Candidate 3

SECTION 1 — 60 marks
Attempt ALL questions

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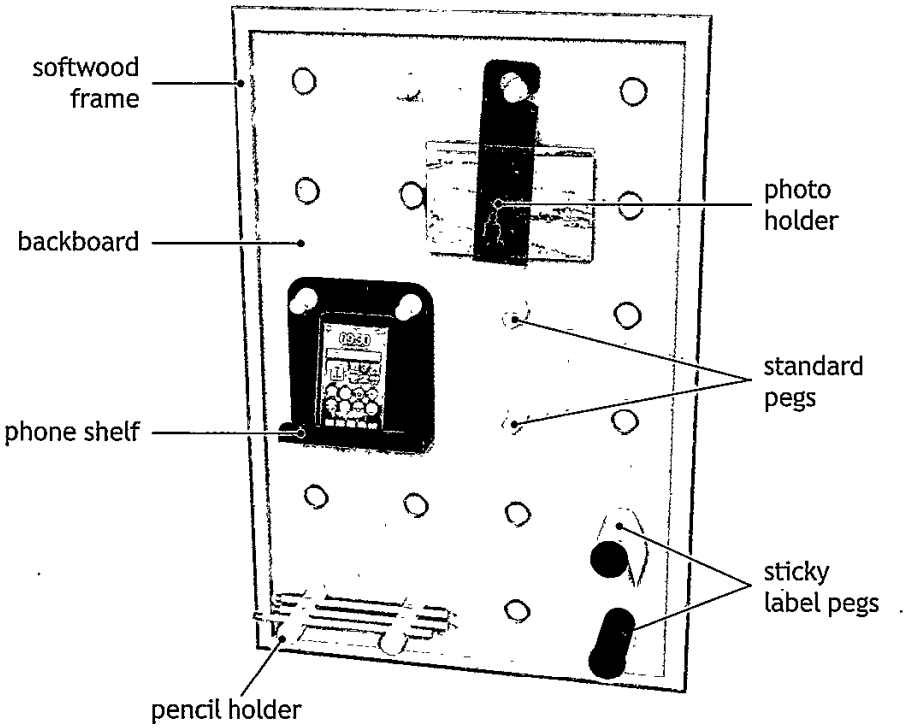
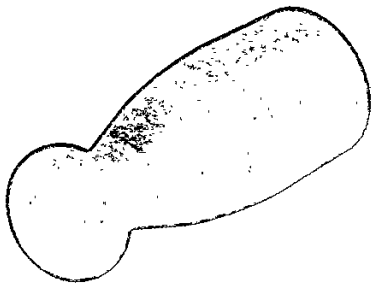
1. A design proposal for a peg board and accessories is shown below.



(a) The standard pegs were made from hardwood.



(i) Name a suitable light coloured hardwood for the standard peg. 1

beech

1. (a) (continued)

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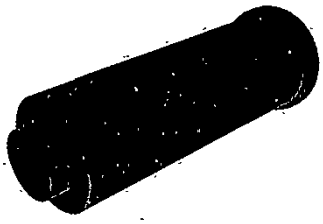
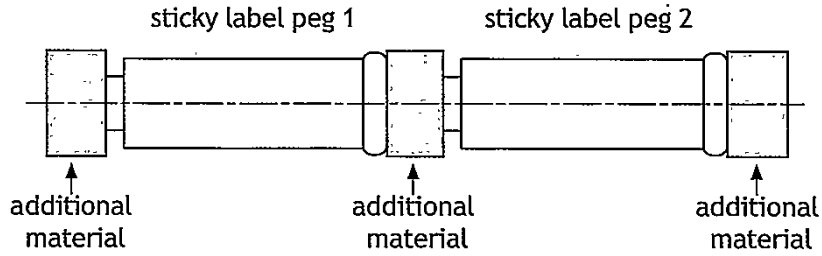
Two sticky label pegs were turned on the wood lathe from a single length of wood.

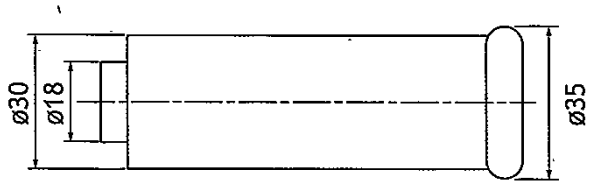




(ii) Outline **two** reasons why additional material is included on the length of wood. 2

additional material is required so that if you accidentally cut the wrong length you can fix the problem easily. It's also there so you don't cut too much off.

