

Candidate 5

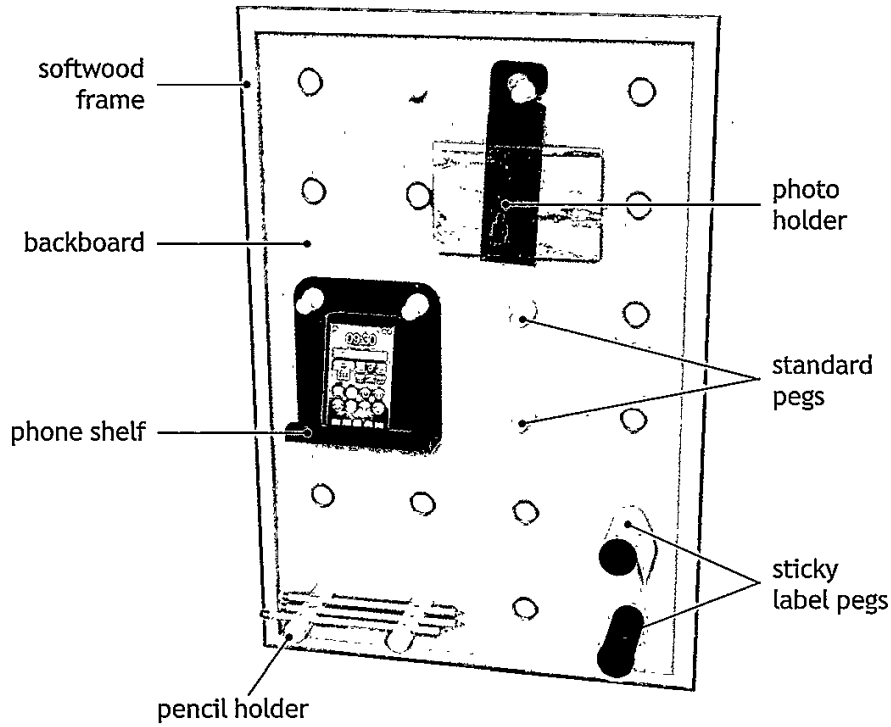
SECTION 1 — 60 marks

Attempt ALL questions

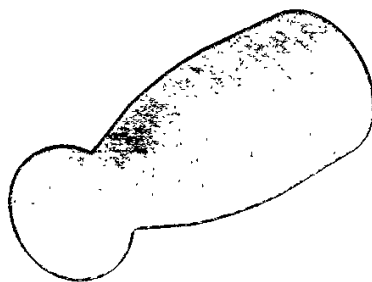
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1. A design proposal for a peg board and accessories is shown below.



(a) The standard pegs were made from hardwood.



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

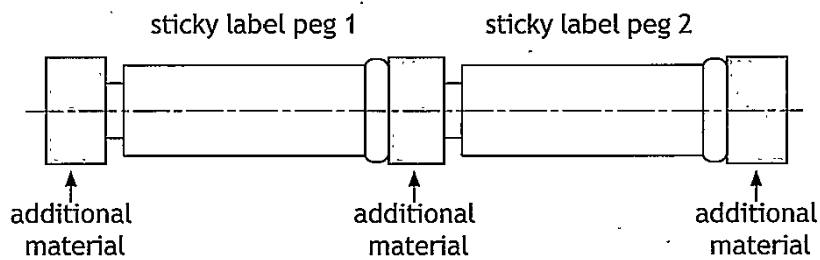
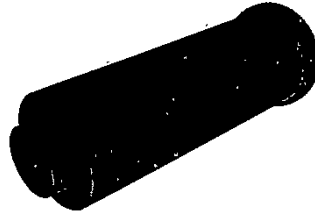
1

beach beech

1. (a) (continued)

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

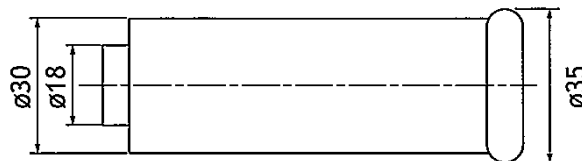


- (ii) Outline two reasons why additional material is included on the length of wood.

2

so that the thin pieces/sections of wood don't snap when turning.
so the wood isn't too short
because it is easier to remove wood rather than add it on.

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

parallel turning.

