



ATAR course examination, 2023

Question/Answer booklet

MATERIALS DESIGN AND TECHNOLOGY

Section Three

Please place your student identification label in this box

WA student number: In figures

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In words

Time suggested for this section

Suggested working time for this section: ninety minutes

Materials required for this section

To be provided by the supervisor

This Question/Answer booklet

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: up to three calculators, which do not have the capacity to create or store programmes or text, are permitted in this ATAR course examination

Place a tick (✓) in one of the following boxes to indicate your examination context

Wood
Metal
Textiles

Number of additional answer booklets used (if applicable):

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of the examination

The Materials Design and Technology ATAR course examination consists of a written component and a practical (portfolio) component.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of written examination
Section One Short answer	3	3	20	30	15
Section Two Extended answer	4	4	40	39	25
Section Three Candidates to choose one of the following contexts: Wood Metal Textiles	6	6	90	80	60
Total					100

Instructions to candidates

- The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2023: Part II Examinations*. Sitting this examination implies that you agree to abide by these rules.
- Write your answers in this Question/Answer booklet preferably using a blue/black pen. Do not use erasable or gel pens.
- Answer the questions according to the following instructions.

Section Three: Answer all of the questions within your context: Wood, Metal or Textiles.
- You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.
- Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Section Three: Sectionalised and extended answer**60% (80 Marks)**

You are required to choose **one** of the following options, according to the context you have studied in 2023.

Tick one of the boxes below to indicate your choice of context.

Context	✓	Question	Pages
Wood	<input type="checkbox"/>	8–13	4–16
Metal	<input type="checkbox"/>	14–19	18–30
Textiles	<input type="checkbox"/>	20–25	32–44

Now turn to the relevant pages and answer the questions for the context you have studied.

Section Three: Wood context

60% (80 Marks)

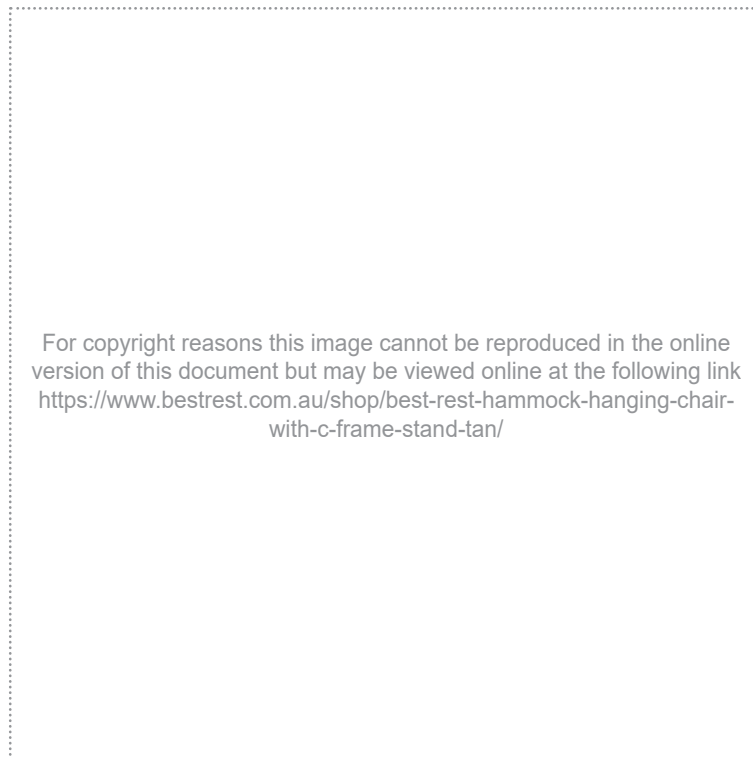
This section contains **six** questions. Answer **all** questions.

Suggested working time: 90 minutes.

Question 8

(19 marks)

Below is a picture of an outdoor hanging chair that has been designed for adults. It has a metal frame to support the timber seat and the textile cushion.



- (a) Name a suitable timber and its classification for the laminated armrests. (2 marks)

Timber: _____

Classification: _____

- (b) Outline **three** properties you consider to be important when selecting timber for the armrests. (6 marks)

