 Do **not** write in the margins.

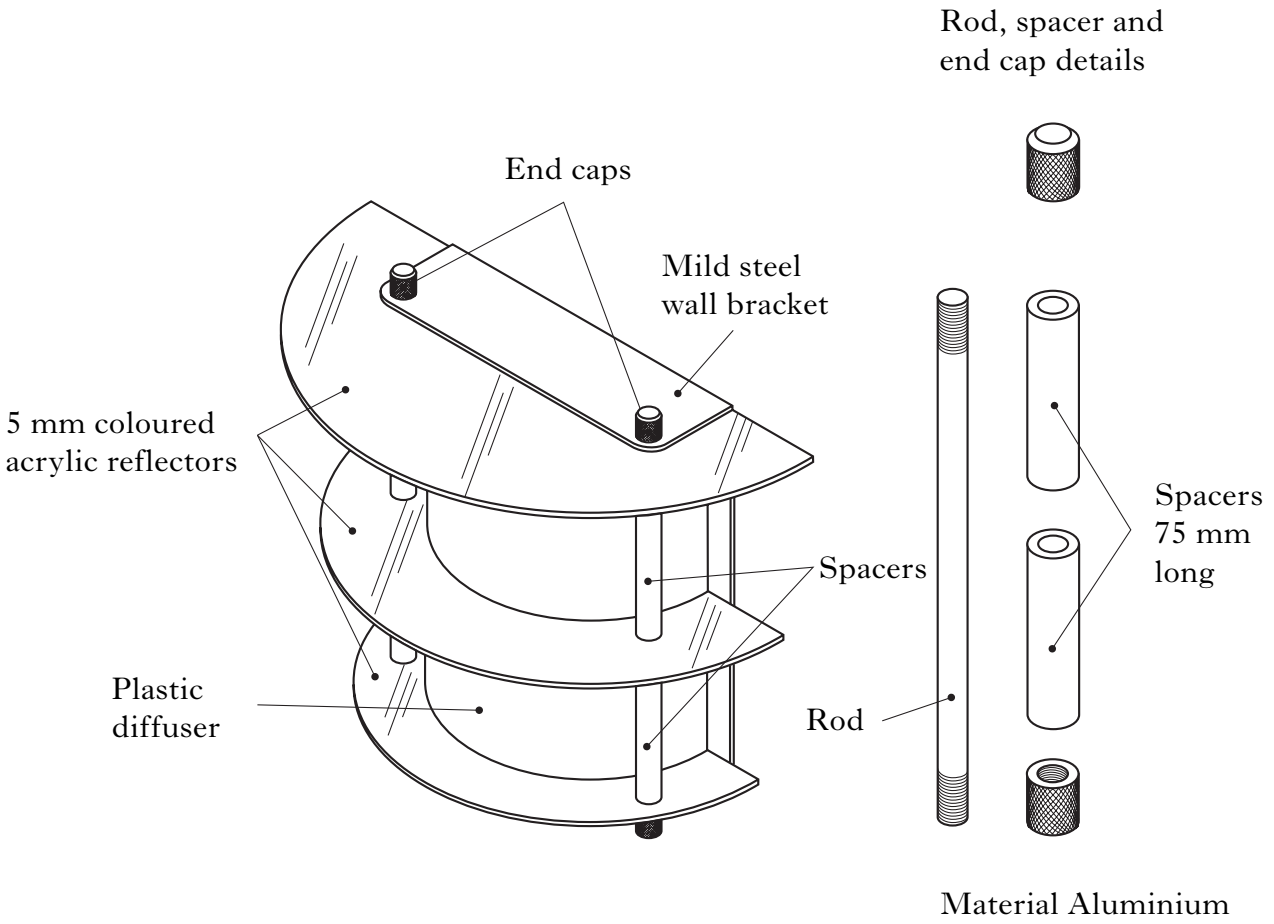
5 All dimensions are given in millimetres.

6 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.

PB 0600/403 6/14270

ATTEMPT ALL QUESTIONS

1. A wall light is shown.



(*a*) (i) Colour was an area of aesthetics investigated during the design of the wall light.

State **two** further areas of aesthetics that may have been considered during the design of the wall light.

1 _____ **1 0**

2 _____ **1 0**

(ii) Materials were also investigated during the design of the wall light.