The sticky label pegs were turned to the sizes shown below.



(iii) Name the lathe process carried out to reduce the diameter from 35 to 30mm. 1

A skew chisel

(iv) Name the hand tool that should be used to check that the diameters are the correct size. 1

Outside calipers

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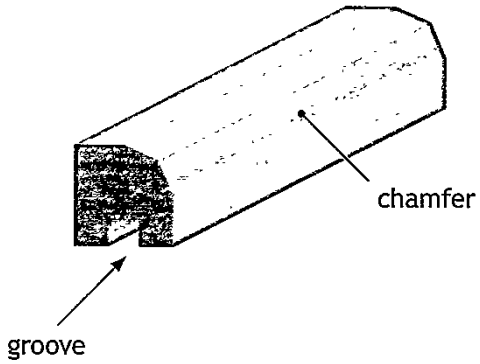
1. (continued)

(b) The four sides of the frame were cut from one length of wood and shaped as shown below.



Complete the sequence of operations shown below by filling in the appropriate process and tools.

(i)

Step	Process	Tools
1	Mark lengths	Try-square, rule, pencil
2	Mark chamfer	Marking gauge, rule, pencil
3	Cut groove	Plough plane
4	Cut chamfer	Jack plane, ~~tenon saw~~
5	Cut lengths	tenon saw

4

(ii) Explain why Step 4 was carried out before Step 5 in the table above. 1

Step 4 was carried out first because it is easier to cut the groove along the whole piece of wood when it is together.

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1. (b) (continued)

The frame was checked for squareness during assembly.

(iii) Describe **two** methods of checking the frame is square.

You may use sketches to illustrate your answer in the box below. **2**

One method is to use a band clamp. You can also use a try square once the model has been dry cramped to find the right angles in all four corners.

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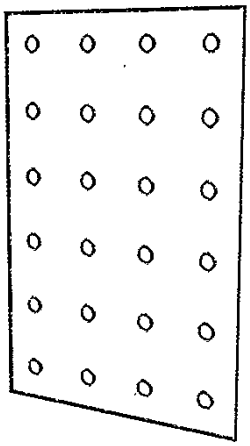
1. (continued)

(c) MDF was used to make the backboard.



(i) State **two** reasons why MDF is a suitable choice of material for the backboard. **2**

MDF is cheap and reliable. Also, no one will really see the back of the model so a cheap solution is a MDF board.

A pillar drill was used to create the holes.

(ii) State **two** safety checks that must be carried out on the pillar drill before use. **2**

Chuck key is removed

Safety guard is down

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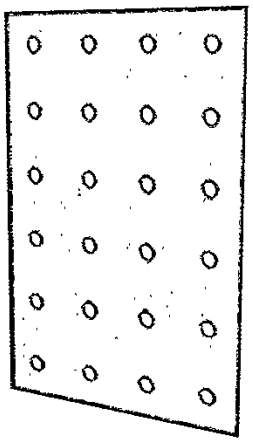
1. (c) (continued)

Grey paint was applied to the surface of the backboard.



(iii) Describe **three** ways to ensure a high quality paint finish. 3

To get a high quality finish with the paint you can put several coats on. You can paint the board first then drill the holes so you don't get any drip marks. Pencil marks are sanded down before painting.

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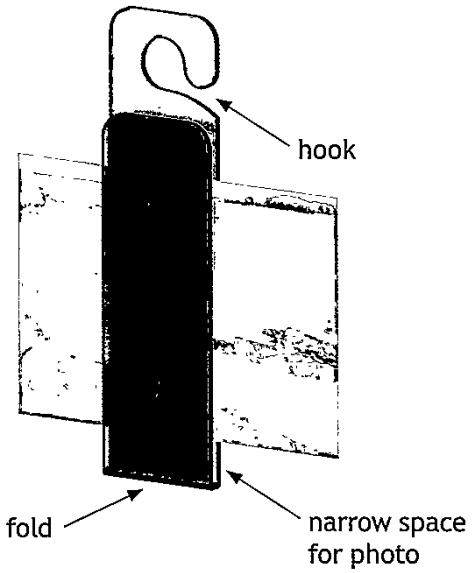
1. **(continued)**

(d) A photo holder was made from thermoplastic sheet.



The thermoplastic sheet was marked out and folded to securely hold a photo.

