AS
DESIGN AND TECHNOLOGY (PRODUCT DESIGN)
FOR TEACHING FROM 2017

2022 EXAMINATION

UNIT 1 OER MATERIAL (ANNOTATED)

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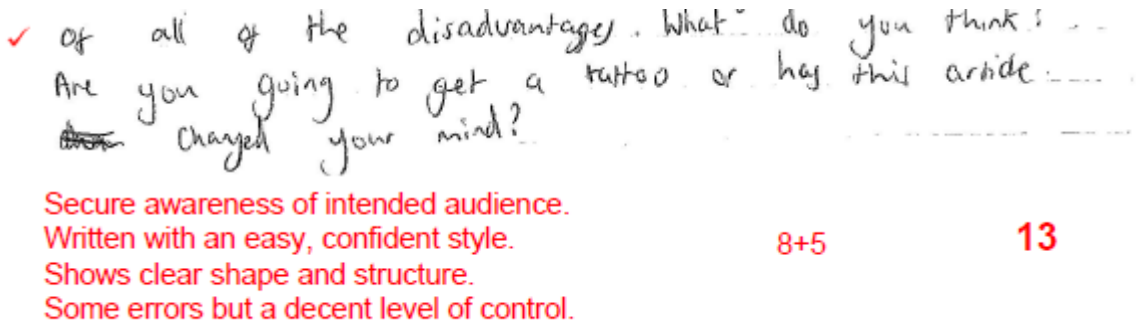

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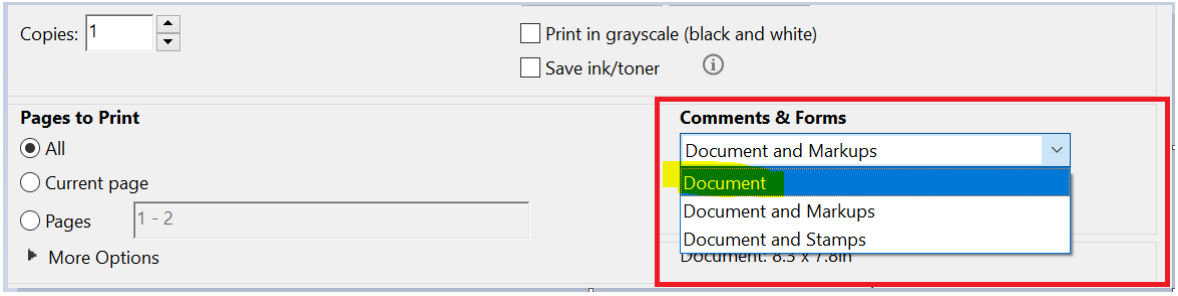

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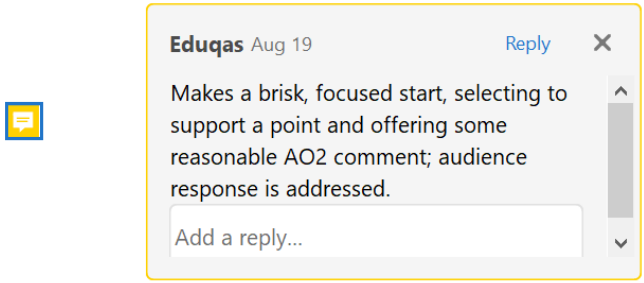

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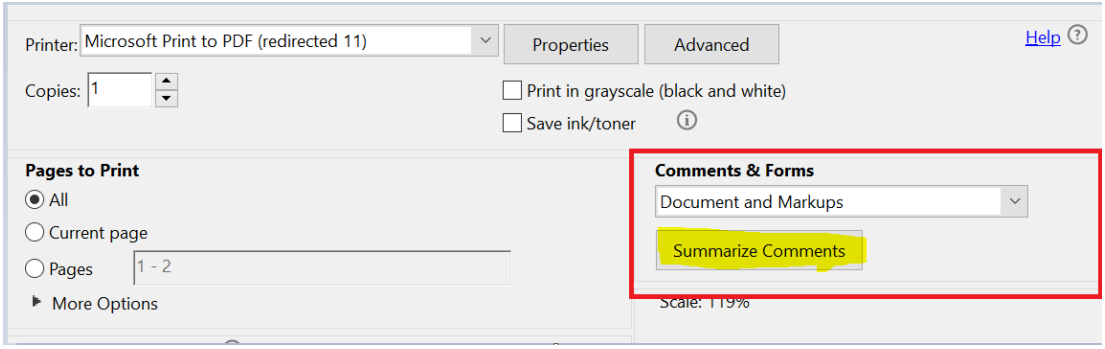

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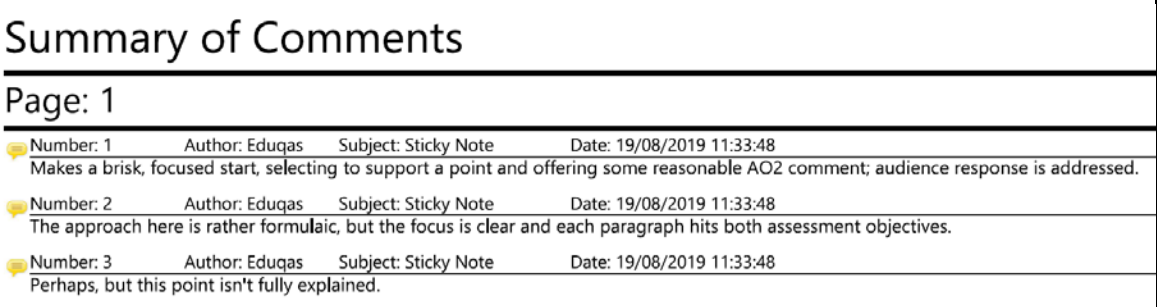


1. The photographs below show four different uses of mild steel.

(a) State the physical properties of mild steel that make it suitable for the uses shown above. [2]

.....

.....

.....

Question1	The photographs below show four different uses of mild steel.			
		AO3	AO4	Mark
(a)	State the physical properties of mild steel that make it suitable for the uses shown above.		✓	2

The response must identify the relevant physical properties of mild steel

Incorrect/ no response

1 mark for each reason. (Maximum 2 marks for the question)

Examples:

The physical properties of mild steel include:

- *strength*
- *ductility*
- *hardness*
- *impact resistance*
- *toughness*
- *Malleability when heated*

Guidance to markers

Incorrect/ no response	**0 marks**
Mild steel is a ductile material that can be drawn into a range of shapes.	**1 mark**
Mild steel is both ductile and tough, these properties allow the material to be drawn into a range of shapes/ forms and absorb many impacts without damage.	**2 marks**

Accept any appropriate relevant answer.

		AO3	AO4	Mark
(b)	The steel frame in parts of the building and the trailer has been galvanized. Give a detailed reason for this surface finish.		✓	2

Award up to 3 marks based on:

Galvanising

- *Provides protection from the environment.*
- *Hard wearing and long lasting and is suitable for external conditions.*
- *Protects the mild steel from corrosion.*
- *Will need less maintenance to maintain the integrity of the mild steel.*
- *Less ongoing maintenance*
- *Expensive to apply using specialist facilities*

Guidance to markers

Incorrect/ no response	**0 marks**
Galvanising provides protection from the environment.	**1 mark**
A galvanised finish is hard wearing and will last for a long time providing the mild steel with protection from corrosion in any environment.	**2 marks**

Accept any appropriate relevant answer.

		AO3	AO4	Mark
(c)	Using notes and sketches describe a method of permanently joining mild steel to mild steel.		✓	4

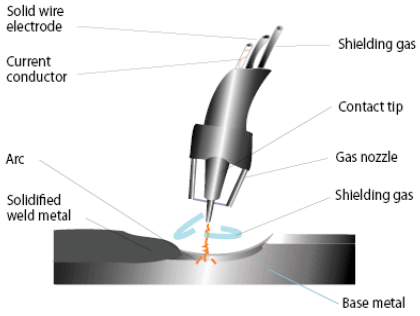
Award up to 4 marks based on:

Identification of one method of joining mild steel i.e., Brazing/Gas welding, Spot, MiG, TiG, Electrode/Arc welding.

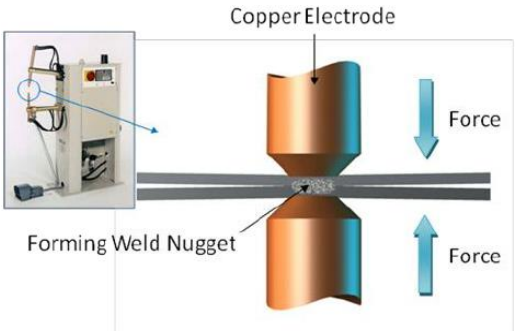
- *Using rivots*
- *Use of a labelled diagram explaining the elements of the selected welding method.*
- *Statement identifying that heat is required to melt the parent metal; heat source can be either gas or electrical.*

Accept soldering as a permanent method of joining metals but limit to ½ marks as this is not fully appropriate / suitable in the context of the question

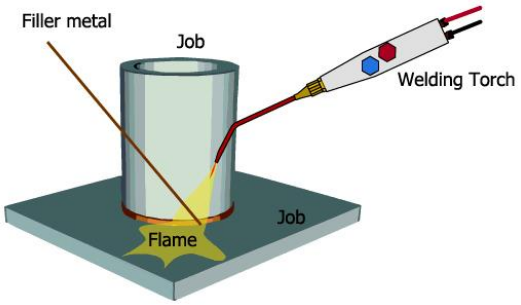
ELECTRODE/ARC



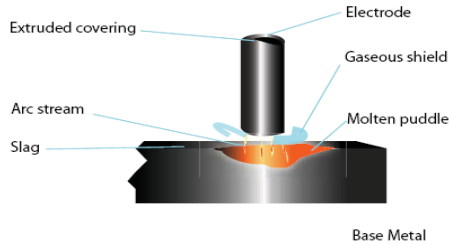
SPOT WELDING



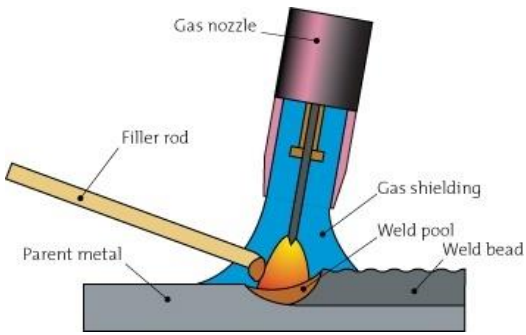
BRAZING/GAS WELDING



MIG WELDING



TIG WELDING



Poor quality sketch that does not show process.	**0 marks**
Quality sketch that shows the process.	**1 mark**
Guidance to markers	
Incorrect/ no response	**0 marks**
A simple diagram with limited understanding – limited labelling.	**1 mark**
A more detailed diagram demonstrating understanding – All key parts labelled.	**2 marks**
A detailed diagram supported with labels and a written explanation demonstrating understanding of the welding method identified.	**3 marks**

(b) The steel frame in parts of the building and the trailer has been galvanized. Give a detailed reason for this surface finish. [2]

.....