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

1

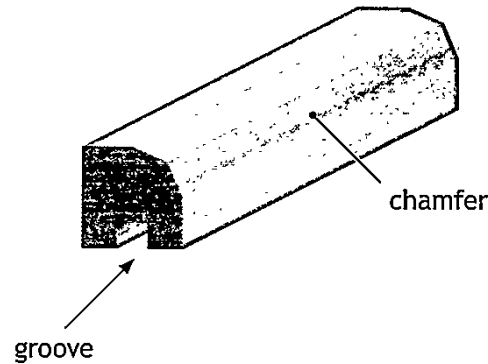
outside calipers.

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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	pencil, rule.
3	Cut Groove	Plough plane
4	Cut chamfer	Jack plane
5	Cut lengths	tenon saw, G clamps

4

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

1

~~so the~~ so if the edges were to be chipped in the planing process they would be removed any way.

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1. (b) (continued)

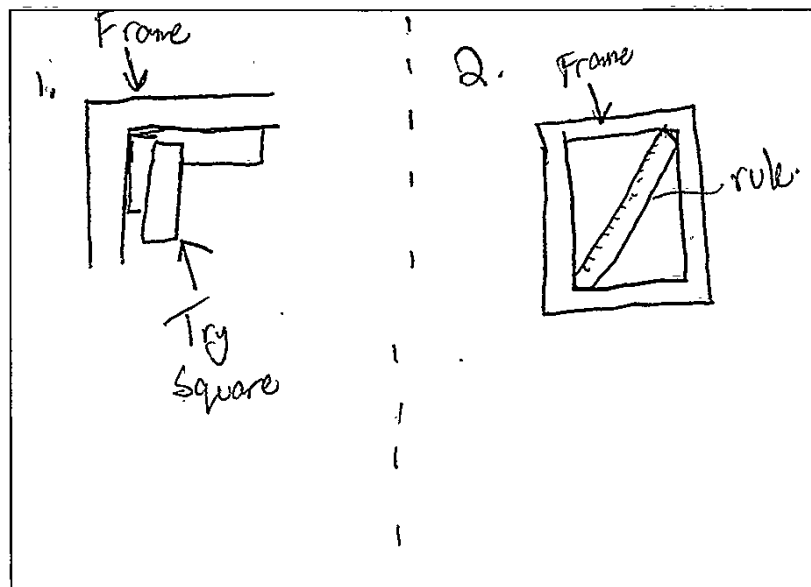
The frame was checked for squareness during assembly.

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

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

2

1. put a try square in the corner and make sure the edges are touching
2. Measure corner to corner with a rule and make sure they are equal

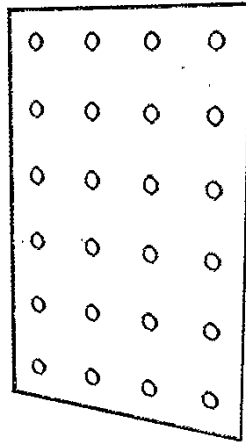


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1. (continued)

(c) MDF was used to make the backboard.



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

2

it comes in a sheet form so all
that would be needed is to drill
the holes & it is easy to work
with because it isn't a hard wood.

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

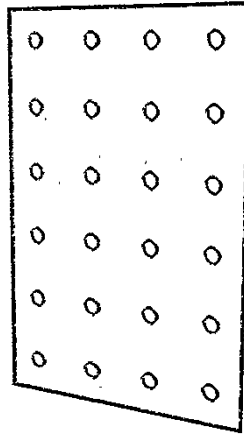
chuck key is removed.
the guard is down securely.

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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

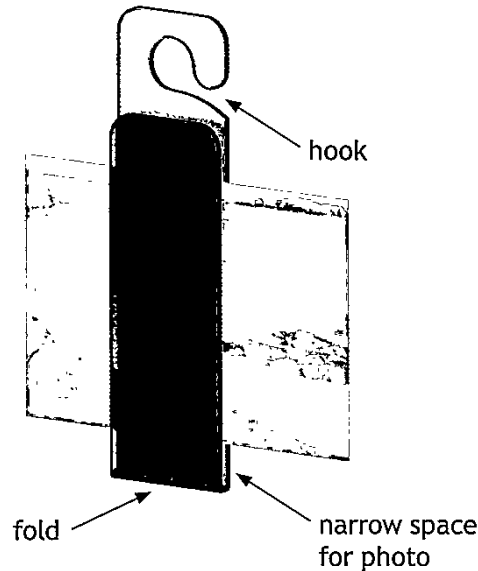
use a primer - to make the paint stick
Apply multiple coats to make sure
there are no missed spots
Use spray paint so there are no
brush marks or lines from the direction
the brush was going.