Describe how the photo holder would have been folded into shape, with reference to workshop tools and equipment. 2

To fold the thermoplastic a template can be used so once its heated by a strip heater it can be folded quickly and accurately.

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1. **(continued)**

(e) The phone shelf was made from copper sheet.

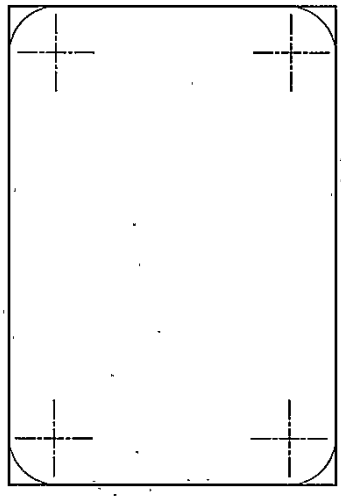
(i) State **two** reasons why copper is a suitable choice of material for the phone shelf. **2**

The copper is suitable for this phone shelf because the shelf is heavy enough that when the phone is placed it doesn't fall.

[Turn over

1. (e) (continued) MARKS DO NOT WRITE IN THIS MARGIN

The phone shelf corners were marked out on a sheet of copper as shown below.



(ii) Describe how to mark out the corners, with reference to workshop tools.

You may use sketches to illustrate your answer in the box below. 3

To mark out a corner you will need a steel rule ~~to~~ and a scribe to find the length and to mark the length. Then use an engineer's square and scribe to draw a straight line 90° from the side of the material. Then do this another 3x on the other corners.

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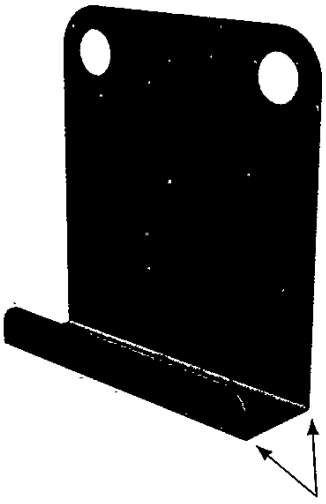
1. (e) (continued)

(iii) Describe how to cut **and** shape the corners, with reference to workshop tools. 2

To cut the corners, use a hacksaw to cut off the majority of the material. Then use a file to smooth and round the corners.



90° bends

(iv) Describe how to form the 90° bends, with reference to workshop tools. 2

To bend the material to a 90° angle, use ~~a~~ an engineer's vice and a rectangular piece of metal material with 90° angles sat in the vice. with the copper. Then, use a hammer to slowly bend the material to 90° then do it again to get the second 90° bend.

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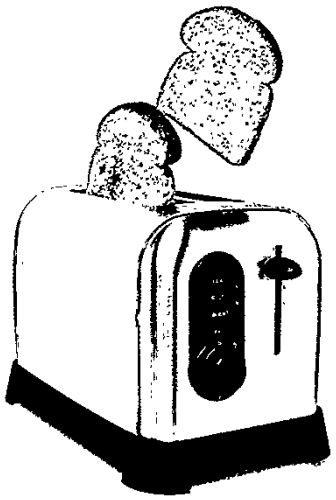
2. A company that manufactures kitchen appliances wishes to add a toaster to their range.



(a) The designer used a questionnaire to research existing toasters.

(i) Describe the key stages of a questionnaire. 3

Key stages in a questionnaire are to find the customers' point of view on things. Also, to see if the customers would buy a product and to give a broad range of questions so that the customers may give their opinion on it.

(ii) Name an alternative research technique which the designer may have used. 1

A survey

MARKS | DO NOT WRITE IN THIS MARGIN

2. **(continued)**

The designer produced a product specification after completing the research.

(b) Explain why a specification is used during the design process. 1

The specification is used so you know what your goal is.

The designer used brainstorming as an idea generation technique.

(c) Describe the key stages of brainstorming. 3

Key stages when using brainstorming to gather ideas is to have a piece of paper and pencil to quickly write down an idea so you can think of a new one. Also, to have products to influence you and maybe spark an idea. To have a quiet environment or calming colours around you.

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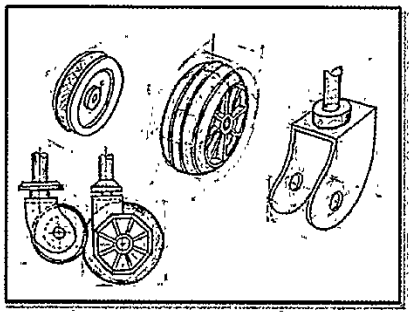
3. A range of graphic techniques were used throughout the design of the trolley wheel shown below.