State **two** reasons why the choice of material is important.

1 _____ **1 0**

2 _____ **1 0**

1. (continued)

(*b*) "The bulb must be easy to change" appeared in the specification for the wall light.

State the design factor being considered to ensure that the bulb can be easily changed.

1 0

_____

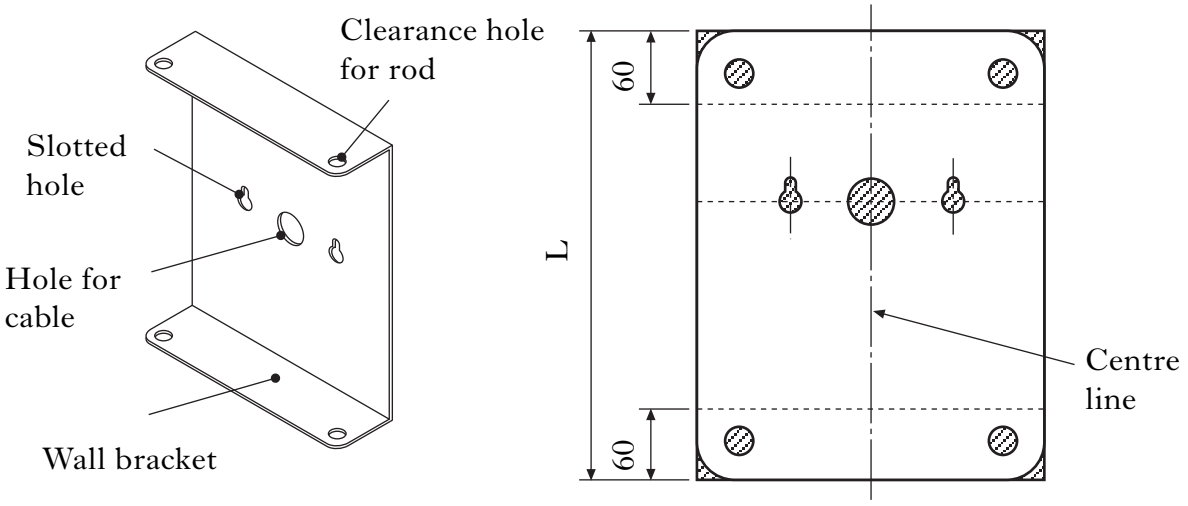
(*c*) The three acrylic reflectors were drilled to allow the rods and spacers to be fitted. Describe a method of ensuring that the holes in the acrylic reflectors line up.

_____

1 0

_____

(*d*) The mild steel for the wall bracket was marked out as shown.



(i) Mild steel is a ferrous metal.

State what is meant by a ferrous metal.

1 0

_____

(ii) The wall bracket holds three acrylic reflectors and two spacers.

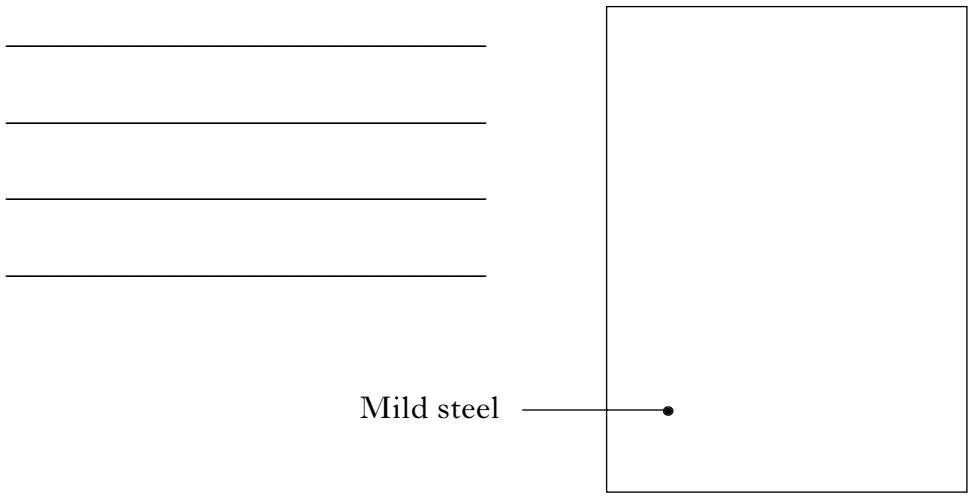
State the total length (L) of the material required for the wall bracket.