One: _____

Two: _____

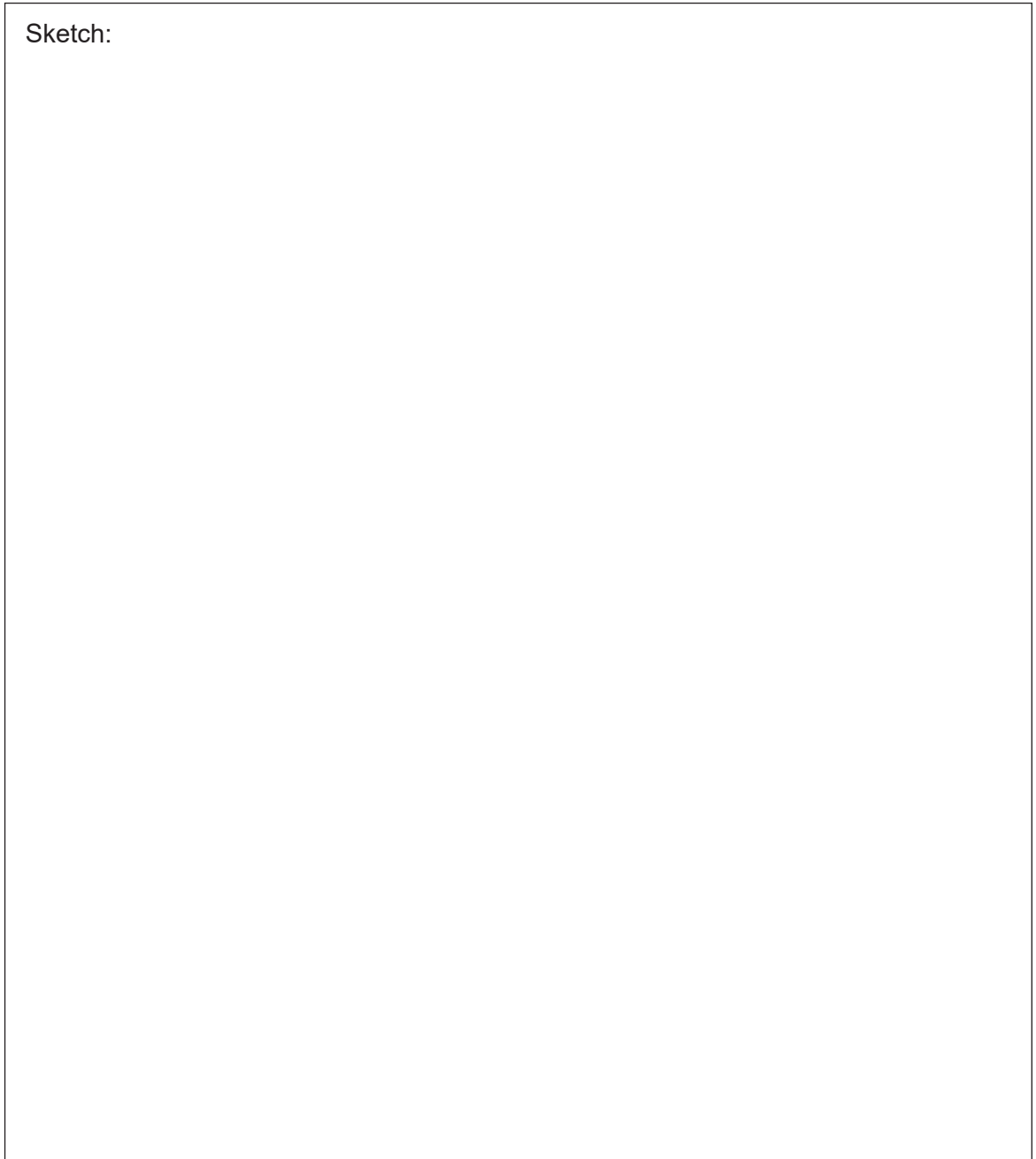
Three: _____

Question 8 (continued)

- (c) Describe the process for testing **one** property of timber that you could carry out in a school workshop. Use a sketch to support your answer. (5 marks)

Description: _____

Sketch:



- (d) Outline **three** factors that are necessary to ensure accurate results when carrying out tests on timber. (6 marks)

One: _____

Two: _____

Three: _____

Question 9

(9 marks)

- (a) Identify **two** common methods used for the conversion of timber. (2 marks)

One: _____

Two: _____

- (b) With reference to **one** of the methods identified in part (a), outline **two** characteristics of timber converted this way. (4 marks)

Method of conversion selected: _____

One: _____

Two: _____

- (c) On the image below, draw an end view of a log sawn using a common method for the conversion of timber. Name the method below. (3 marks)

For copyright reasons this image cannot be reproduced in the online version of this document but may be viewed at the following link
<https://www.shutterstock.com/image-photo/warm-wooden-tree-section-rings-texture-559162552>

Method: _____

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Question 10

(14 marks)

Your client has asked you to design and manufacture a desk for their home office.

Draw a final design solution on the page opposite, with **five** annotations, based on the client's feedback and using the design brief below. The design will be presented to the client, and it should reflect the rapid concept sketches shown below.

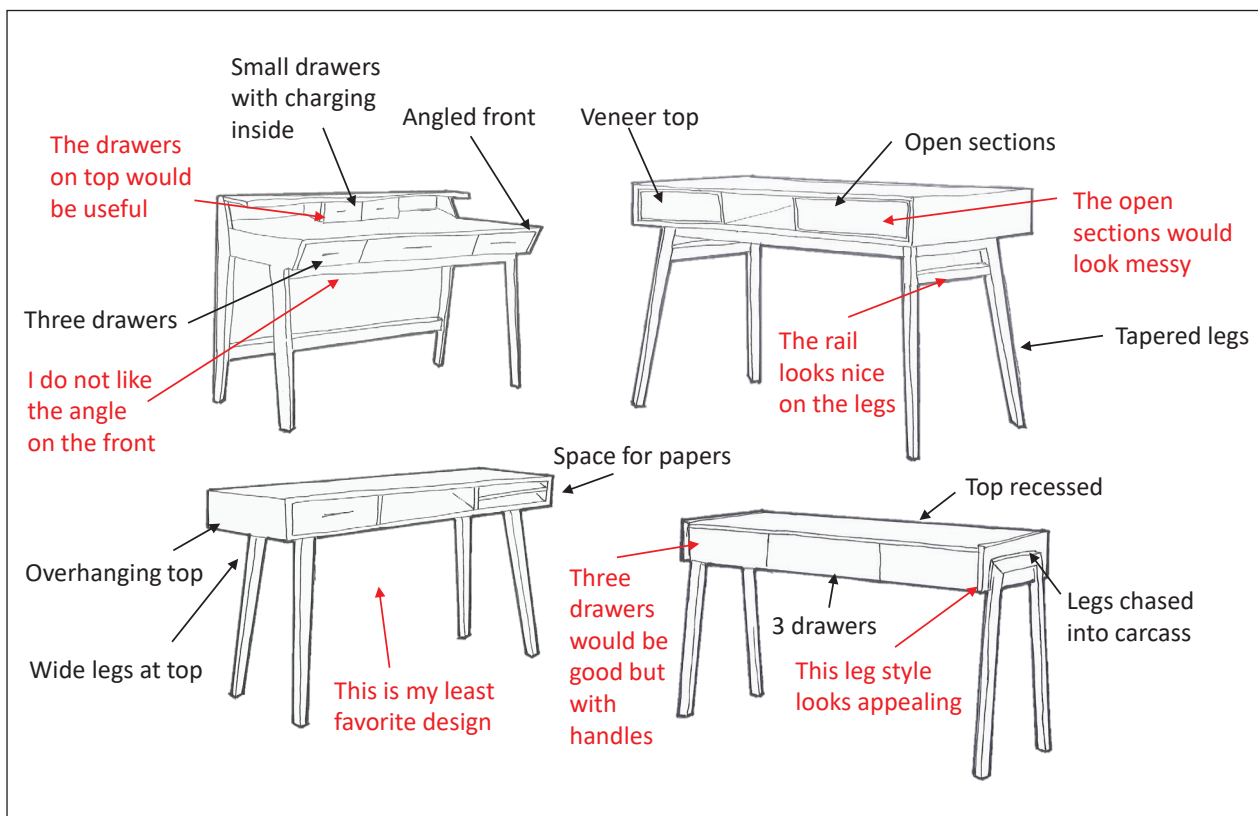
Design brief:

- the overall design of the desk should have a modern aesthetic
- the main material must be a suitable timber
- must have storage for documents
- must have a dark finish
- must accommodate charging stations and cables
- must have tapered legs.


Sketch (4 marks)
Annotations (10 marks)

Rapid concept sketches:

The annotations in red are from your client.



Final design solution:



Question 11

(12 marks)

- (a) State **two** reasons why finishes are applied to timber products.

(2 marks)

One: _____

Two: _____

- (b) Recommend **two** finishes for the table on the boat pictured below and justify each of your selections. (4 marks)



One: _____

Two: _____

(c) Outline **three** ways that applying finishes will affect the usability of the table in part (b).
(6 marks)

One: _____

Two: _____

Three: _____

Question 12

(16 marks)

You have decided to make chopping boards as gifts, like the one pictured below. You will need to make 10 chopping boards and work efficiently to ensure they are finished on time.



- (a) Outline **three** ways to reduce the production time when making the chopping boards.

(6 marks)

One: _____

Two: _____

Three: _____

- (b) Identify a technique that could be used with a router to shape the handle recess. (1 mark)

- (c) Explain how to carry out the technique identified in part (b). (4 marks)

- (d) The handle on the chopping board is connected to the timber using threaded rod; two holes are drilled into the timber and then the threaded rod is glued in. Identify a suitable adhesive for this process and state **two** of its relevant characteristics. (3 marks)

Adhesive: _____

Characteristic one: _____

Characteristic two: _____

- (e) Outline an appropriate decoration for the chopping board that could be used to elevate its aesthetic appeal. (2 marks)

Question 13

(10 marks)

In today’s era of ‘fast furniture’ prices are cheaper, production is quicker, and new designs are entering the market more rapidly, resulting in a shorter life span for furniture, much like ‘fast fashion’.

Discuss **two** environmental impacts of ‘fast furniture’.

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Section Three: Metal context

60% (80 Marks)

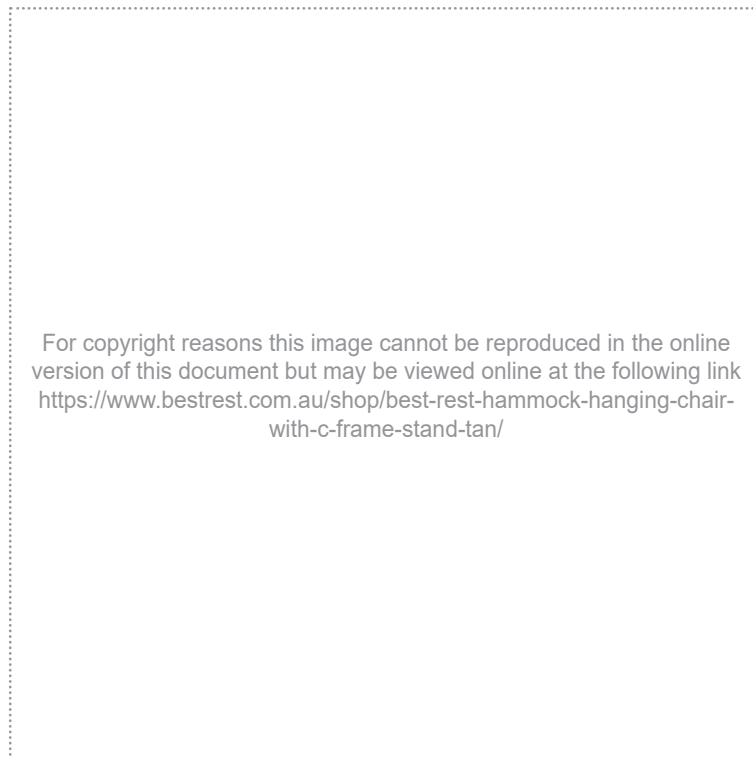
This section contains **six** questions. Answer **all** questions.

Suggested working time: 90 minutes.

Question 14

(19 marks)

Below is a picture of an outdoor hanging chair that has been designed for adults. It has a metal frame to support the timber seat and the textile cushion.