.....

.....

(c) Using notes and sketches describe a method of permanently joining mild steel to mild steel. [4]

1. The photographs below show four different uses of mild steel.

(a) State the physical properties of mild steel that make it suitable for the uses shown above. [2]

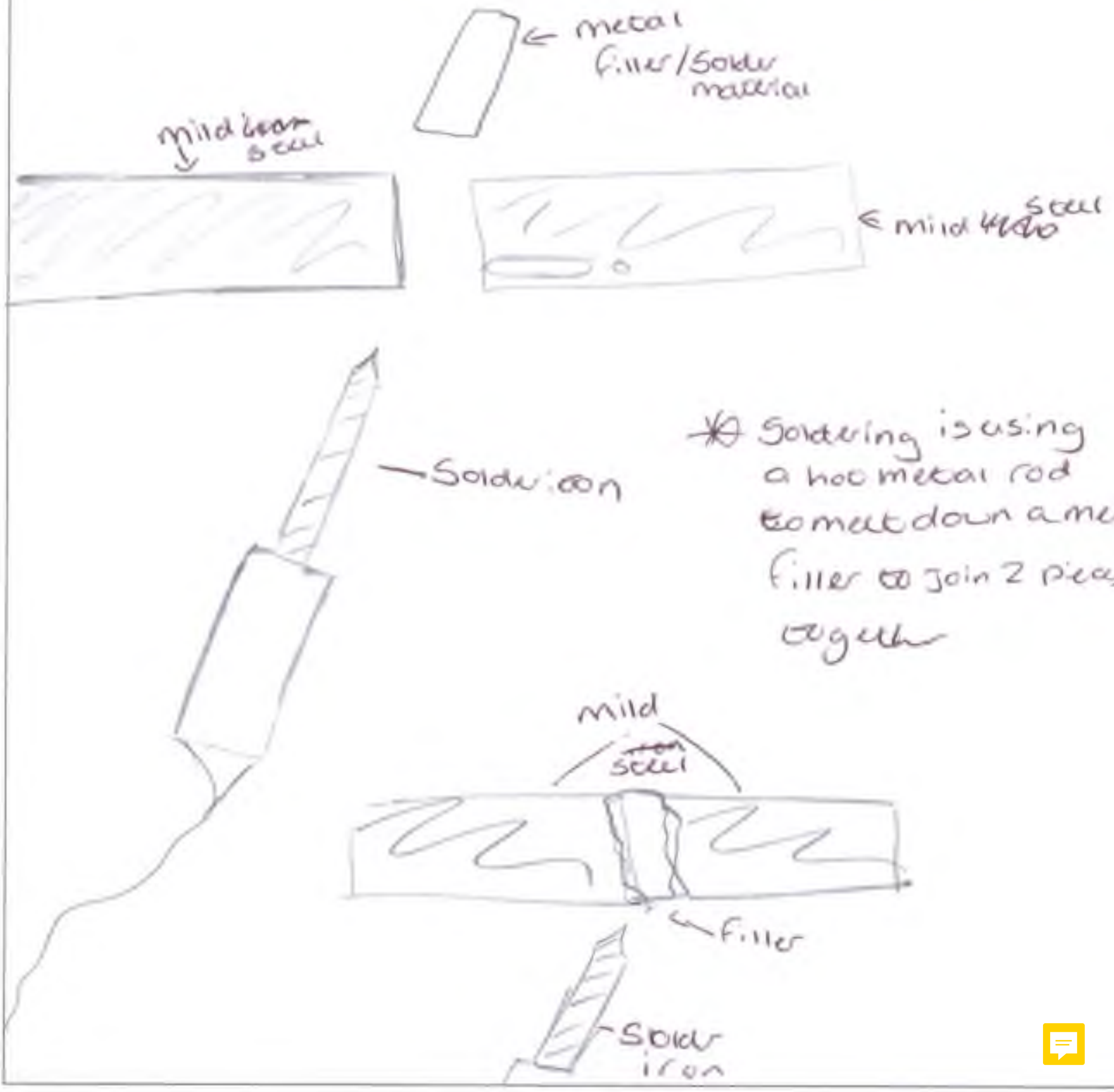
Mild Steel is Scratch resistand and has low water absorbancy making it good for outdoor /everyday use

(b) The steel frame in parts of the building and the trailer has been galvanized. Give a detailed reason for this surface finish. [2]

~~when it is galvanized it is galvanized it is to to happen~~

(1) it has a low water absorbency ~~Aitt Shint~~ (2) it is scratch resistant

(c) Using notes and sketches describe a method of permanently joining mild steel to mild steel. [4]



Soldering is using a hot metal rod to melt down a metal filler to join 2 pieces together

1. The photographs below show four different uses of mild steel.

(a) State the physical properties of mild steel that make it suitable for the uses shown above. [2]

It is strong so won't break easily.

It is malleable so can be moulded easily.

(b) The steel frame in parts of the building and the trailer has been galvanized. Give a detailed reason for this surface finish. [2]

~~Galvanized~~ Galvanizing is dipping ~~metal~~ ferrous metals in a bath of zinc to coat the metal to help it from corroding.

(c) Using notes and sketches describe a method of permanently joining mild steel to mild steel. [4]

Brazing =

1. You take the pieces ~~of~~ of mild steel and put a filler rod in between the two pieces.
2. Then heat the filler rod with the heat touch until ~~not~~ molten.
3. Leave filler rod and pieces of metal to cool down.

Example = Bike parts frames ~~are~~ are brazed together.

1. The photographs below show four different uses of mild steel.

(a) State the physical properties of mild steel that make it suitable for the uses shown above. [2]

~~Mild steel has high tensional ~~stre~~, tensile and compressional~~

Mild steel is very tough, meaning it can absorb impact. ~~It can also be~~

It has high fusibility too, meaning it can easily be cast in a mould.

It's malleability also allows it to stay in the shape ~~it~~ it has been formed to.

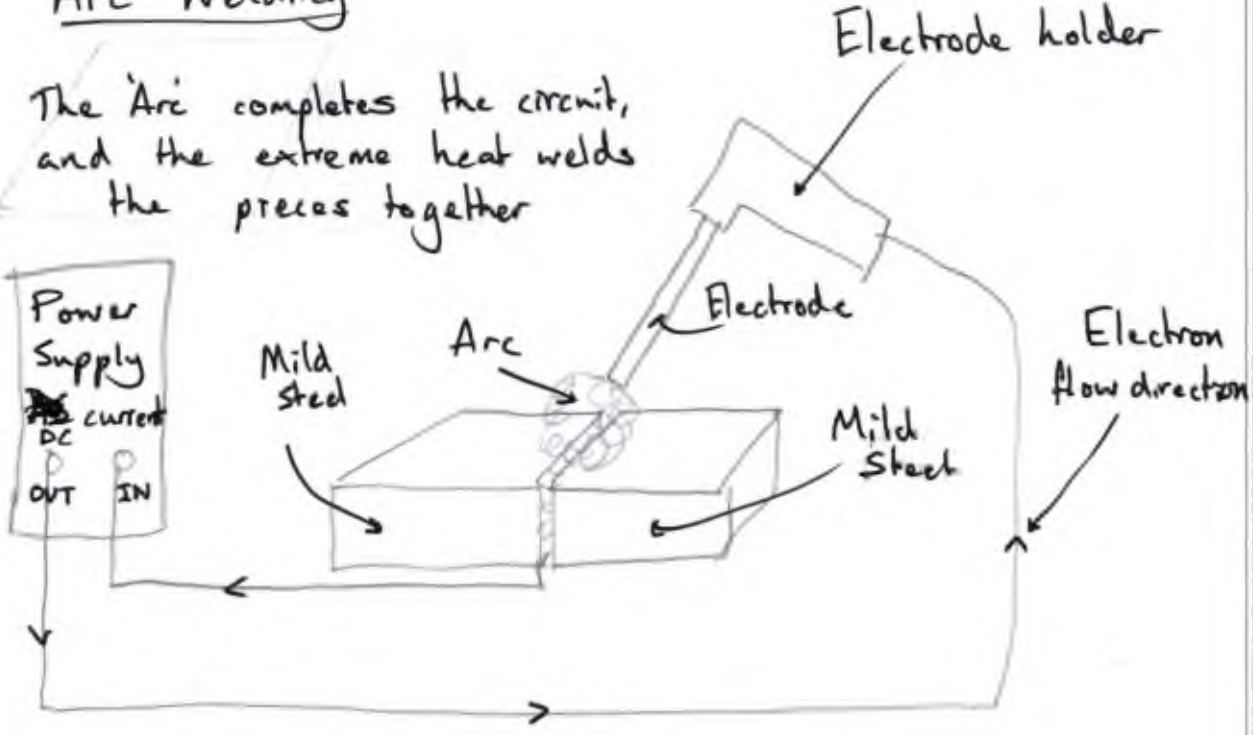
(b) The steel frame in parts of the building and the trailer has been galvanized. Give a detailed reason for this surface finish. [2]

Galvanising adds a layer of zinc plating to the outside. This makes it more resistant to corrosion, and less penetrative to water, and therefore less likely to rust, and degrade.