1 0

Total length (L) _____

1. (*d*) (continued)

(iii) A centre line was marked on the material for the wall bracket. Describe how odd leg callipers can be used to scribe a centre line without the use of a ruler. *Sketches may be used to illustrate your answer.*



2 1 0

(*e*) (i) The mild steel was drilled.

State a reason why the metal was centre punched before drilling.

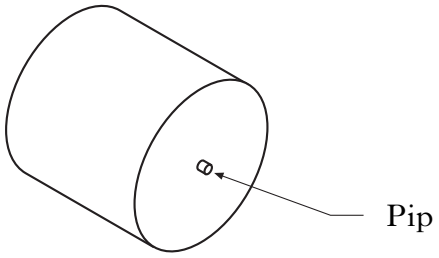
1 0

(ii) State a reason for the slotted holes in the wall bracket.

1 0

(*f*) (i) The end caps were faced off using a metal lathe.

State **one** fault that would result in a small "pip" forming on the cap during turning.



1 0

1. (*f*) (continued)

(ii) During the manufacture of the end caps the tool shown below was used.

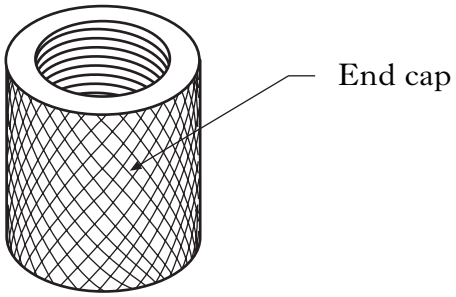
State the name of this tool.

_____ **10**

State the purpose of this tool.

_____ **10**

(iii) A metal lathe was used when drilling a blind hole in each end cap.



Describe a method of ensuring the depth of the blind holes is 30 mm.

_____

_____ **10**

[Turn over

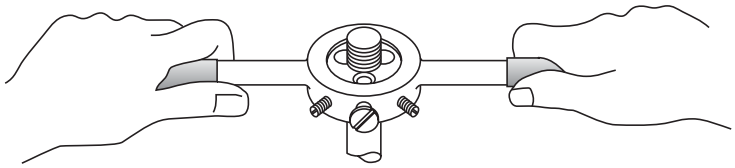
1. (continued)

(*g*) (i) Taps were used to thread the blind holes.

State the name of the last tap used when threading a blind hole.

_____ **10**

(ii) The tool shown below was used to cut an external thread on the rod.



State the name of this tool.

_____ **10**

(iii) The thread was found to be a tight fit. Describe how to adjust this tool to ensure a good fitting thread.

_____

_____ **210**

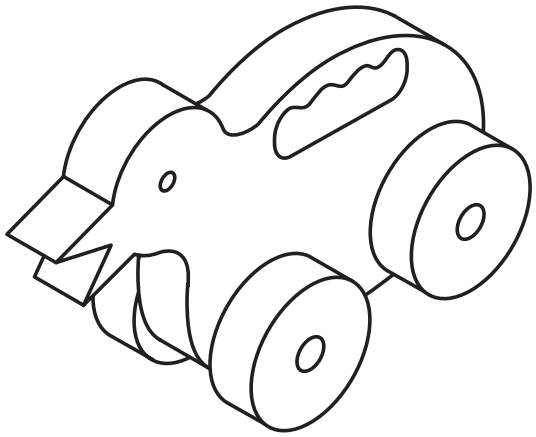
_____

(*h*) The end caps were knurled.

State an adjustment to the speed of the metal lathe that may be necessary prior to knurling.