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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

In the workshop the photo holder would have been folded by marking out an axis it would have been folded along then along that axis use a strip heater to make the plastic bendy and malleable then fold it. potentially using a template or jig.

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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

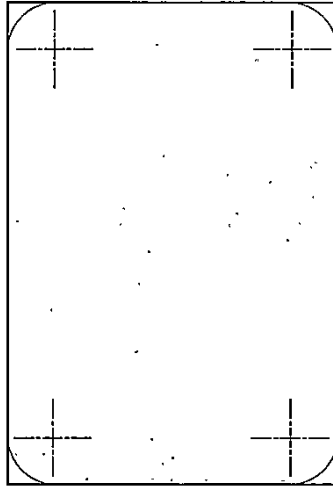
it wouldn't need a high quality finish
is easily accessible
comes in sheet so all it would need
is to be bedded into shape.

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1. (e) (continued)

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

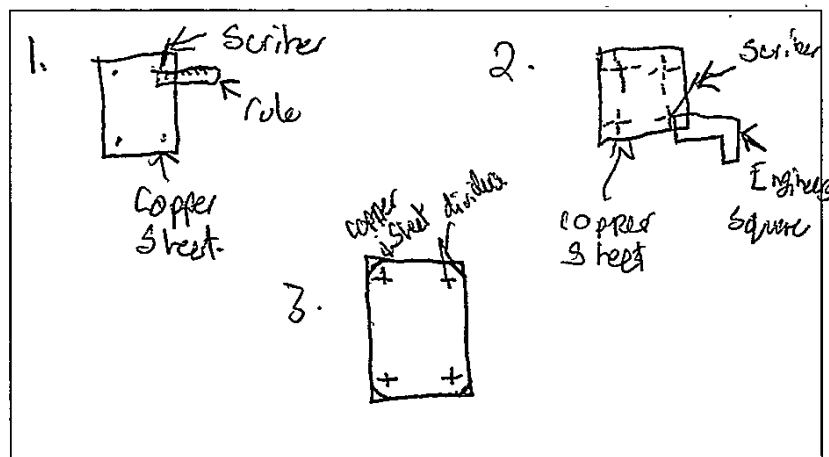


(ii) Describe how to mark out the corners, with reference to workshop tools.

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

3

1. First use a rule and scriber to find the centre point of the circles that the corners were finished along
2. then use engineers square and scriber to mark the center lines.
3. Finally use dividers to mark the curve



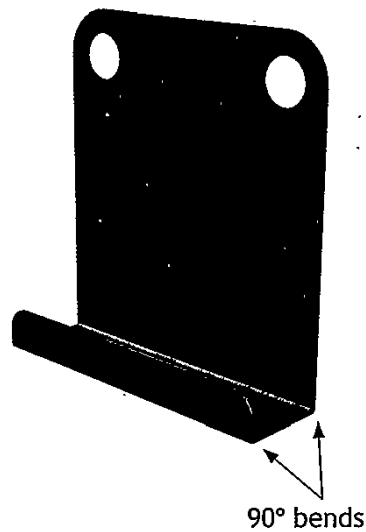
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1. (e) (continued)

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

2

to cut the corners, the majority of waste material can be removed via a Hacksaw then you shape it with a file.



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

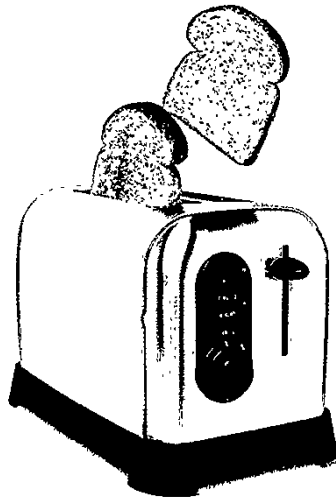
2

to form the 90° bends you mark it out with an Engineers square steel rule and scriber then go to the box folder and bend it on said lines.

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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

Planning - Create questionnaire with desired questions about relevant topics.
 Answering - Hand out questionnaire and gather results from the public.
 Results - After gathering results use the results to form a specification for the new toaster.

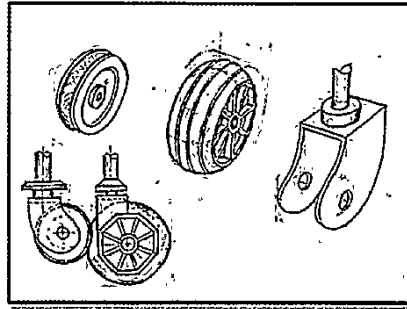
- (ii) Name an alternative research technique which the designer may have used.