(c) Using notes and sketches describe a method of permanently joining mild steel to mild steel. [4]

Arc Welding

The 'Arc' completes the circuit, and the extreme heat welds the pieces together



Current flows one way through the 'circuit', in this case, as it is 'DC'. Current flows in way of arrows

2. Product designers and manufacturers have access to materials that are produced in 'stock size/form'.

(a) Explain the term 'stock size/form'. [2]

(b) Describe the advantages to both the designer and manufacturer of materials being available in 'stock form'. [6]

Question 2	Product designers and manufactures have access to materials that are produced in 'stock size/form.			
		AO3	AO4	Mark
(a)	Explain the term 'stock size/form		✓	2
	The response must demonstrate understanding of the term 'stock size/ form. *Example:* Incorrect/ no response Materials that have been machined / processed into standard sizes, shapes or forms. Materials that are kept in specified forms/sizes by material suppliers ready for immediate dispatch when ordered. **Accept any other appropriate response**			**0 marks** **1 mark** **2 marks**

		AO3	AO4	Mark
(b)	Justify the advantages to both the designer and manufacturer of materials being available in 'stock form'.		✓	6

The response must be justifying the advantages of stock size/ form material.

Award up to 6 marks based on:

- *Uniformity of size of materials across countries, allows sourcing of material from the cheaper supplier even if that is another country.*
- *Ease of transport / handling once converted from raw material: stock sizes allow for specialised handling equipment that can load/ unload quickly, stackable and palletised.*
- *Stock sizes are cheaper than specialised sizes.*
- *QC is guaranteed by the manufacturer of the stock form.*
- *Consistent appearance/ finish, designer or manufacturer can be assured of the aesthetic qualities of the material.*
- *Standard sizes allows the designer work with the sizes of the stock forms to minimise waste/cost effective.*
- *Manufactures have access to stock piled materials reduce lead times.*

Incorrect/ no response	**0 marks**
Level 1 • The candidate has a simplistic knowledge of the issues associated with the question. • Limited use of terminology and technical language. • The candidate has limited knowledge of stock materials.	**1 mark**
Level 2 • The candidate has a basic understanding of the issues associated with the question. • Satisfactory use of terminology and technical language. • The candidate has some general knowledge of stock materials, but lacking detail.	**2-3 marks**
Level 3 • The candidate demonstrates a clear understanding of the issues associated with the question. • Good use of terminology and technical language. • The candidate has demonstrated real knowledge and understanding of the suitability/importance/ use of stock forms.	**4-5 marks**
Level 4 • The candidate demonstrates a detailed understanding of the issues involved in the question. • Very good use of terminology and technical language. • The candidate has demonstrated detailed knowledge of the use and application of stock forms/materials in design and manufacture	**6 marks**

2. Product designers and manufacturers have access to materials that are produced in 'stock size/form'.

(a) Explain the term 'stock size/form'. [2]

Stock size means that the material can be bought in standardised sizes therefore allowing production to be easier and more efficient

(b) Describe the advantages to both the designer and manufacturer of materials being available in 'stock form'. [6]

An advantage for some designers would be the ability to know where joints would have to be if it was a large project it also gives the designer the ability to work out how ~~much material is needed~~ many designs can be made before theat.

A benefit for the manufacturer would be the ease of production along with ease of transportation due to everything being a stock size

2. Product designers and manufacturers have access to materials that are produced in 'stock size/form'.

(a) Explain the term 'stock size/form'. [2]

A standard size of a material that is mass produced e.g A4 paper A stock size is a very common/standard size at which a material is cut and sold e.g A4 paper

(b) Describe the advantages to both the designer and manufacturer of materials being available in 'stock form'. [6]

An advantage of stock sizes is they are often the cheapest form of a material that a designer can by so by designing your product to encorporate these sizes would save alot of time and money. If a designer uses stock sizes then less people and equiptment are needed to manufacture product, as it is already cut to necessary size

* for manufacturers and designer

Examiner only

2. Product designers and manufacturers have access to materials that are produced in 'stock size/form'.

(a) Explain the term 'stock size/form'. [2]

Stock Sizes are set measurements of certain products like lengths of wood, or lightbulb sizes. They make it easier* because they are more accesable and cheap if the sizes are set across different shops

(b) Describe the advantages to both the designer and manufacturer of materials being available in 'stock form'. [6]

An advantage to the designer of the materials being available in stock sizes is that it is easier for them to purchase the material because all shops will sell the same sizes. Another advantage to the designer is that they are often cheaper to buy. Similarly an advantage to the manufacturer is that it's cheaper because they can produce the material on a batch or mass scale, decreasing the cost per unit. ~~Alternatively~~ ALSO making stock forms makes it easier and faster to produce the material because identicle copies can need to be made.

3. Reverse engineering and product analysis are two design strategies used within the iterative design process.

Analyse the importance of both strategies in the design and development of a product. [8]

Question 3	**Reverse engineering and product analysis are two design strategies used within the iterative design process.** **Analyse the importance of both strategies in the design and development of a product.**			
		AO3	**AO4**	**Mark**
		✓		8

Award up to 8 marks for responses based on:

Examples:

Reverse Engineering

- *Can identify possible methods of manufacture.*
- *Can identify a possible range of materials which could be used.*
- *Can identify the assembly sequence.*
- *Requires a similar/same competitors' product. – for comparisons*
- *Understanding the technology used within a product and apply it in the design of the new product.*

Product Analysis

- *Can identify possible methods of manufacture.*
- *Can identify a possible range of materials which could be used.*
- *Can identify ergonomic considerations.*
- *Can identify anthropometric considerations.*
- *Can identify the products place in the market.*
- *Requires a similar/same competitors' product.*
- *Reference to user requirements.*
- *Costs/economics*

Do not credit answers that are repeated.

Responses must be based on Reverse Engineering and Product Analysis

Incorrect/ no response	**0 marks**
Level 1 • The candidate has a simplistic knowledge of the issues associated with the question. • Limited use of terminology and technical language. • The candidate has limited knowledge of design strategies • The candidate will express basic principles clearly, if not always fluently.	**1-2 marks**
Level 2 • The candidate has a basic understanding of the issues associated with the question. • Satisfactory use of terminology and technical language. • The candidate has some general knowledge of the design strategies, but they are not always considered in detail. • The candidate will express straightforward principles clearly, if not always fluently. Answers may deviate from the question.	**3-4 marks**

	Level 3 • The candidate demonstrates a clear understanding of the issues associated with the question. • Good use of terminology and technical language. • The candidate has demonstrated real knowledge and understanding of the research strategies • The candidate will express the application of the strategies clearly and fluently. **Level 4** • The candidate demonstrates a specific ability to analyse questions, considers a wide range of factors and has a clear understanding of the issues associated with the question. • Very good use of terminology and technical language. • The candidate has demonstrated detailed knowledge of the use and application of the two design strategies • The candidate will express complex ideas extremely fluently.	**5-6 marks** **7-8 marks**

3. Reverse engineering allows the designer of a product to assess any improvements needed to improve their products. It can also allow the designer of the product explore a variety of different ideas and ways in how they can make their product more appealing to the target market their product is aimed at.

A product analysis allows the designer to consider their product. It can focus on the aesthetics, cost, consumer, environment suitability, size, safety, functionality and the materials of the product that will be used.

3. Reverse engineering and product analysis are two design strategies used within the iterative design process.

Analyse the importance of both strategies in the design and development of a product. [8]

Reverse engineering is important to the design and development of a product as it allows the designer to see how others have assembled a similar product which then allows the designer to take inspiration from this to incorperate in to their work. It also lets the designer see what could have worked better where something possibly didn't work very well. Product analysis is great for designers to see where a product is effective and useful and where it is not so useful. It also allows the designer to see any safety hazards that might be in the product and how the designer can ensure they are not used again.

taking apart product to analyse

looking at detail at product

5

Aesthetics
Cost
Ergonomics
Safety
Function
manufacture

3. Reverse engineering and product analysis are two design strategies used within the iterative design process.

Analyse the importance of both strategies in the design and development of a product. [8]

Reverse engineering is key to In the design and development of a product as it allows you to have a Closer look Inside your products or Similar ones. Reverse engineering is when the product is taken apart so you can assess how the product functions and how it asembles all its parts. To help gain Ideas and Inspiration designers can use reverse engineering to look at Similar/Competitors products and see exactly how they function and Come together. It Can also help to create new ideas by looking at what is not good with others Products and Improving on it.

Product analysis is when every aspect of the Product/design is carefully looked at In detail, for example the aesthetics, Cost, Safety and ergonomics of the Product. This is Important as before a Product hits the market it needs to be user friendly. In my opinion the aesthetics of the Product is very Important as it is the first thing the user sees, and so ensuring that the aesthetics of the Product fits with the aesthetics and taste of the user is key. Also analysing the cost of making the Product is Important to understand Wheather the Product will be Profitable. Overall Product analysis aids to Improve and make changes or See what is good about ~~the~~ a design or Product.

4. Environmental issues are a world-wide concern. Study the image below and evaluate the advantages and disadvantages of using polymers in product design. [8]

Marks will be awarded for the content of the answer and the quality of communication.