- (a) Name a suitable metal that could be used to make the metal frame of the chair and state a characteristic of that metal. (2 marks)

Metal: _____

Characteristic: _____

- (b) The performance of the frame is very important as the chair suspends the user above the ground. Outline **three** properties you consider to be important when selecting metal for the frame. (6 marks)

One: _____

Two: _____

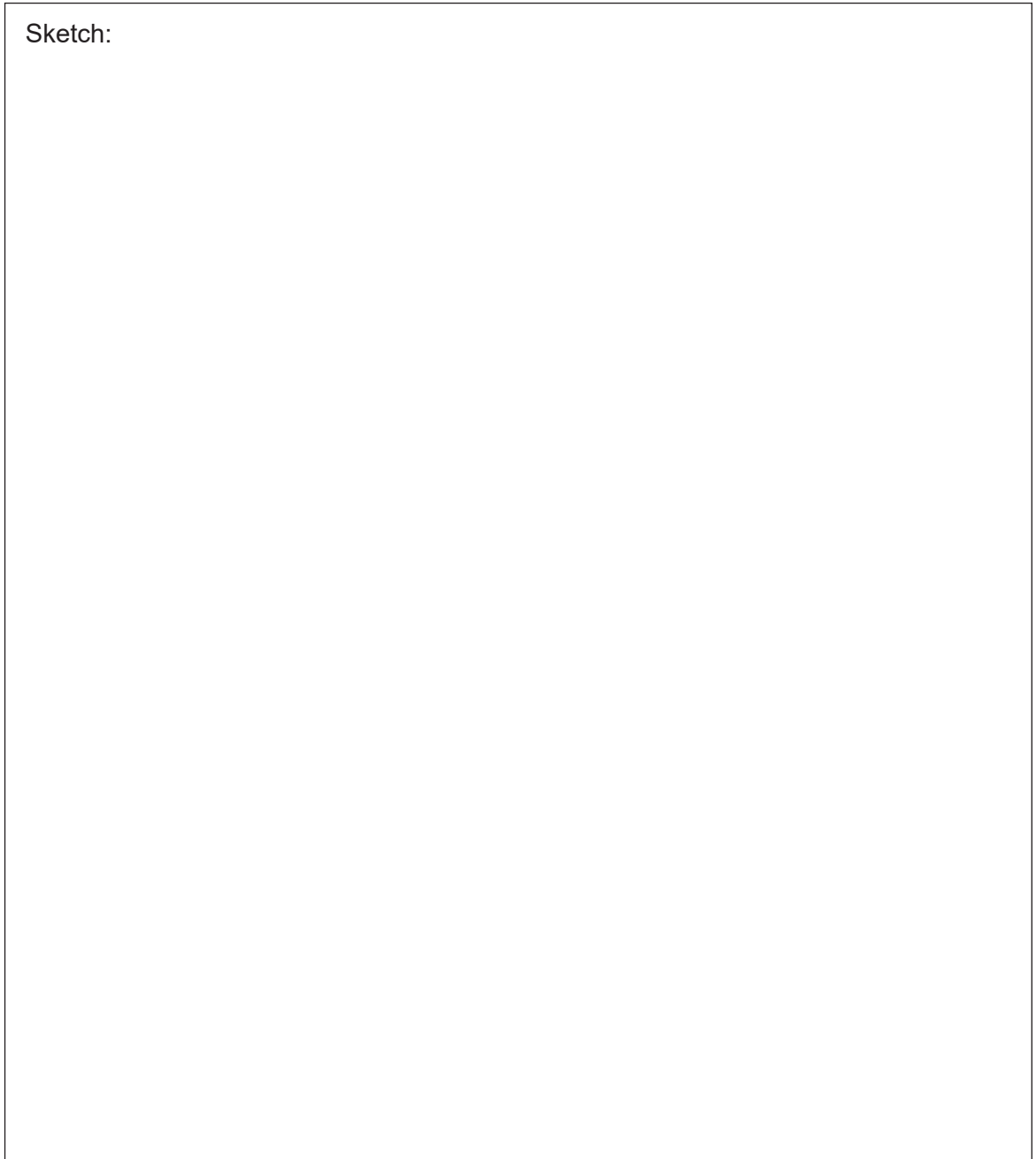
Three: _____

Question 14 (continued)

- (c) Describe the process for testing **one** property of metal that you could carry out in a school workshop. Use a sketch to support your answer. (5 marks)

Description: _____

Sketch:



- (d) Outline **three** factors that are necessary to ensure accurate results when carrying out tests on metal. (6 marks)

One: _____

Two: _____

Three: _____

Question 15

(9 marks)

(a) Outline the difference between a pure metal and an alloy.

(2 marks)

(b) Explain the difference between low, medium and high carbon steels.

(4 marks)

(c) Identify a metal innovation and outline **two** characteristics of this material.

(3 marks)

Metal innovation: _____

Characteristic one: _____

Characteristic two: _____

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See next page

Question 16

(14 marks)

Your client has asked you to design and manufacture an occasional table for their hallway.

Draw a final design solution on the page opposite, with **five** annotations, based on the client's feedback and using the design brief below. The design will be presented to the client, and it should reflect the rapid concept sketches shown below.