(a) Sketches were used at the initial ideas stage.

State **two** reasons why this graphic technique is appropriate. 2

This is an appropriate graphic technique because it allows you to change anything or evolve it.

(b) During the planning for manufacture stage, the designer would produce working drawings.

State **two** reasons why working drawings are required. 2

Working drawings are required so that when you are making your product you know what sizes to get of material and to make it look as identical to the drawing as possible.

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4. Models are often used during the design process.

Explain why models may be used during the design process. 3

Models are used during the design process to have a feel for it and to see if anything might need to be changed if it is impractical.

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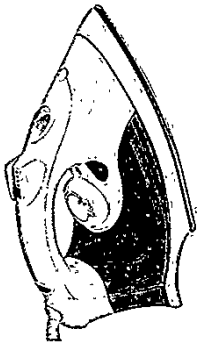
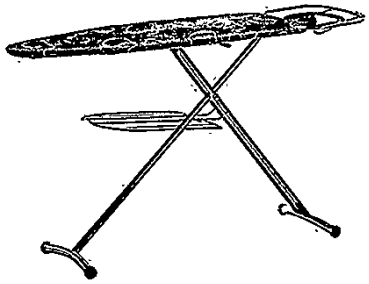
MARKS | DO NOT WRITE IN THIS MARGIN

5. An iron and ironing board are shown below.





You must give different examples in (a), (b) and (c).

(a) Describe how ergonomics may have influenced the design of the iron and/or the ironing board. 4

Ergonomics would have influenced the design of the iron and ironing board depending on the target market of the customer. This ironing board looks to have been targeted towards boys because of its simple colours so they would have made the handles for the iron slightly bigger to fit the average size male. The height of the ironing board would have been made for a suitable height of average sized men.

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5. (continued)

(b) Describe how function may have influenced the design of the iron and/or the ironing board. **2**

The function was influenced in the design of the ironing board to simply uncrease clothes and to have somewhere to sit the iron when folding clothes.

(c) Describe how safety may have influenced the design of the iron and/or the ironing board. **2**

Safety would have been influenced on the design of the iron to have warning labels and a warning light so that they know not to touch the iron. The wire on the iron should also be long so you dont need to fidget about and maybe accidentally burn yourself.

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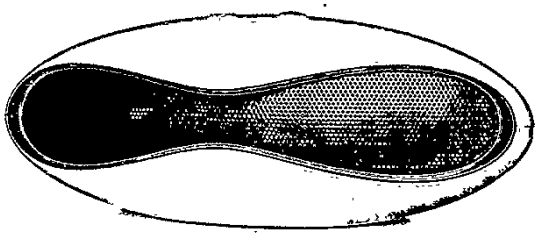
6. A portable speaker is shown below.



(a) Describe **three** aesthetic aspects of the speaker. 3

An aesthetic aspect of the speaker is the bright colours which would attract your attention. You would also be able to see clearly that it is a speaker. It would also be easy to carry about and comfortable to hold.

The company developing the speaker has a strong brand image.

(b) Explain **two** benefits of a strong brand image. 2

A benefit of a strong brand image is so that people would be able to identify it more easily and people would know it is reliable because they trust the brand on other products.

Marketing techniques can be used to influence sales.

(c) Name **two** marketing techniques that the company could use to promote the speaker. 2

Bright colours would suggest their market is for kids. Also the ~~design~~ design and the way it looked would influence the marketing.