Question 4	**Environmental issues are a world-wide concern. Study the images below and evaluate the advantages and disadvantages when using polymers in product design.**			
		AO3	**AO4**	**Mark**
		✓		8
	The response must discuss the use of designed polymers and identify both the advantages and disadvantages. *Responses could include:* *Use of oil in production.* *Disposal of waste polymers.* *Pollution of the oceans and the food chain.* *Use for a wide variety of products.* *Flexibility of the material i.e. range of colours and functions.* *Allowing for greater creativity in design.* *Manufacturing processes.* *Packaging.* *Reusing polymers.*			
	Incorrect/ no response			**0 marks**
	Level 1 • The candidate has a simplistic knowledge of the issues associated with the question. • Limited use of terminology and technical language. • The candidate has limited knowledge of the aesthetic qualities of the product and/ or consideration for the user in their design. • The candidate will express basic ideas clearly, if not always fluently. Answers may deviate from the question or not be relevant. • Grammar, punctuation and spelling may be weak impacting on effective communication.			**1-2 marks**
	Level 2 • The candidate has a basic understanding of the issues associated with the question. • Satisfactory use of terminology and technical language. • The candidate has some general knowledge of the aesthetic qualities and consideration for the user in the design aspects, but they are not always considered in detail. • The candidate will express straightforward ideas clearly, if not always fluently. Answers may deviate from the question or be weakly presented. • There may be some errors of grammar, punctuation and spelling but is still able to communicate the issues			**3-4 marks**

	Level 3 • The candidate demonstrates a clear understanding of the issues associated with the question. • Good use of terminology and technical language. • The candidate has demonstrated real knowledge about the aesthetic qualities, linked to the products discussed. There are descriptive comments about some elements of the needs of the end user. • The candidate will express moderately complex ideas clearly and fluently, through well-linked sentences and paragraphs. Answers will be generally relevant and structured. • There may be occasional errors of grammar, punctuation and spelling.	**5-6 marks**
	Level 4 • The candidate demonstrates a specific ability to analyse questions, considers a wide range of factors and has a clear understanding of the issues associated with the question. • Very good use of terminology and technical language. • The candidate has demonstrated detailed knowledge about the aesthetic qualities, linked to the products identified. There are detailed descriptive comments about specific elements of the needs of the end user. • The candidate will express complex ideas extremely fluently. Sentences and paragraphs will follow on from each other smoothly and logically. Answers will be consistently relevant and structured. • There will be few, if any, errors of grammar, punctuation and spelling. ***Accept any other appropriate response***	**7-8 marks**

4. Environmental issues are a world-wide concern. Study the image below and evaluate the advantages and disadvantages of using polymers in product design. [8]

recycle

Marks will be awarded for the content of the answer and the quality of communication.

An advantage of using polymers is that they are cheap to buy. This means that many prototypes can be made out of polymer and you can keep improving it. Also, after creating these prototypes you can recycle them which helps with less pollution. Another advantage is that when designing a product with polymers, you can choose different colours to experiment and try out. You could even get feedback from your target market asking which colour is the best so you can use polymers in research and design too. However, most people throw away polymers anywhere which causes pollution. Also, if you use polymers in products you would have to apply a finish over it which takes time and can be expensive.

* on Continuation Page

4. Environmental issues are a world-wide concern. Study the image below and evaluate the advantages and disadvantages of using polymers in product design. [8]

Marks will be awarded for the content of the answer and the quality of communication.

Polymers come from crude oil which is a natural resaurce, often faund under the sea. The extraction of crude oil is extremly bad for the environment as ~~th~~ ~~ear~~ ~~d~~ the oil rigs or oil spilages can destroy sea life, and also the transportation and procesing of crude oil into polymer releases lots of harmfull greenhouse gasses into the atmosphere, contributing to climate change.

Once the polymers become products because it is such a cheap material many products are single use. Many single use products then end up at landfill or like the picture above just left on the floor. And plastic can take thousands of years to fully decompose. Plastic being left at a beach (like the picture above) is even more harmfull as it can easily be ingested by birds or sea life and in some cases can the kill them.

For continuation only.

4) Despite the many disadvantages of the use of polymers in product design there are some* one being that it is very cheap and accesible to use for the manufacturer, this then decreases the price for the consumer. Another ~~also~~ advantage of plastic is that it comes in many different forms, so a wide range of products can be made.

4. Environmental issues are a world-wide concern. Study the image below and evaluate the advantages and disadvantages of using polymers in product design. [8]

Marks will be awarded for the content of the answer and the quality of communication.

The plastic bags are made out of a ~~thermoplastic~~ thermoplastic. ~~This means~~ Polythene is the polymer that is used to make ~~plastic bags~~ Plastic bottles ~~there~~ they are ~~recyle~~ easily recyclable but most end up in Landfill which is a ~~disdv~~ disadvantage ~~because~~. Polymers are ~~s~~ made ~~of~~ from oil which is a finite resources, so ~~other~~ ~~ones~~ once it's runs out it's agne. An advantage is that ~~s~~ certain plastics ~~,~~ (thermoplastic) can be recyled unlike other materials. For example metal can be recyled but ~~is~~ can be harder to reclye than polymers. Another advantage is that polymers are ~~easit~~ easier to manufacter more difficult ~~easier shapes~~ detailed shapes ~~,~~ because of the different types of manufacturing ~~Rodcess~~ Process Like blow moulding, Injection and vaccum forming.

5. The storage unit below is manufactured from a regenerated material, plywood. The unit consists of three parts that are slotted together.

(a) Identify with reasons a possible method of manufacture for the End Piece. [2]

.....

.....

.....

(b) Using notes and sketches explain how the body of the unit could be formed. [4]

(c) State the properties of plywood that make it a suitable material for this storage unit. [2]

.....

.....

.....

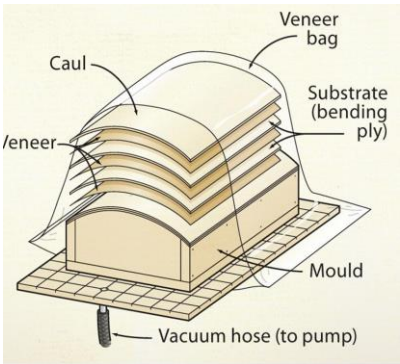
Question 5	The storage unit below is manufactured from a regenerated material, plywood. The unit consists of three parts that are slotted together.			
		AO3	AO4	Mark
(a)	Identify with reasons a possible method of manufacture for the end piece.		✓	2
	The response must identify possible method of manufacture for the end piece only with an appropriate reason • *CAM using a router or laser* • *Traditional hand cutting* • *Using a Jig or Template.* *Incorrect/ no response* Process stated with no justification. Process stated with supporting/ justified benefit. ***Stating two methods of manufacture with no justification award only 1 mark*** *Example:* *A CAM router. This will allow for a much faster production time when compared to making the product using traditional workshop tools.* ***Accept any other appropriate response*** ***Maximum 2 marks***			**0 marks** **1 mark** **2 marks** **2 marks**

		AO3	AO4	Mark
(b)	Using notes and sketches explain how the body of the unit could be formed.		✓	4

The response must explain how the main body of the unit could be manufactured.

Award up to 4 marks based on:

Veneer/ Vacuum Bag.
Moulds/ formers.
Steam bending.
Kerfing. This can be credited but will require the candidate to apply a veneer to the main body of the unit



Simple supporting statement:

- *A vacuum table uses a flexible membrane and an air pump.*

Guidance to markers

Diagram and notes required for 4 marks

Incorrect/ no response	**0 marks**
A simple diagram with limited understanding – limited labelling.	**1 mark**
A more detailed diagram demonstrating understanding - All key parts labelled.	**2 marks**
A detailed diagram supported with labels and a written explanation demonstrating understanding of the forming method.	**3 marks**

Example: (With supporting diagram)

A vacuum table uses a flexible membrane and an air pump.	**2 marks**
A mould is placed on the bed of the vacuum table with the veneers of wood in the correct position. *Once the membrane is sealed over the mould and plywood air is removed from the table forming a vacuum.* *The flexible membrane causes the plywood to form around the mould/former*	**4 marks**

		AO3	AO4	Mark
(c)	State the properties of plywood that make it suitable material for this storage unit.		✓	2

Response must identify the properties of plywood that make it suitable for the unit.

Award 2 marks based on stating two properties

Guidance to markers

- Strength in all directions
- No weakness due to grain.
- Can be formed around moulds/ formers
- Can be shaped using a kerfing technique.

Examples:

No answer or inappropriate answer **0 marks**

Can be easily shaped around a former/mould. **1 mark**

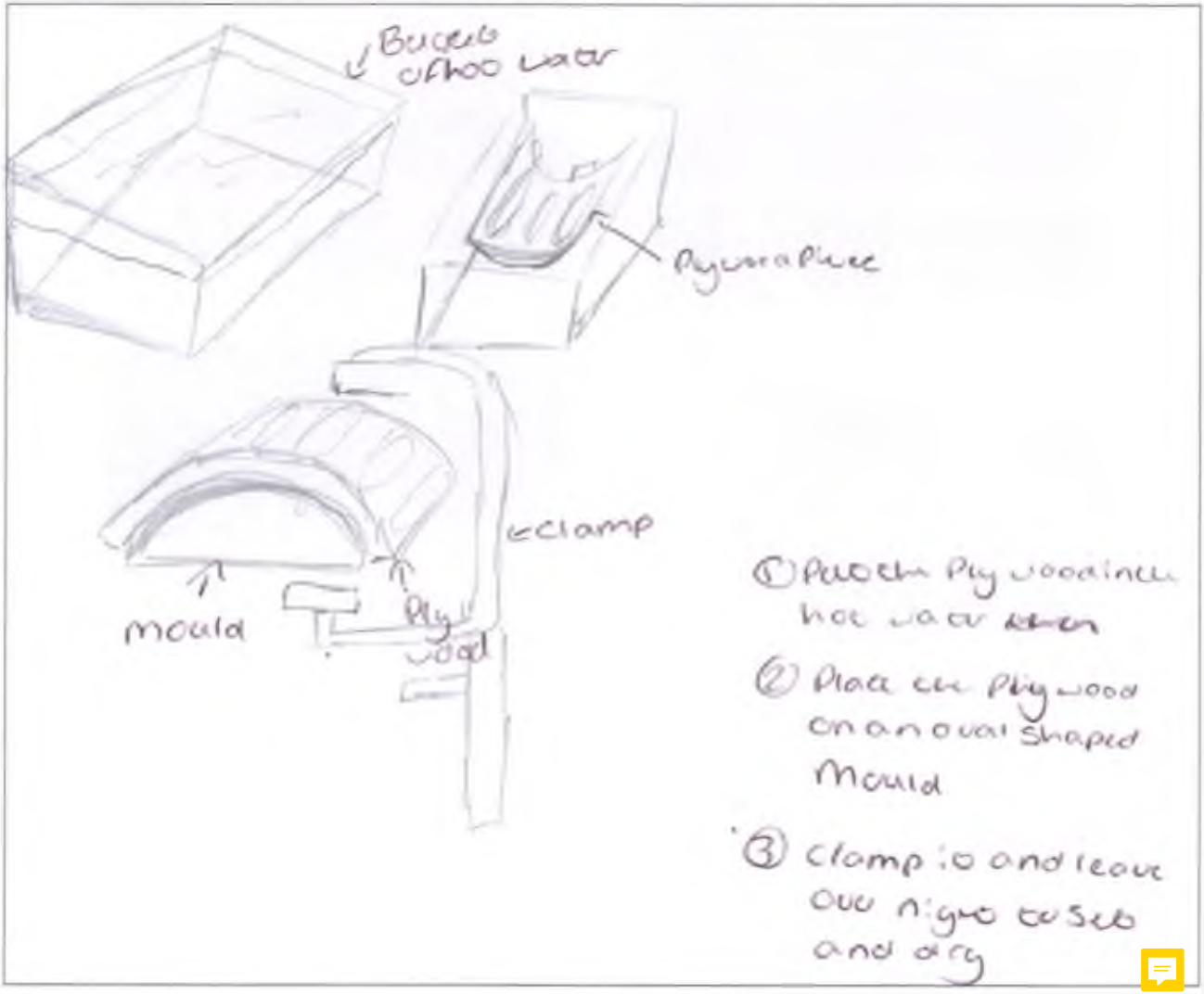
Plywood is structurally sound material that can be easily shaped around a former/mould. **2 marks**

5. The storage unit below is manufactured from a regenerated material, plywood. The unit consists of three parts that are slotted together.

(a) Identify with reasons a possible method of manufacture for the End Piece. [2]

This end Piece could be laser cutt due to its round shape a laze cutter can cut them out easier than a the normal saw

(b) Using notes and sketches explain how the body of the unit could be formed. [4]



(c) State the properties of plywood that make it a suitable material for this storage unit. [2]

Ply wood is malluable making it easy to bend and shape.

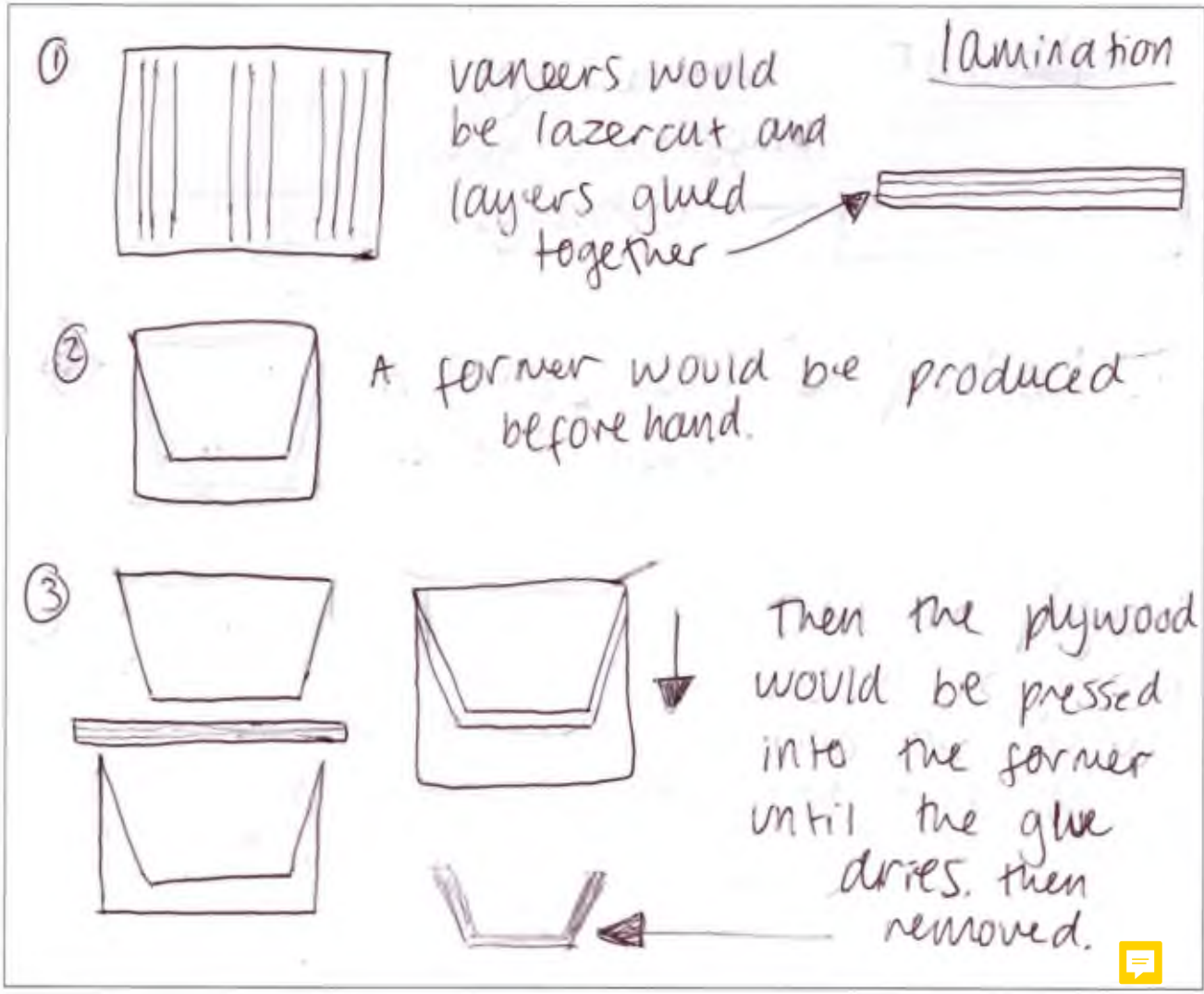
5. The storage unit below is manufactured from a regenerated material, plywood. The unit consists of three parts that are slotted together.

(a) Identify with reasons a possible method of manufacture for the End Piece. [2]

because

The end piece could be lazer cut ~~because~~ the shape would be accurate so it would slot ~~with~~ into the other pieces perfectly. Also lazercutting is a cheap process once set up.

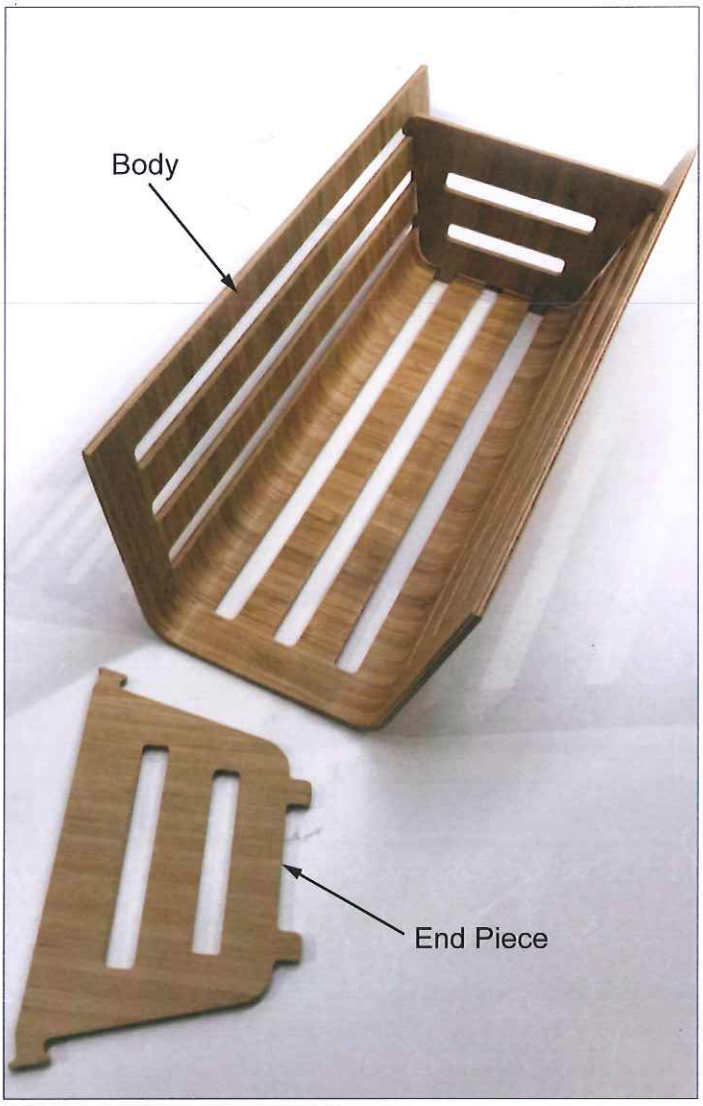
(b) Using notes and sketches explain how the body of the unit could be formed. [4]



(c) State the properties of plywood that make it a suitable material for this storage unit. [2]

Plywood is durable and strong so it will be able to hold and store items for a long time. Also it has a smooth finish which is appealing to the user.