_____ **10**

2. A hand held toy is shown.



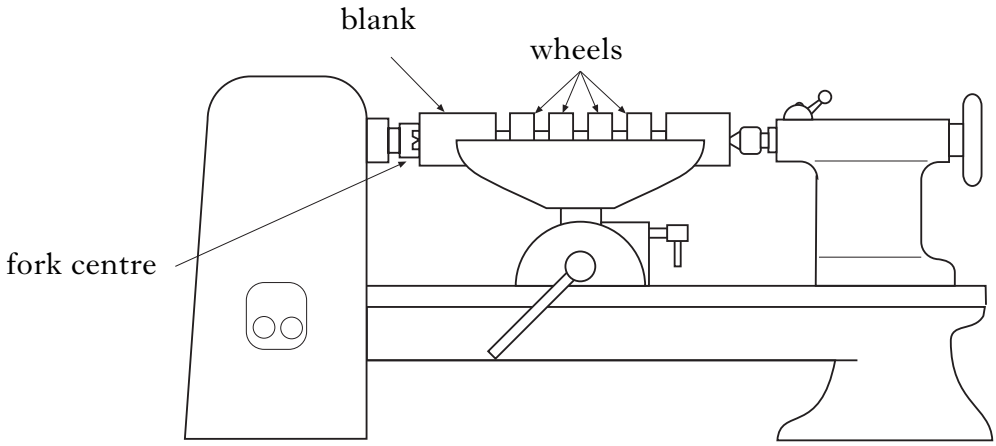
(*a*) The toy was made from a light coloured, close grained hardwood.

State the name of a suitable hardwood.

1 0

_____

(*b*) The four wheels were made using the wood lathe as shown.



(i) State a reason why the blank is longer than the combined width of the four wheels.

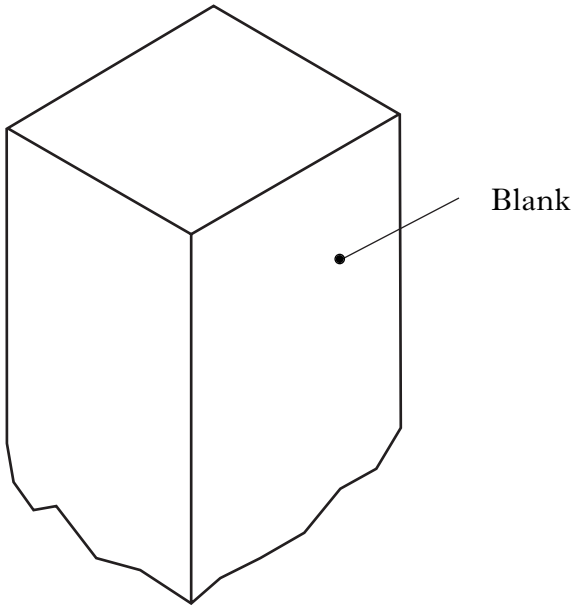
1 0

_____

[Turn over

2. (*b*) (continued)

(ii) On the sketch show how the end of the blank is prepared for fixing to the fork centre.



1 0

(iii) State the name of **two** turning tools used during the manufacture of the wheels.

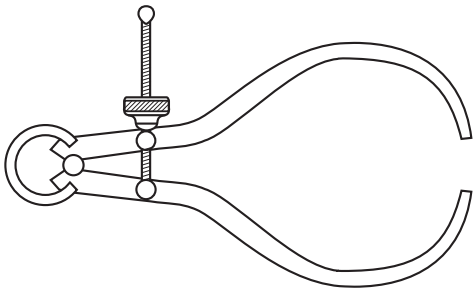
1 0

Tool 1 _____

1 0

Tool 2 _____

(iv) The following tool was used during the manufacture of the wheels.



State the name of this tool and describe its purpose.

1 0

Name_____

1 0

Purpose_____

2. (*b*) (continued)

(v) The wheels were sanded before removal from the wood lathe. State **two** adjustments that should be carried out before sanding.

1 0 1 0

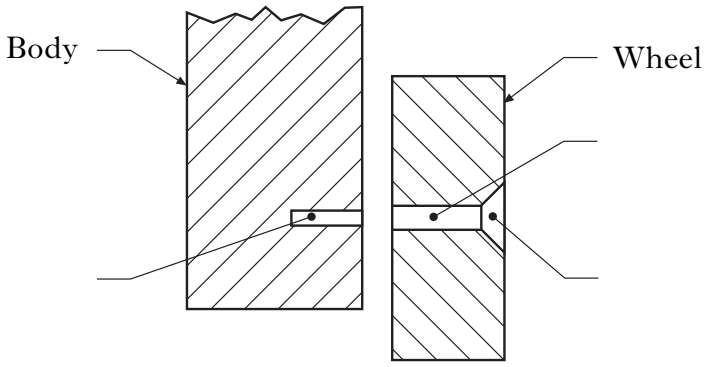
1 _____

2 _____

(*c*) The three holes listed were drilled in preparation for fixing the wheels to the body using wood screws.