1

mood/lifestyle board - about target market

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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

because sketches are quick and easy to form and can still be developed.

because sketches are rough and can still be tried and tested and are easily changed.

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

State two reasons why working drawings are required.

2

so the manufacturer knows what size to make the parts and

so the manufacturer knows how to make the part and where it goes.

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4. Models are often used during the design process.

Explain why models may be used during the design process.

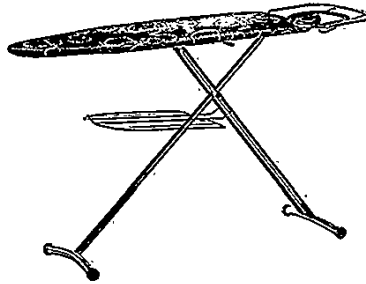
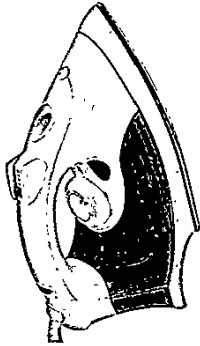
3

Models are used to help the designer think about what materials to use and to help the designer visualise and contemplate the proportion of the model. A model can also be used to test out the theory behind the product and to see if it works or not.

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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 influenced the design of the iron's handle to make sure the iron stays in the users hand and to make sure it doesn't fall out their hand. Ergonomics has also influenced the design of the ironing board by how wide the legs go so it sits comfortably at waist height for people in between the 80th and 95th.

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5. (continued)

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

2

Function has influenced the design of the ironing board because it has a secondary function of holding iron on the side of the board as well as having the clothes on top. It has also influenced it by having a small shelf for ironed clothes attached to the leg.

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

2

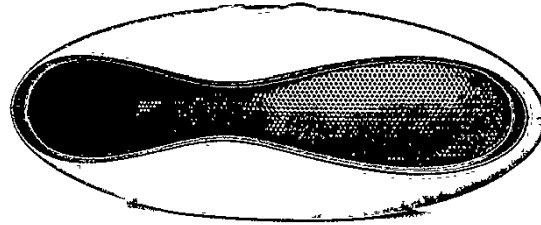
Safety may have influenced the design of the iron by having the majority of the iron made out of plastic which isn't a good conductor so the handle wouldn't get too warm when it's being used.

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6. A portable speaker is shown below.



(a) Describe three aesthetic aspects of the speaker.

3

The bright colours is an aesthetic aspect that makes the speaker look interesting. The odd shape is an aesthetic aspect of the speaker which also makes it look interesting. The smooth texture is another aesthetic aspect of the speaker.

The company developing the speaker has a strong brand image.

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

2

One benefit of this is that the brand is trusted so it is more likely to be purchased over another brand's speaker which isn't trusted. Another benefit is it will get advertised.

Marketing techniques can be used to influence sales.

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

2

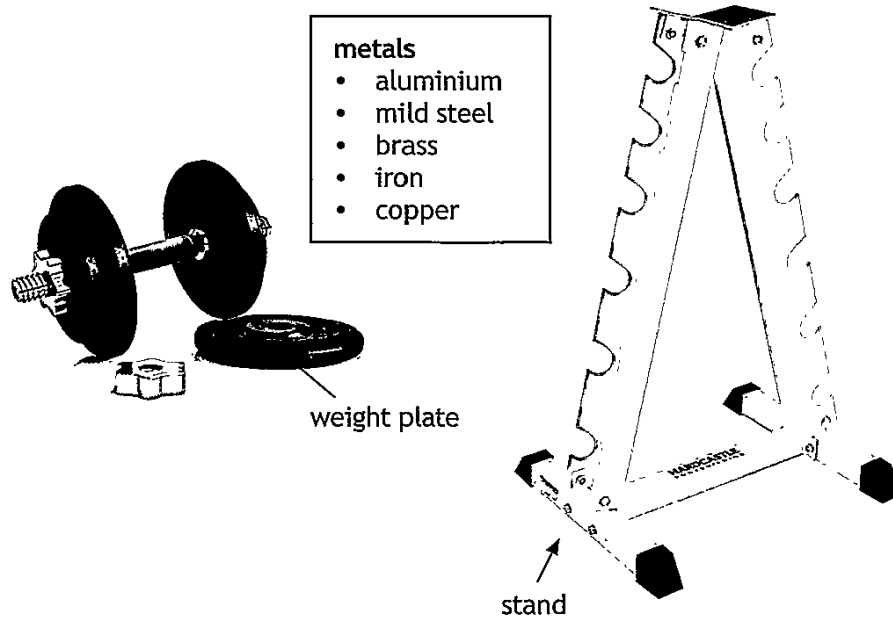
In the shop say it is on special offer or say it comes with a free song.