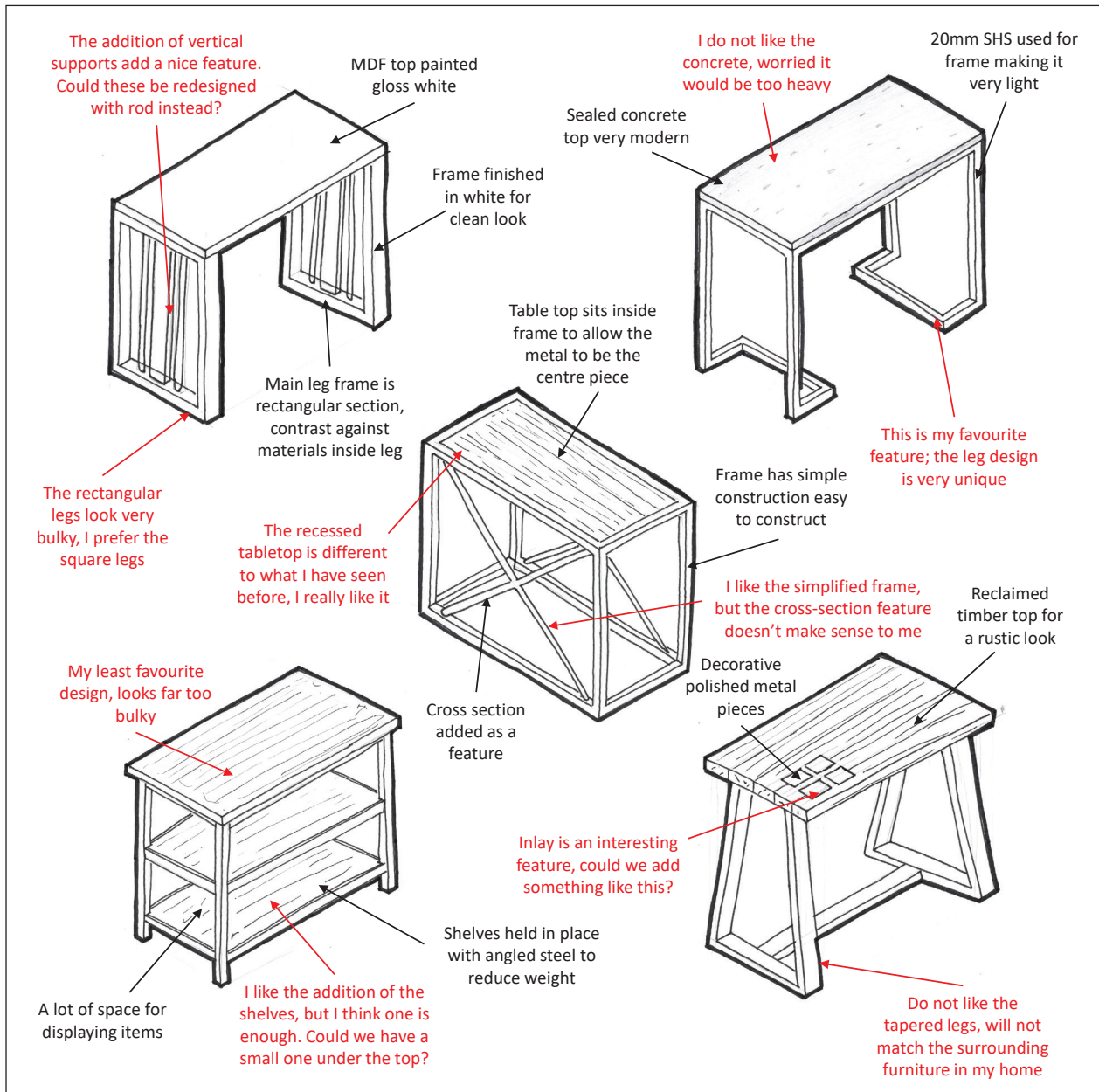
Design brief:

- the overall design of the table should have a modern aesthetic
- the main material must be a suitable metal
- the user must be able to display personal items easily
- must have a suitable finish
- must have at least one decorative feature
- must not have any sharp edges.

Sketch (4 marks)
Annotations (10 marks)

Rapid concept sketches:

The annotations in red are from your client.



See next page

Final design solution:

Question 17

(12 marks)

- (a) State **two** reasons why finishes are applied to metal products. (2 marks)

One: _____

Two: _____

- (b) Recommend **two** finishes for a newly manufactured steel toolbox and justify each of your selections. (4 marks)

One: _____

Two: _____

- (c) Outline **three** ways that applying finishes will affect the usability of the toolbox in part (b).
(6 marks)

One: _____

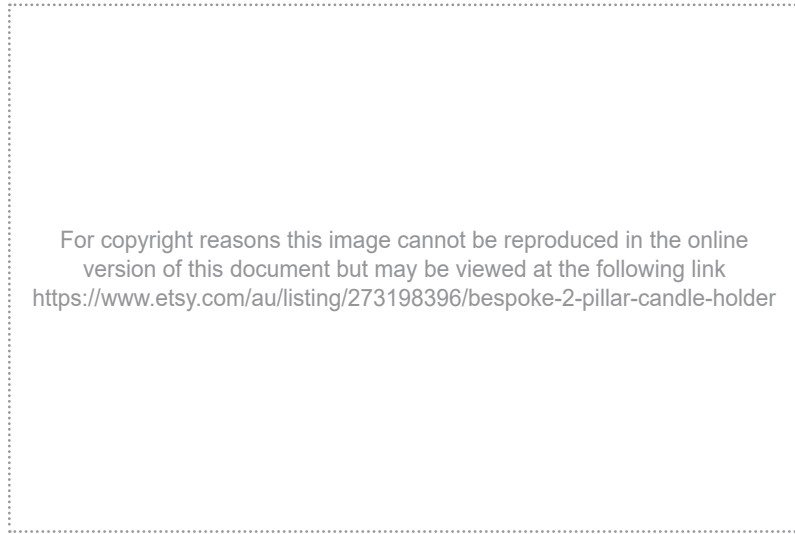
Two: _____

Three: _____

Question 18

(16 marks)

You have decided to make candle holders as gifts, like the one pictured below. You will need to make 10 candle holders and work efficiently to ensure they are finished on time.