Countersink **Pilot** **Clearance**

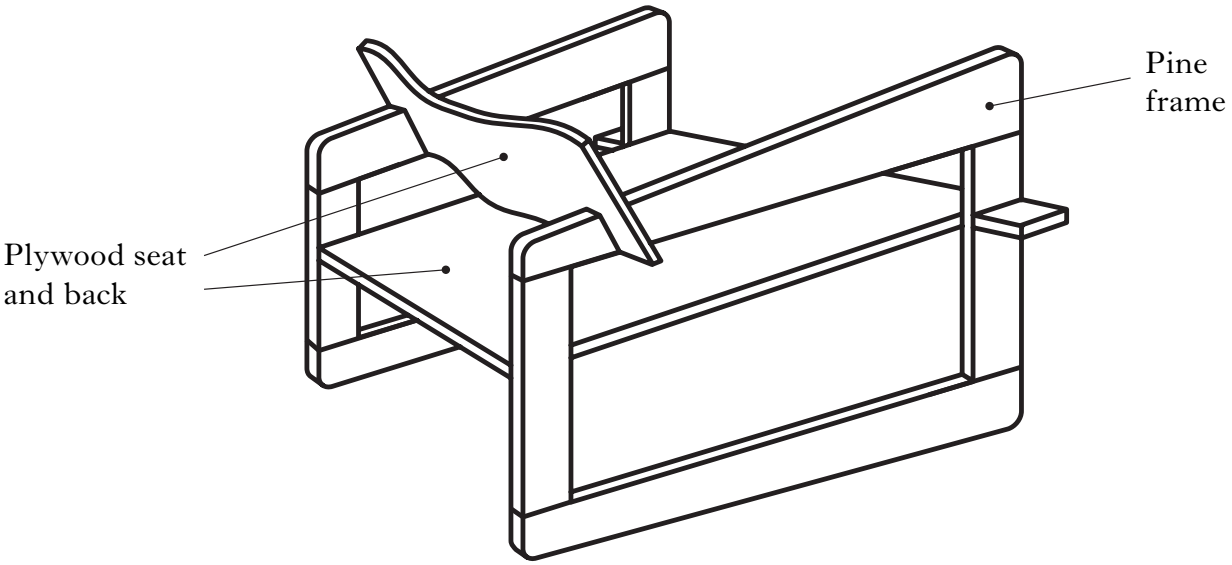
Label the holes on the sketch using the list above.



3 2 1 0

[Turn over

3. A pupil's design for a chair is shown.



(*a*) (i) During the design of the chair a scale model was made.

State **two** reasons for producing a scale model.

Reason 1 _____

_____ **10**

Reason 2 _____

_____ **10**

(ii) An ergonome was used during the design of the chair.

State what is meant by *an ergonome*.

_____

_____ **10**

(*b*) (i) Pine and hardwoods were considered for the frame of the chair. Explain why the use of pine is considered more environmentally friendly than the use of a hardwood.

_____

_____ **10**

3. (*b*) (continued)

Plywood was used for the seat and the back of the chair.

(ii) Describe the constructional feature that gives plywood its strength.

Sketches may be used to illustrate your answer.

_____

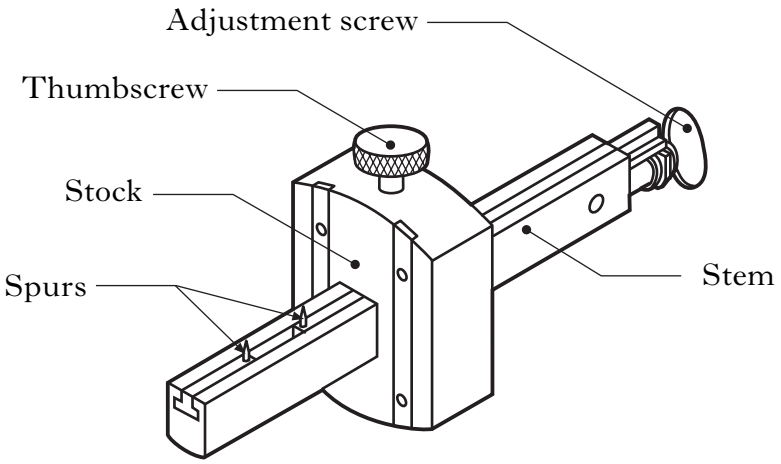
_____

_____

_____

1 0

(*c*) (i) The tool shown below was used in the manufacture of the chair.