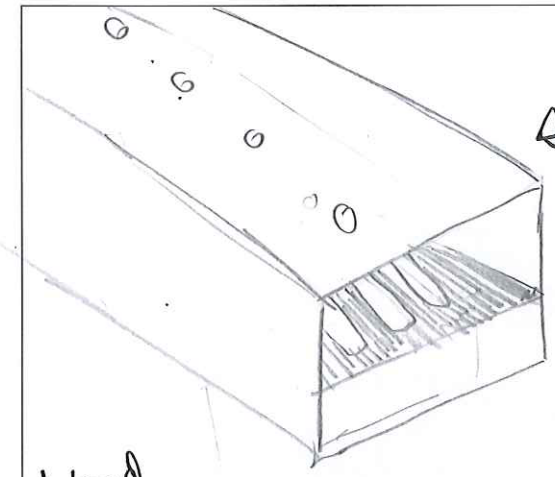
5. The storage unit below is manufactured from a regenerated material, plywood. The unit consists of three parts that are slotted together.



(a) Identify with reasons a possible method of manufacture for the End Piece. [2]

The end piece can be manufactured using a laser cutter machine as it provides a uniform and accurate end-product with little waste.

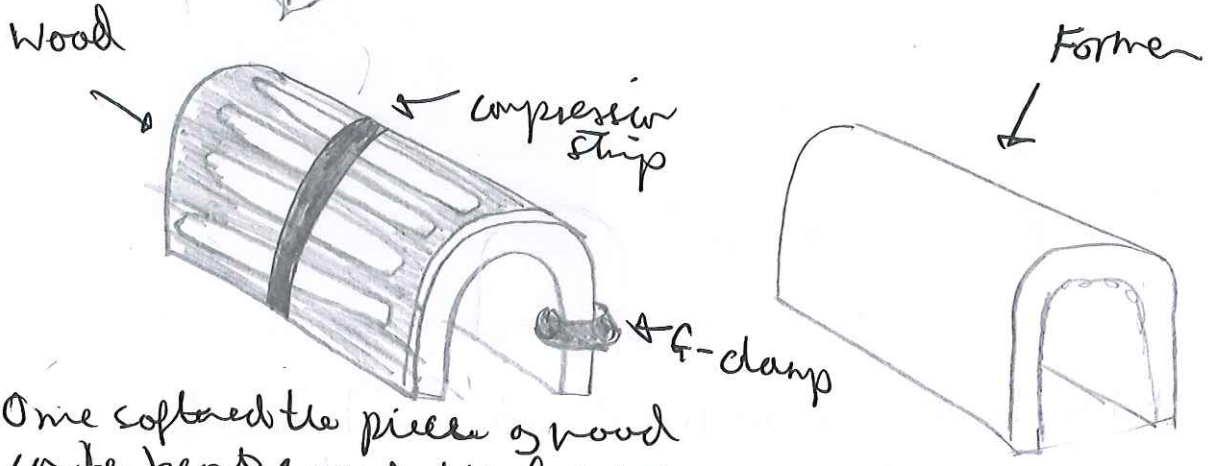
(b) Using notes and sketches explain how the body of the unit could be formed. [4]



Not accurate representation of scale

Body of the unit could be steam bent

- The wood is put into a water tight ~~chamber and steam is~~ chamber and steam is pumped in

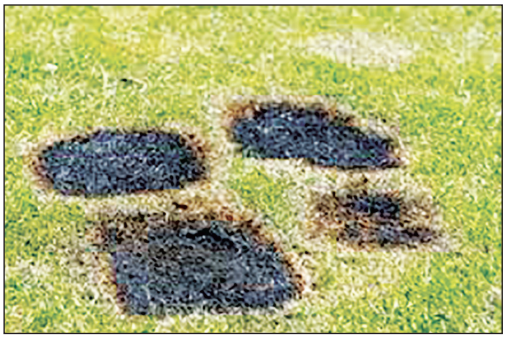


Once softened the piece of wood can be bent around the former secured with G-clamps.
A compression strip can be used

(c) State the properties of plywood that make it a suitable material for this storage unit. [2]

Plywood is durable and has high dimensional stability as it has no grain weakness. It also has a smooth finish.

6. For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.



(a) With reference to the contexts above fully describe **four** different issues associated with the use of disposable barbecues. [8]

(b) Design a **reusable portable unit** that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea.

A standard size disposable barbecue is 300 mm x 300 mm x 100 mm.

Marks will be awarded for:

(i) an innovative and **reusable portable unit** that holds the disposable barbeque. [8]

(ii) how the unit addresses environmental issues. [4]

(iii) how it meets the safety requirements of the user when cooking the food. [4]

(iv) the quality of communication and the use of annotated, 2D and 3D drawings. [4]

Present your design idea in the space below.

You are not expected to render, colour or shade your design.

(c) (i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

Question 6	For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.			
		AO3	AO4	Mark
(a)	With reference to the contexts above fully explain **four** different issues associated with the use of disposable barbecues.		✓	8

Response could be based on:

- *Use of portable BBQs on park furniture and grass areas, this leads to damage as a result of the heat generated by the base of the BBQ.*
- *Safety all the utensils and equipment are on the ground people could walk or fall onto them.*
- *Concerns over hygiene as all the utensils equipment are at ground level and laid out in contact with the grass.*
- *Sociable event with many people engaged in the activity but not focussed on the instant BBQs. BBQs become a hazard at ground level.*

Guidance to markers

Identification of issue	**1 mark**
Identification of issue with justification	**2 marks**
Example:	
Incorrect/no response	**0 marks**
The use of portable BBQs can lead to burnt grass and furniture	**1 mark**
When placed on the ground or a wooden flat surface a portable BBQ can burn the surface as a result of the heat produced by the charcoal in the tray being in contact with the ground or surface	**2 marks**

Accept any other appropriate response

		AO3	AO4	Mark
(b)	Design a portable unit that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea. A standard size disposable barbecues is 300mm x 300mm x 100mm. Marks will be awarded for: (i) an innovative and portable unit that holds the disposable barbeque. [8] (ii) how the unit meets environmental issues. [4] (iii) how it meets the safety requirements of the user when cooking the food. [4] (iv) the quality of communication and the use of annotated, 2D and 3D drawings. [4]		✓	20

	(i) an innovative and portable unit that holds the disposable barbeque. *The response must contain possible **innovative** design features for a portable stand for instant BBQs.* I*nnovative features could include:* *A folding system for the elements of the product allowing it to be portable.* *A temporary joint that allowed for ease of assembly.* *Use of a material i.e. Kevlar.*	
	Incorrect/ no response.	**0 marks**
	Design produced showing no innovative features.	**1-2 marks**
	Design produced with limited innovative features, some not relevant to the design problem.	**3-4 marks**
	Design proposed with some innovative features, most relevant to the design problem.	**5-6 marks**
	Innovative design proposed and clearly relevant to the design problem.	**7-8 marks**

	(ii) how the unit meets environmental issues. *The response must identify possible environmental issues concerning the use of portable BBQ**s** and the proposals attempt to address these issues.* *Environmental issues addressed could include:* *Burning the surface that the Portable BBQ rests on.* *Embers/coals from the BBQ setting light to the surrounding area.* *Disposal of the used BBQ.* No issue identified / no response. Candidate highlights an environmental issue. Candidate identifies how the design produced addresses the environmental issue highlighted. **Maximum of 4 marks**	**0 marks** **1 mark** **2 marks**
	(iii) how it meets the safety requirements of the user when cooking the food. *The response must identify issues concerning the safe use of portable BBQ**s** when preparing food.* *Safety issues addressed could include:* *Accidental burning through contact with BBQ.* *Hygienic storage of utensils when not in use.* No issue identified / no response. Candidate highlights a safety and Hygiene issue. Candidate identifies how the design produced addresses issue highlighted. **Maximum of 4 marks**	**0 marks** **1 mark** **2 marks**
	(iv) The quality of communication and use of annotated 2D and 3D drawings. *There MUST be a mixture of 2D and 3D design sketches generated. Sketches should include annotation.* ***Candidates are not expected to render, colour or shade your design work.*** **Guidance to markers** The emphasis is on the quality of communication and presentation of design ideas. Idea developed with either 2D **or** 3D illustrations only. Idea developed with both 2D **and** 3D illustrations, illustrations provide limited information. Ideas developed with both 2D **and** 3D illustrations, illustrations highlight many design details for the design. Creative use of both 2D **and** 3D illustrations, illustrations demonstrate all details fully explain the design. **Maximum of 4 marks.**	**1 mark** **2 marks** **3 marks** **4 marks**

		AO3	AO4	Mark
(c)			✓	12

(i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

The response must identify and justify why a prototype is essential prior to full scale production.

Guidance to markers

No mention of material.	**0 marks**
Identifying a reason.	**1 mark**
Identified reason with a valid justification.	**1 mark**

Maximum 4 marks

Examples:

A prototype is the first generation of a manufactured product and will allow the designer/ manufacturer to identify possible faults/ errors in the design prior to the full-scale production. **1 mark**

Production prototype will allow the manufacturer to identify suitable production processes and possible standard parts that could be used allowing the efficient and economical production of the product. **2 marks**

Accept any other appropriate response

(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

The response must identify both advantages and disadvantages for both the consumer and the manufacturer. The response does not need to discuss the benefits for the developing country.