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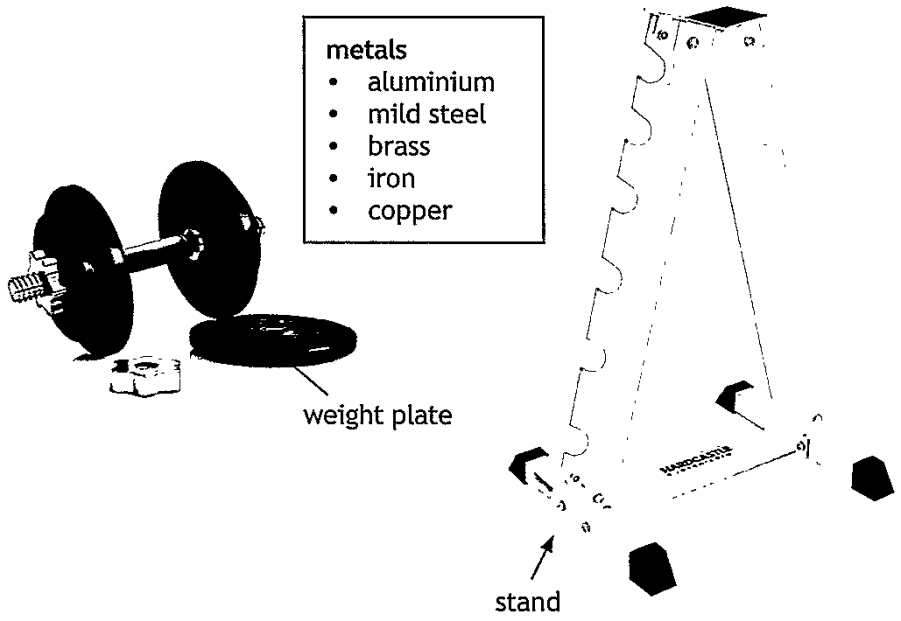
SECTION 2 — 20 marks

Attempt ALL questions

7. The dumbbell and stand shown below have been produced using a range of metals and processes.



(a) Select appropriate metals for the weight plate and stand from the list provided **and** explain why they would be suitable.

You must give a different metal and explanation for each item.

(i) Weight plate. **2**

Metal Mild steel

Suitable because mild steel is heavy

(ii) Stand. **2**

Metal Aluminium

Suitable because aluminium is easy to cut and shape grooves

[Turn over

MARKS | DO NOT WRITE IN THIS MARGIN

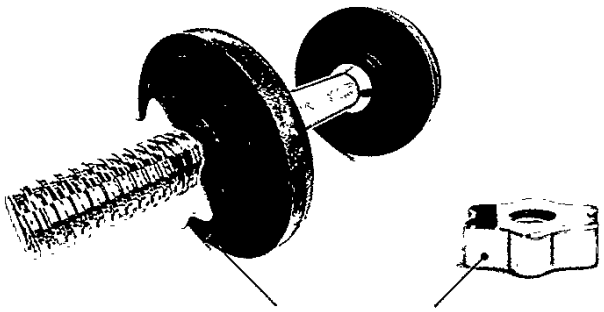
7. (continued)

(b) The weight plates have been sand cast.

Describe **two** identifying features that would show the weight plates have been sand cast. 2

The hole in the middle of the weight would suggest it has been sand casted.
The thickness of the weights.

(c) The spin lock collars have been die cast.



Explain why die casting was used to manufacture the spin lock collars. 2

Die casting was used for the spin lock collars because of the unique and difficult shape.

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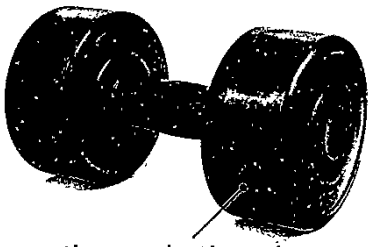
7. (continued)

(d) A concrete filled dumbbell is shown below.



Name a suitable process to manufacture the thermoplastic casing of the dumbbell **and** explain why it is suitable. **2**

Process Vacuum forming

Suitable because it is easy to form the plastic to the shape needed

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8. Many products are mass manufactured.

(a) Describe the impact of mass manufacturing on society. 3

The impact of mass manufaching products means sometimes we have too much of a product. Sometimes, lots of people have a demand for a specific product they want. People become needy maybe for a product and ask that more are made without realising how much it might affect the environment or their health.

Not all products are mass manufactured.

(b) Explain why some products are not suitable for mass manufacture. 1

Some products are not suitable because they are either too little of material or the material is too rare.

9. Manufacturers often use standard components in the production of products.

Outline the possible benefits of using standard components. 2

Standard components are beneficial because it saves money and because they are easy to make which saves time.

MARKS | DO NOT WRITE IN THIS MARGIN

10. Manufacturers have a responsibility to reduce the damage they cause to the environment.

Outline the steps that a manufacturer could take to reduce their impact on the environment. 4

Make less of their product so that it becomes more rare and only richer people buy it.

Use renewable energy instead of fossil fuels.

~~Replace materials~~ Recycle their material from products that have already been used.

If companies are using wooden products, buy the materials from a renewable source.

[END OF QUESTION PAPER]