- (a) Outline **three** ways to reduce the production time when making the candle holders.

(6 marks)

One: _____

Two: _____

Three: _____

(b) Identify a technique that could be used to shape the scrolls on the candle holder. (1 mark)

(c) Explain how to carry out the technique identified in part (b). (4 marks)

(d) Describe an appropriate non-permanent joining method to attach the candle discs to the scrolled arms. (3 marks)

(e) Outline an appropriate decoration for the candle holder that could be used to elevate its aesthetic appeal. (2 marks)

Question 19

(10 marks)

In today's era of 'fast furniture' prices are cheaper, production is quicker, and new designs are entering the market more rapidly, resulting in a shorter life span for furniture, much like 'fast fashion'.

Discuss **two** environmental impacts of 'fast furniture'.

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See next page

Section Three: Textiles context

60% (80 Marks)

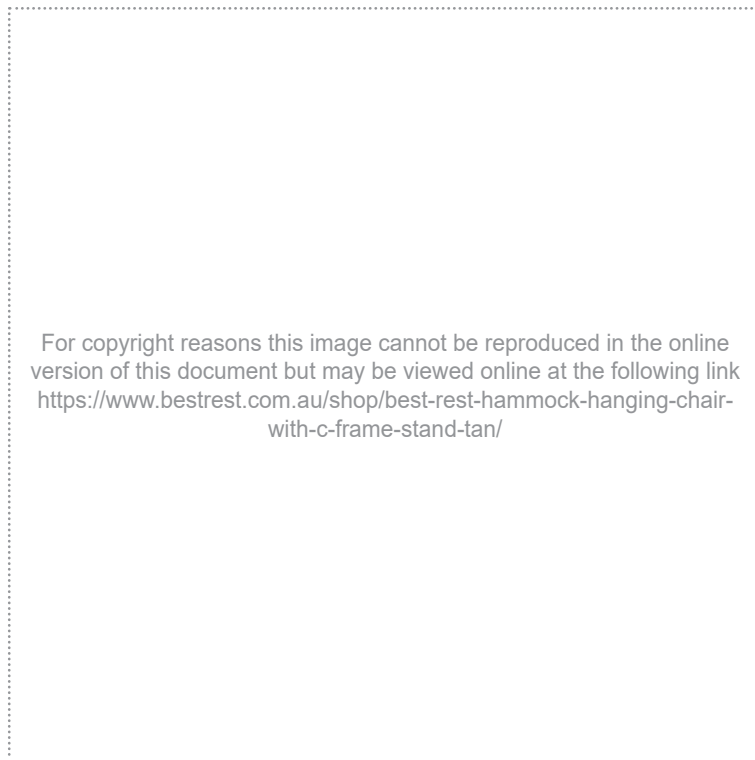
This section contains **six** questions. Answer **all** questions.

Suggested working time: 90 minutes.

Question 20

(19 marks)

Below is a picture of an outdoor hanging chair that has been designed for adults. It has a metal frame to support the timber seat and the textile cushion.



- (a) Name a suitable fibre and a suitable fabric structure for the cushion cover. (2 marks)

Fibre: _____

Fabric structure: _____

- (b) Outline **three** properties you consider to be important when selecting a fabric for the cushion cover. (6 marks)