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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 it is cheap and dense

so it makes a good weight because it
doesn't need to be massive to be heavy.

- (ii) Stand.

2

Metal Aluminium

Suitable because it's light weight but durable

so it will hold up the weight of the dumbbells.

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7. (continued)

(b) The weight plates have been sand cast.

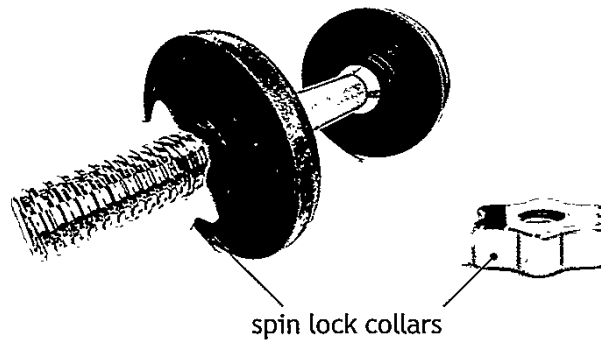


Describe two identifying features that would show the weight plates have been sand cast.

2

Surface of the metal is rough almost
'grainy' and it is not a complex shape
but is solid.

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



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

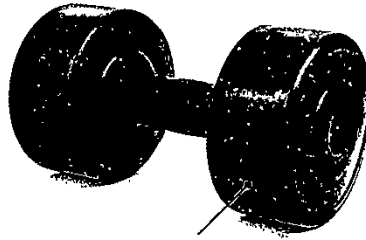
2

because the thread is a complex shape
and couldn't be made via sand casting.
and it has a nice finish.

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7. (continued)

(d) A concrete filled dumbbell is shown below.



thermoplastic casing

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

2

Process rotational moulding

Suitable because it creates hollow objects.

which can be filled.

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8. Many products are mass manufactured.

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

3

More robots are used which take jobs so there are less jobs for people in the community, but if the robots malfunction there will be more electricians and engineers needed to fix them. This also means the products made are cheaper because there are more of them and it costs the manufacturer less to produce them.

Not all products are mass manufactured.

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

1

Some products are too complex to be mass manufactured.

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

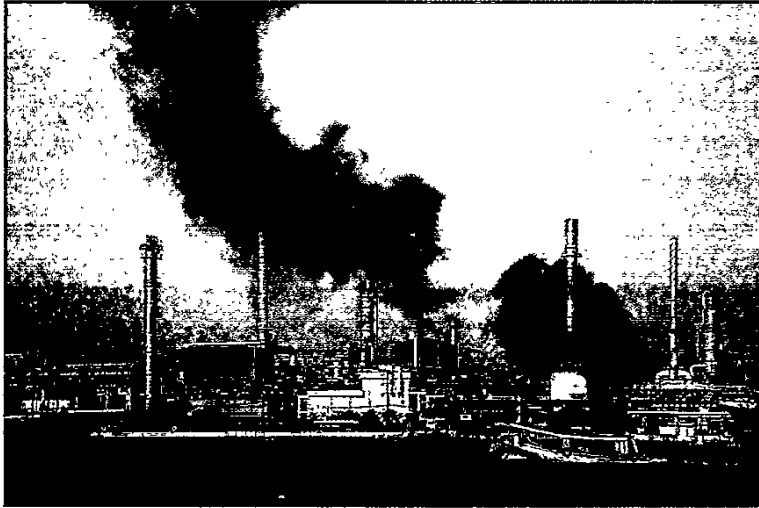
Outline the possible benefits of using standard components.

2

If one breaks it is easy to replace because it isn't a custom made part. Costs less to make the product because they don't need to hire skilled people to make custom parts. Also just order in standard components.

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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

One step they could take is to use locally sourced materials like local wood and metal so less carbon dioxide is emitted because it doesn't need to be shipped over from another country to be delivered to a store. Another is to reduce the size of packaging like flat pack it so more products can be fitted into ~~one~~ ^{one} shipping/delivery so it takes less trips to get the ~~same~~ ^{same} number of products to a store. Another is to use recyclable materials so that after the use, the product can be made into something

[END OF QUESTION PAPER]

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ADDITIONAL SPACE FOR ANSWERS

(10 cont.) else another is for every tree they cut down
they plant another 2 or something like that.