State the name of the tool.

Tool _____

1 0

(ii) Describe **two** adjustments that could be made to this tool.

1 _____

_____

1 0

2 _____

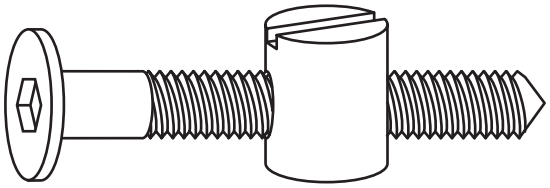
_____

1 0

[Turn over

3. (continued)

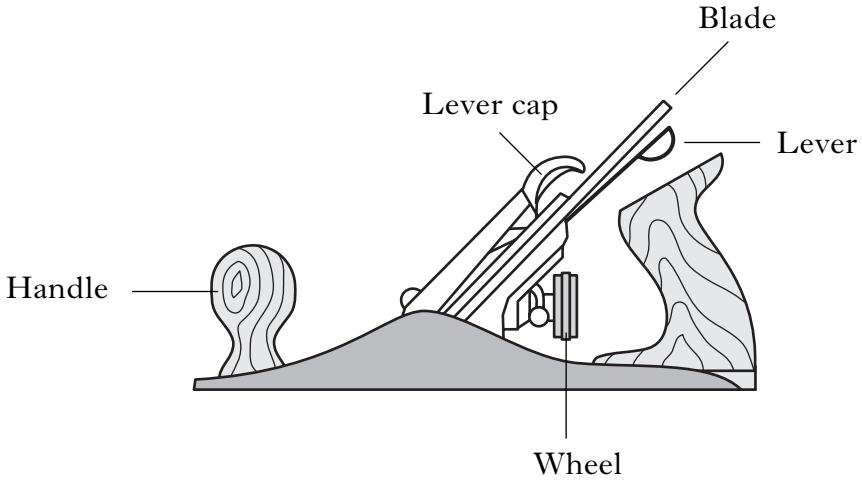
(*d*) The fixing shown below was used during the manufacture of the chair.



State the name of this type of fixing.

_____ **10**

(*e*) The taper on the arm was formed using a plane.



Describe how the plane can be adjusted to:

(i) ensure that the blade is level

_____

_____ **10**

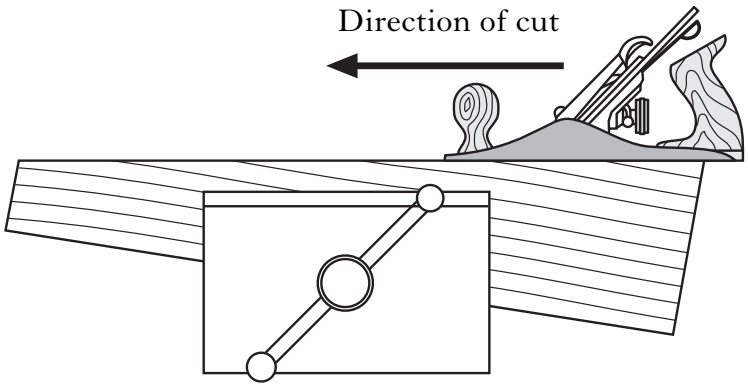
(ii) change the depth of cut

_____

_____ **10**

3. (*e*) (continued)

(iii) State a reason why the taper on the arm was planed in the direction shown.