Guidance to markers

Advantages for the consumer:
- *Cheaper Products.*
- *Variety of products available*

Disadvantages for the consumer:
- *Perceived lower quality product.*
- *Not supporting domestic economy*

Advantages for the Manufacturer:
- *Lower production/ operational costs, cheaper labour.*
- *Fewer regulations allowing for more flexible working conditions.*
- *Larger pool of available labour.*
- *Production plants closer to raw materials, reducing transport costs.*
- *Economical for larger production runs.*
- *Competitive advantage.*

Disadvantages for the manufacturer:
- *Distance for the transport of the finished products will increase costs*
- *Quality control concerns.*
- *Regional/ Local political stability.*
- *Public relations issues.*
- *Communication can be difficult over long distances and different cultures/countries.*
- *Lack of flexibility.*

	Incorrect/ no response	**0 marks**
	Level 1 • The candidate has a simplistic knowledge of the issues associated with the question. • Limited use of terminology and technical language. • The candidate has limited knowledge of the concept of global manufacturing. • The candidate will express basic ideas clearly.	**1-2 marks**
	Level 2 • The candidate has a basic understanding of the issues associated with the question. • Satisfactory use of terminology and technical language. • The candidate has some general knowledge of the global manufacturing but they are not always considered in detail. • The candidate will express straightforward ideas clearly.	**3-4 marks**
	Level 3 • The candidate demonstrates a clear understanding of the issues associated with the question. • Good use of terminology and technical language. • The candidate has demonstrated real knowledge of global manufacturing some issues discussed. There are descriptive comments about some elements of the needs of the end user. • The candidate will express moderately complex ideas clearly.	**5-6 marks**
	Level 4 • The candidate demonstrates a specific ability to analyse questions, considers a wide range of factors and has a clear understanding of the issues associated with the question. • Very good use of terminology and technical language. • The candidate has demonstrated detailed knowledge regarding Global manufacturing. • There are detailed descriptive comments about specific elements of the manufacturer and the consumer. • The candidate will express complex ideas extremely fluently. ***Accept any other appropriate response***	**7-8 marks**

6. For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.

(a) With reference to the contexts above fully describe **four** different issues associated with the use of disposable barbecues. [8]

It can ruin the wildlife by causing fires when not used properly

It can make permanent mark on ~~select~~ stuff such as wood on tables

(b) Design a **reusable portable unit** that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea.

A standard size disposable barbecue is 300 mm x 300 mm x 100 mm.

Marks will be awarded for:

(i) an innovative and **reusable portable unit** that holds the disposable barbeque. [8]

(ii) how the unit addresses environmental issues. [4]

(iii) how it meets the safety requirements of the user when cooking the food. [4]

(iv) the quality of communication and the use of annotated, 2D and 3D drawings. [4]

Present your design idea in the space below.

You are not expected to render, colour or shade your design.

This reusable and portable devise holds the desposable BBQ and stops it from ruining Soute like ~~st~~ bottles and grass, the desposable BBQ slots into the holder and is easy to put in and take back out after it has cooled down ~~after~~ being used

(c) (i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

So there is no problems ~~with~~ with the final product

(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

6. For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.

(a) With reference to the contexts above fully describe **four** different issues associated with the use of disposable barbecues. [8]

It burns ~~a~~ wood, the material ~~is~~ that the disposable ~~bbq's~~ BBQ is made ~~of~~ out of ~~as~~ conducts to much heat through the material that it burns^ and stains wood. The BBQ cause/starts fires, ~~the~~ the people sometimes could ~~of~~ just leave the disposable ~~is~~ BBQ on the floor while ~~it's~~ it's still hot not realising. The grass then catches fire and if it's a place that has really dry grass the fire could spread really quickly ~~&~~ which ~~would~~ ~~too~~ could case harm to people or maybe even animals if close by. Disposable, one use then but in the bin for land fill instead of recyled.

only

(b) Design a **reusable portable unit** that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea.

A standard size disposable barbecue is 300 mm x 300 mm x 100 mm.

Marks will be awarded for:

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Present your design idea in the space below.

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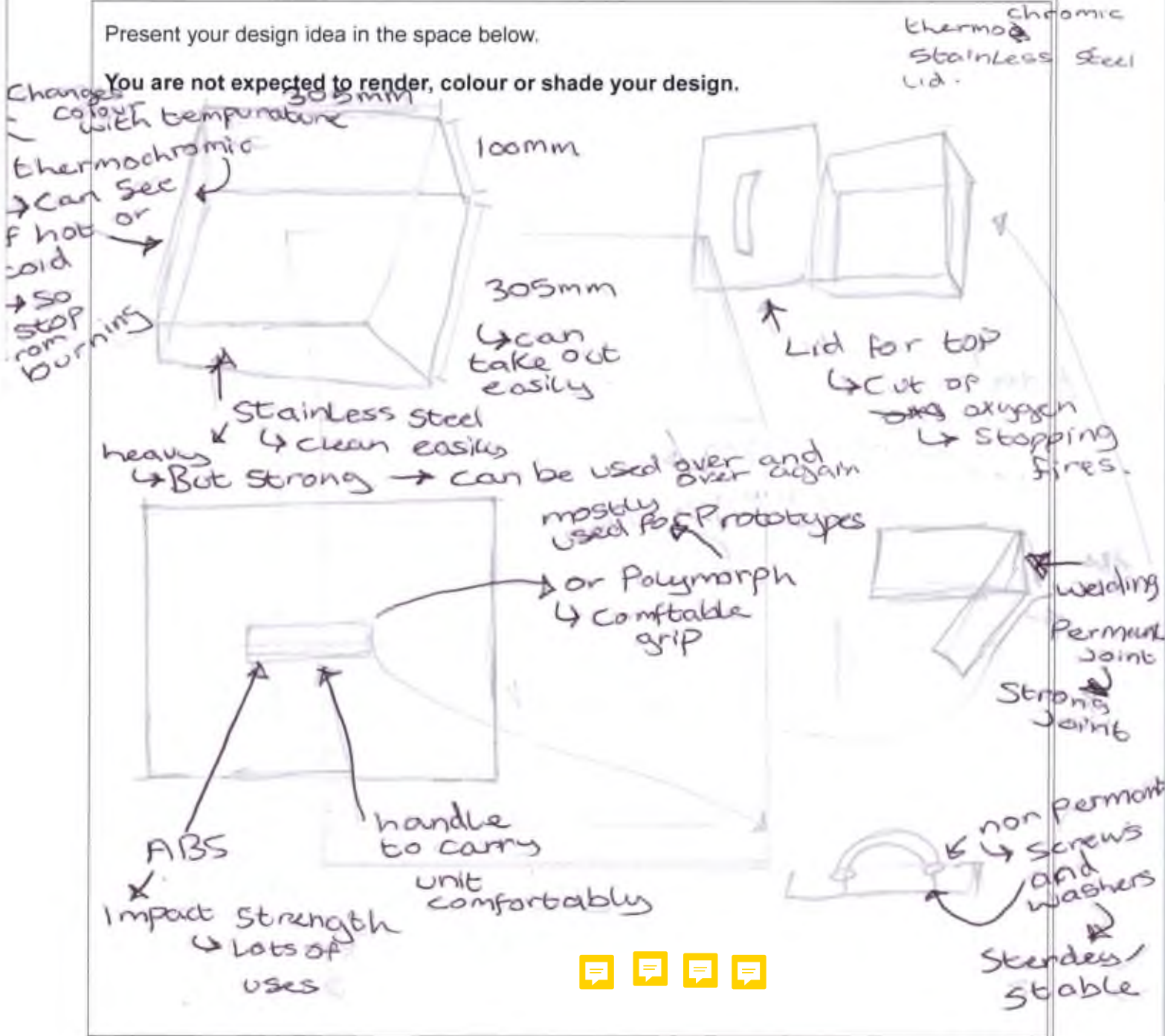


(c) (i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

Protypes show if the design works ~~[illegible]~~ in terms of design, mesurments, material etc.

Protypes are quick to produce and ~~can~~ show where improvements can be made.

(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

Consumer = ~~advantage~~ advantage is the product could ~~be~~ be ~~cheap~~ high quality because it's made in a developing country. That ~~means~~ is good for the consumer because the product should last well.

~~Disad~~ Disadvantage is that the consumer might have to pay more in the total price because even though it's sold in the uk it isn't made in the uk so has to be shipped over which ^ Costs.

6. For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.

directly on the floor

burning hot bases

high fires

(a) With reference to the contexts above fully describe **four** different issues associated with the use of disposable barbecues. [8]

the first issue is that BBQ's have a high tendency to start fires which when in tall grass areas can quickly spread. Another issue is that of scorching, due to the product being made from thin aluminium or steel, the heat transfers through the bases and can burn the grass or table, etc. This creates an unpleasant sight looking at burn marks. Another issue is eating off the floor, this can be hazardous due to insects and weed killer used on the grass. A final issue is that of others, not everyone likes the smell of smoke and therefore are opposed to BBQ's.

(b) Design a **reusable portable unit** that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea.

A standard size disposable barbecue is 300 mm x 300 mm x 100 mm.