One: _____

Two: _____

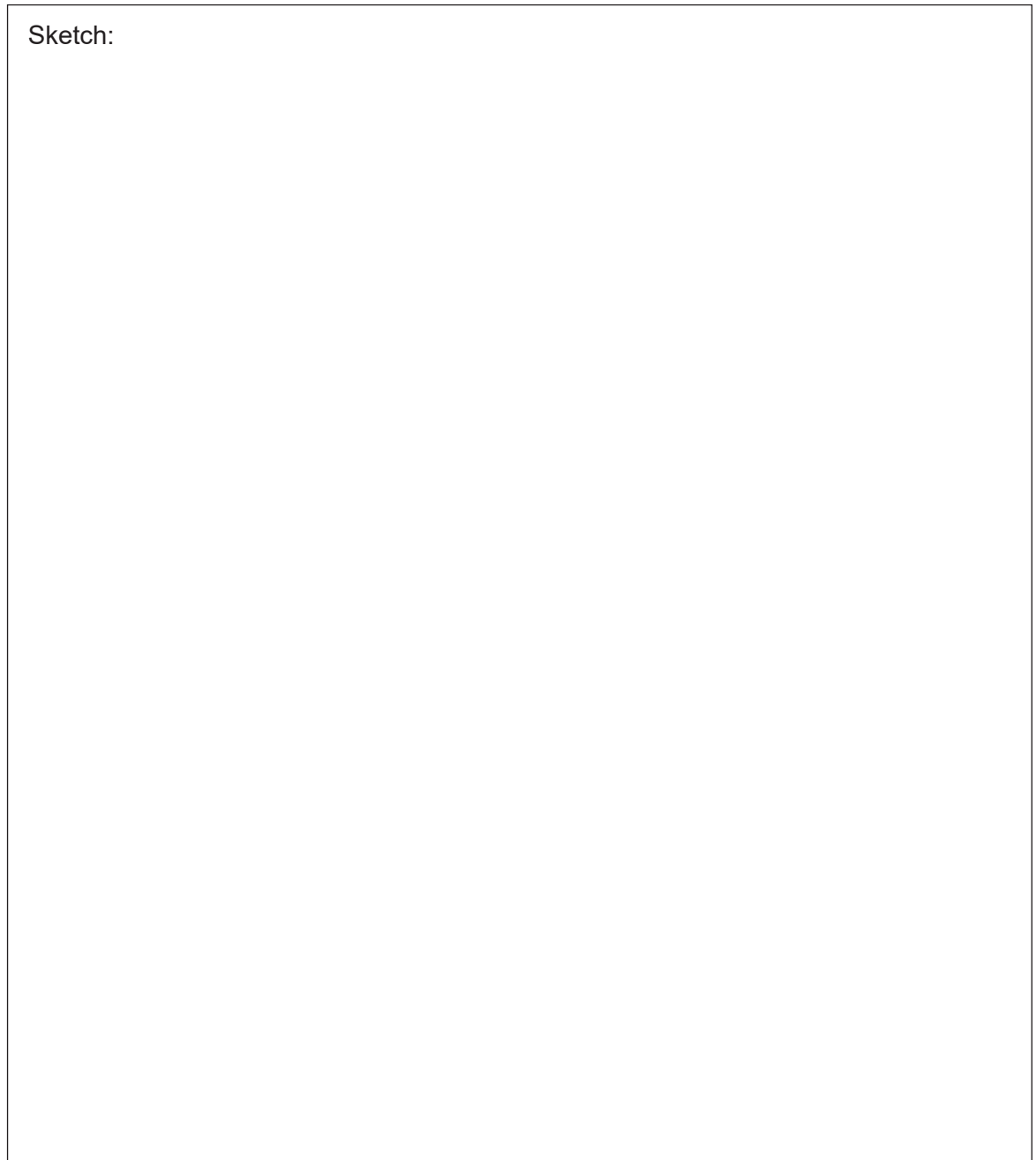
Three: _____

Question 20 (continued)

- (c) Describe the process for testing **one** property of fabric that you could carry out in a school workroom. Use a sketch to support your answer. (5 marks)

Description: _____

Sketch:



- (d) Outline **three** factors that are necessary to ensure accurate results when carrying out tests on textiles. (6 marks)

One: _____

Two: _____

Three: _____

Question 21

(9 marks)

(a) Name **two** regenerated fibres.

(2 marks)

One: _____

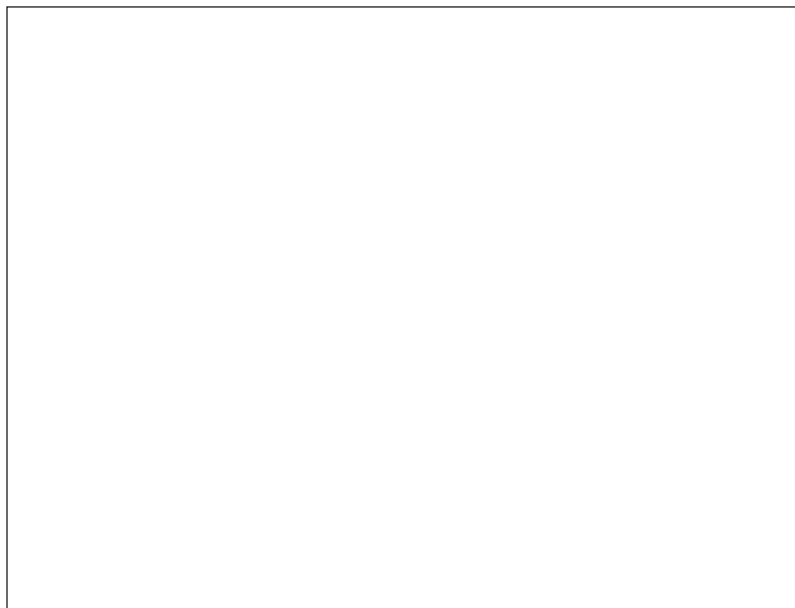
Two: _____

(b) Explain the difference between regenerated and synthetic fibres.

(4 marks)

(c) In the box below draw and label a weft knit fabric structure.

(3 marks)



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Question 22

(14 marks)

Your client has asked you to design and manufacture a corset for a medieval themed event.

Draw a final design solution on the page opposite, with **five** annotations, based on the client's feedback and using the design brief below. The design will be presented to the client, and it should reflect the rapid concept sketches shown below.

Design brief:


- the overall design of the corset should have a medieval aesthetic
- must be comfortable to sit, eat and dance in for the event
- must have a narrow ruffle or frill around the neckline
- must have eight panels; four front and four back
- must work with a full skirt that is gathered at the waist.

Sketch (4 marks)
Annotations (10 marks)

Rapid concept sketches:

<p>Design A</p> <div style="border: 1px dashed gray; padding: 5px; margin: 10px 0;"> <p>For copyright reasons this image cannot be reproduced in the online version of this document</p> </div> <p>Design B</p> <div style="border: 1px dashed gray; padding: 5px; margin: 10px 0;"> <p>For copyright reasons this image cannot be reproduced in the online version of this document</p> </div> <p>Design C</p> <div style="border: 1px dashed gray; padding: 5px; margin: 10px 0;"> <p>For copyright reasons this image cannot be reproduced in the online version of this document</p> </div> <p>Design D</p> <div style="border: 1px dashed gray; padding: 5px; margin: 10px 0;"> <p>For copyright reasons this image cannot be reproduced in the online version of this document</p> </div>	<p style="text-align: center;">Client feedback</p> <p>Design A</p> <ul style="list-style-type: none"> • I like the lacing up the centre front. I think the peplum at the waistline is too heavy to go over my skirt. • I like the shape of the front neckline, but the back neckline is a bit too high. <p>Design B</p> <ul style="list-style-type: none"> • I don't like the small ruffle on the centre front hemline. • The bows on the shoulder straps are too fussy, I prefer the shoulder style of Design A. • I love the 3 laces in the front of this design – I think that would be comfortable to wear. <p>Design C</p> <p>I like the frill around the top, but I think the strapless corset will be uncomfortable to wear. I prefer shoulder straps. I don't like the frill around the bottom edge. I don't think it will sit well over my skirt.</p> <p>Design D</p> <ul style="list-style-type: none"> • I like the shape of the front neckline, but the back neckline is a bit too high. • The hemline is a good length finishing at the waist, but I would like it to curve down at the front to a V point, like Design B.
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Final design solution:



Question 23

(12 marks)

- (a) State **two** reasons why finishes are applied to textile products. (2 marks)

One: _____

Two: _____

- (b) Recommend **two** finishes for the child's backpack pictured below and justify each of your selections. (4 marks)



One: _____

Two: _____

- (c) Outline **three** ways that applying finishes will affect the usability of the backpack in part (b). (6 marks)

One: _____

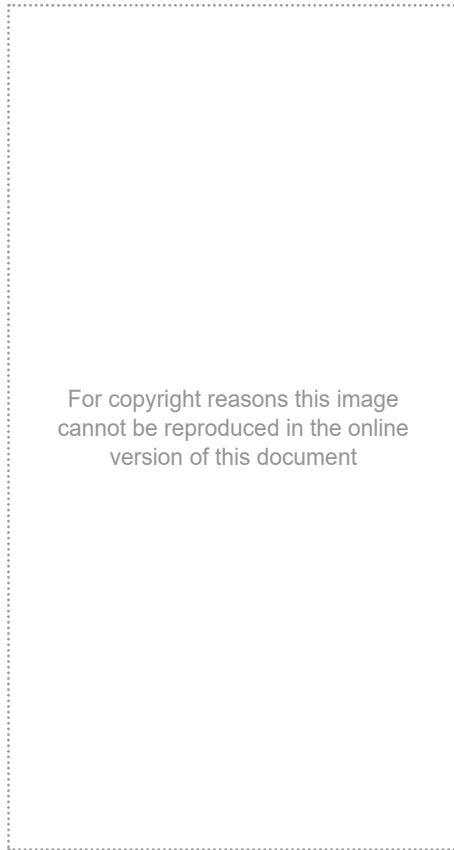
Two: _____

Three: _____

Question 24

(16 marks)

You have decided to make vintage aprons as gifts, like the ones pictured below. You will need to make 10 vintage aprons and work efficiently to ensure they are finished on time.



- (a) Outline **three** ways to reduce the production time when making the aprons. (6 marks)

One: _____

Two: _____

Three: _____

(b) Identify a technique that could be used to shape the aprons into the waistline. (1 mark)

(c) Explain how to carry out the technique identified in part (b). (4 marks)

(d) State **three** reasons for using interfacing around the neckline of the apron. (3 marks)

One: _____

Two: _____

Three: _____

(e) Outline an appropriate decoration for the apron that could be used to elevate its aesthetic appeal. (2 marks)

ACKNOWLEDGEMENTS

- Questions 8, 14, 20** Best Rest. (n.d.). [Photograph of Best Rest hammock hanging chair]. Retrieved May, 2023, from <https://www.bestrest.com.au/shop/best-rest-hammock-hanging-chair-with-c-frame-stand-tan/>
- Question 9c** Kessler, T. (n.d.). *Warm Wooden Tree Section with Rings and Texture Isolated on White. Circular Background With an Organic Feel* [Photograph]. Retrieved May, 2023, from <https://www.shutterstock.com/image-photo/warm-wooden-tree-section-rings-texture-559162552>
- Question 11b** CustomKerriDesign. (n.d.). [Photograph of custom made teak boat table]. Retrieved May, 2023, from <https://www.etsy.com/au/listing/1199725001/boat-table-teak-custom-made-yacht-table>
- Question 12** Sherlock Designs. (n.d.). [Photograph of wooden chopping board with silver handle]. Retrieved May, 2023, from <https://www.sherlockdesigns.com.au/product/large-handmad-tasmanian-blackwood-board-with-silver-handle/>
- Question 18** GeoffColesCreations. (n.d.). [Photograph of two-pillar candelabra with lit candles, decorative metalwork and wooden base]. Retrieved May, 2023, from <https://www.etsy.com/au/listing/273198396/bespoke-2-pillar-candle-holder>
- Question 22** Design A adapted from: Butterick. (n.d.). *Butterick Pattern B4669: Laced Corsets with Peplum Variations* [Pattern]. Retrieved May, 2023, from <https://simplicity.com/butterick/b4669>
Design B adapted from: Butterick. (n.d.). *Butterick Pattern B4669: Laced Corsets with Peplum Variations* [Pattern]. Retrieved May, 2023, from <https://simplicity.com/butterick/b4669>
Design C adapted from: Butterick. (n.d.). *Butterick Pattern B4254: Boned Stays and Corsets* [Pattern]. Retrieved May, 2023, from <https://simplicity.com/butterick/b4254>
Design D adapted from: Butterick. (n.d.) *Butterick Pattern B4669: Laced Corsets with Peplum Variations* [Pattern]. Retrieved May, 2023, from <https://simplicity.com/butterick/b4669>
- Question 23b** Adapted from: J World. (n.d.). [Photograph of Lollipop Kids rolling backpack with lunch bag in fox design]. Retrieved May, 2023, from <https://jworldstore.com/collections/kids-rolling/products/lollipop-kids-rolling-backpack-with-lunch-bag-16-inch?variant=22226663178319>
- Question 24** Adapted from: (n.d.). [Photograph of vintage sewing pattern envelope from New York Patterns showing drawings of aprons]. Retrieved May, 2023, from <https://www.pinterest.co.uk/pin/228065168613963568/>

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