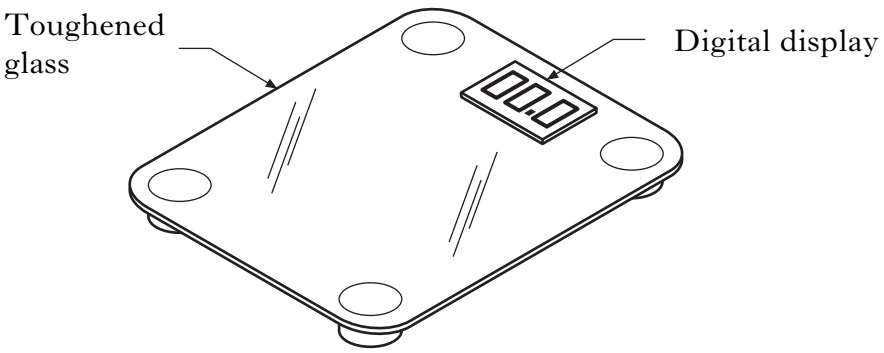


Reason _____

_____ **1 0**

[Turn over

4. Bathroom scales are shown.



(*a*) **Ergonomics** was investigated during the design of the scales.

State what is meant by the term *ergonomics*.

_____

_____ **1 0**

(*b*) (i) The following table was referred to during the design of the scales.

	Adult males			**Adult females**		
	5th % ile	50th % ile	95th % ile	5th % ile	50th % ile	95th % ile
Foot length	240	260	285	215	235	255
Foot width	85	95	110	80	90	100

State the name of this type of data.

_____ **1 0**

4. (*b*) (continued)

(ii) This table refers to 5th, 50th and 95th percentiles.

State what is meant by:

5th percentile

_____

_____ **1 0**

50th percentile

_____

_____ **1 0**

(*c*) The 95th percentile sizes were considered to be important.

State why these are important.

_____

_____ **1 0**

[Turn over

5. A radio controlled racing car is shown below.

(*a*) (i) The body shell was made from polystyrene, a type of thermoplastic.

State what is meant by the term *thermoplastic*.

_____

_____ **10**

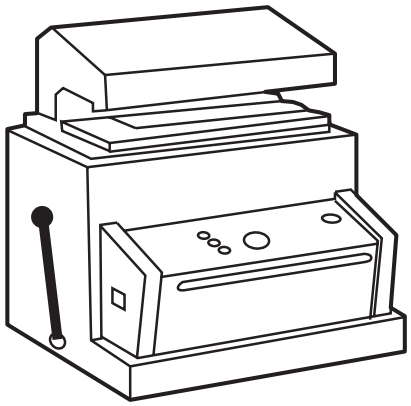
(ii) Acrylic was rejected as a possible material for the body shell.

State a reason why acrylic was considered an unsuitable material.

_____ **10**

(*b*) (i) The body shell was manufactured using the machine shown below.

State the name of this machine.



Name_____ **10**

5. (*b*) (continued)

(ii) Some stages in the manufacture of the body shell are listed below in the wrong order.

- when cool, unclamp the plastic and remove the pattern
- heat the plastic until soft
- switch on the pump and suck out the air
- remove the heat and raise the pattern into the soft plastic

Using the stages listed above, complete the following sequence of operations.

Sequence of operations

1 Place the pattern in the machine and clamp the plastic

2 _____

3 _____

4 _____

5 _____

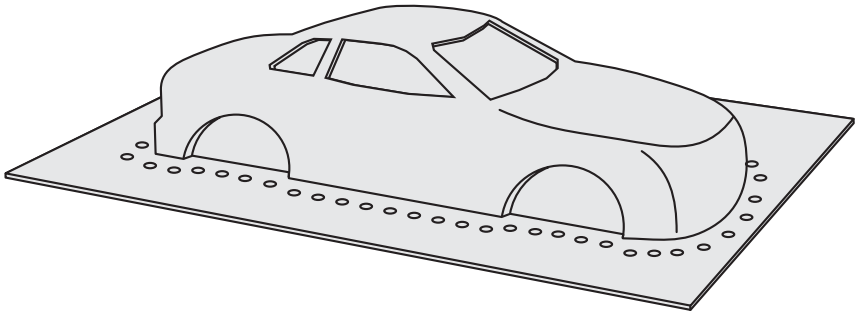
6 Trim off excess plastic

4 3 2 1 0

[Turn over

5. (continued)

(*c*) The pattern used during the manufacture of the body shell is shown below.



Sloping sides, rounded corners and small holes are all features of the pattern.

State a reason for each feature.

(i) Sloping sides

_____

_____ **10**

(ii) Rounded corners

_____

_____ **10**

(iii) Small holes

_____

_____ **10**

[*END OF QUESTION PAPER*]

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