Marks will be awarded for:

(i) an innovative and **reusable portable unit** that holds the disposable barbeque. [8]

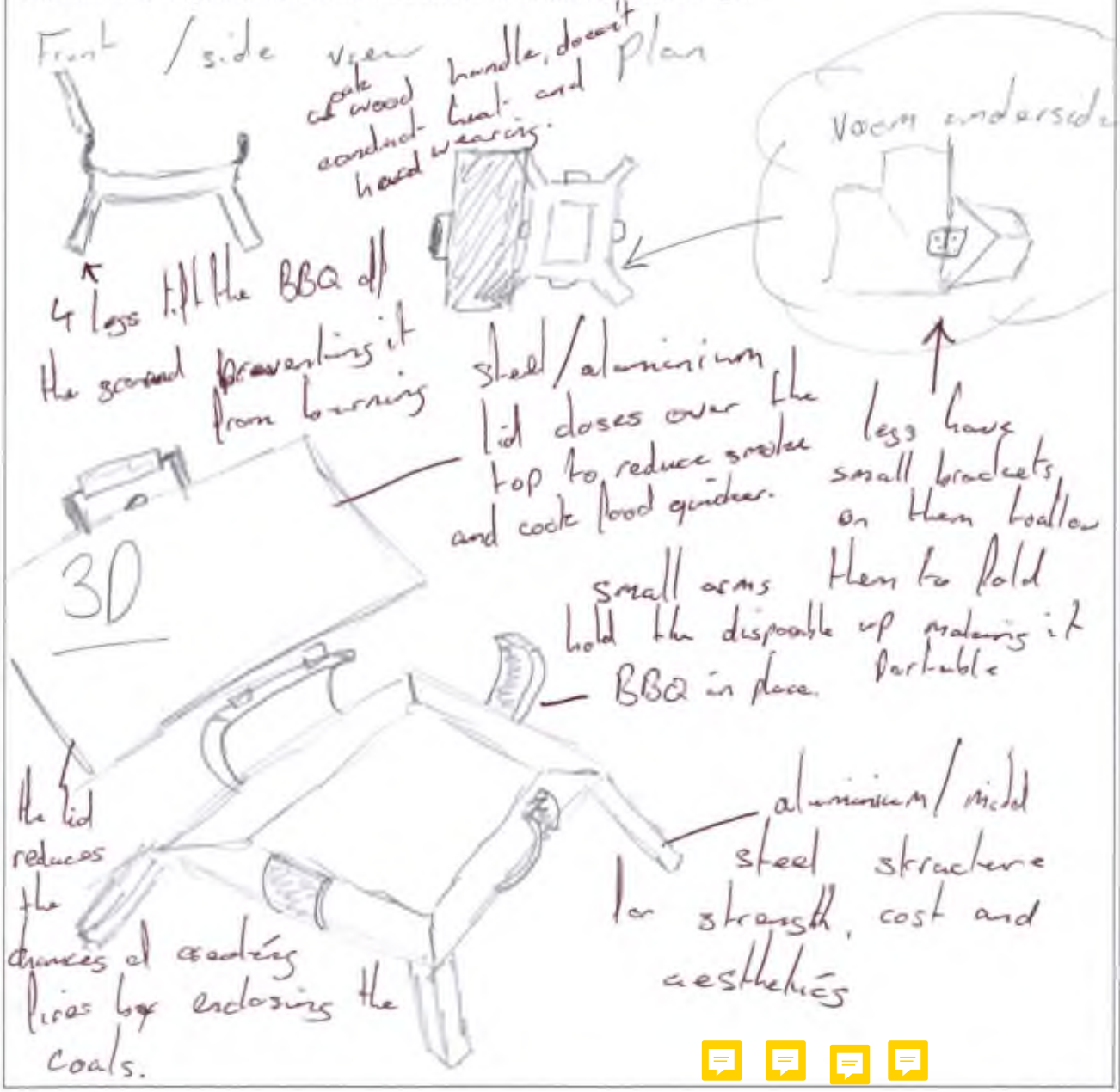
(ii) how the unit addresses environmental issues. [4]

(iii) how it meets the safety requirements of the user when cooking the food. [4]

(iv) the quality of communication and the use of annotated. 2D and 3D drawings. [4]

Present your design idea in the space below.

You are not expected to render, colour or shade your design.



(c) (i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

the first reason is that prototypes allow the designer to iron out any flaws, if you just entered full scale production you could loose money through defects. Prototypes are also a good way of assessing the wants and needs of the target market without this you may not have produced a product that your target markets want.

(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

One advantage to the product being produced in a developing country is that they recieve lower wages than 1st world countries like the UK. This allows the cost of the product to remain low. However this is also a disadvantage because it raises all forms of ethical issues including the use of child labour. Another advantage is that by producing goods in developing countries you are bringing work, ~~and~~ wages and an economy to that nation and are helping it to develope. However another disadvantage is the cost of transporting the product from that nation to the UK. This

For continuation only.

Q6 - c - ii

increases the carbon footprint of the product, plus many people in the UK are opposed to products from developing nations as many UK workers were put out of work due to developing nations undercutting their prices.

only

6. For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.

1

2

3

4

(a) With reference to the contexts above fully describe **four** different issues associated with the use of disposable barbecues. [8]

Picture 3 shows Disposable barbaques can be left behind in parks along with rubbish used when cooking meat and can leave litter in parks which have to be cleaned by government paid litter pickers/cleaners. During the use of disposable barbaques the hot coal can burn through the thin foil and can burn patches in grass harming local wildlife and parks, which may not grow back for a long time. Also can burn objects in the park such as benches and damage them and step fixing of other people using them or money spent on fixing them or replacing them. ↗ more on back 6) a)

(b) Design a **reusable portable unit** that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea.

A standard size disposable barbecue is 300 mm x 300 mm x 100 mm.

Marks will be awarded for:

(i) an innovative and **reusable portable unit** that holds the disposable barbeque. [8]

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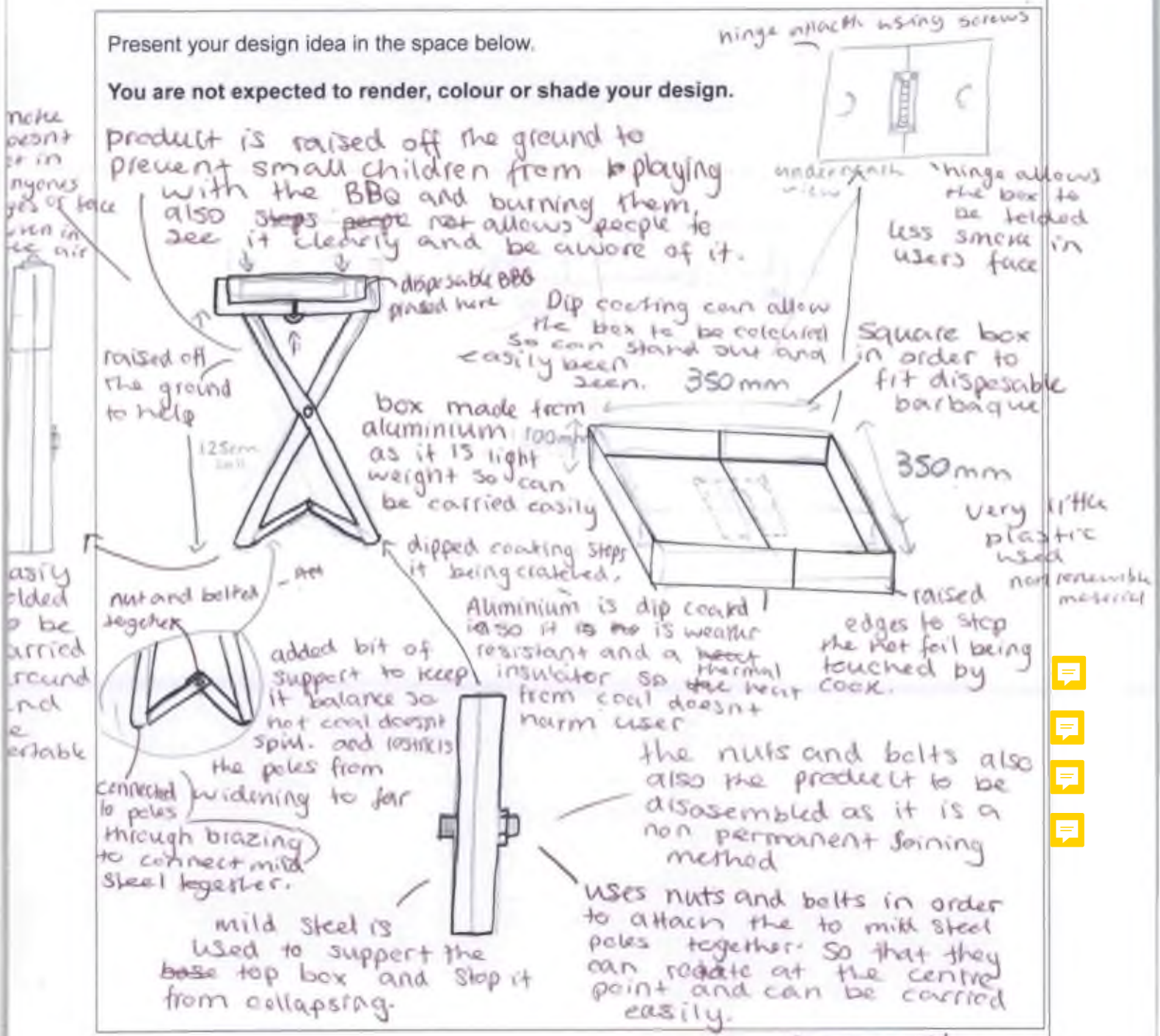
(iv) the quality of communication and the use of annotated, 2D and 3D drawings. [4]

Present your design idea in the space below.

You are not expected to render, colour or shade your design.



(c) (i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

A protype needs to be made in order to test the manufacturing process and check it can be made properly without deformations or problems also to test it functions and have a physical copy of the product to test how it works when being used, & also the see how the product looks when made. ~~and~~ check it

(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

By being produced in developing countries the manufacturer is able to use lower cost labour than in the UK as developing countries dont have as strong labour protection policies. This means they can produce the BBQ for a lower cost which they can pass onto the consumer which will make it cheaper for consumer who will then buy more at a lower price or sell at normal price both ways will gain more profits. However by ~~developing~~ producing in foreign countries manufacturers will have to transport raw materials and products to and from countries which will increase transport costs and production costs lowering profits

END OF PAPER

6a)

Another issue is that if they are not disposed probably whilst they are still hot they can set grass or bins alight and may cause fires to spread around the area destroying wildlife or dangering people, and damaging areas. This also lets out harmful gases such as CO_2 when burning fossil fuels such as coal. and using up the time of fire fighters when could be dealing with other more important situations

But also cause more CO_2 emmisions which will cause worse air pollution and impact the consumer. however so consumers benefit from lower prices as firms labour costs are lowering so can buy however the product may not be as safe high quality and as high a quality as laws in other countries may not be as strict in manufacturing so could harm the consumer, but also labour may not be as good as if they are cheaper so could be a lower quality and possibly break easily