ATAR course examination,
Semester 2, 2020
Question/Answer Booklet

Materials Design and Technology-Textiles

Section 1 & 2 SOLUTIONS

Student WACE No: in figures

in words: _____

_____

Time recommended for these sections
Suggested working time for these sections: sixty minutes

Materials required/recommended for this paper

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: non-programmable calculators approved for use in this examination

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	Your mark
Section One Short answer	4	4	20 mins	21	15%	
Section Two Extended answer	3	3	40 mins	30	25%	
Section Three Candidates to choose **one** of the following contexts: Wood Metal Textiles	6	6	90 mins	85	60%	
				Total	100	

Instructions to candidates

1. The rules for the conduct of ATAR course examinations are detailed in the *Year 12 Information Handbook 2019*. Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer Booklet.

3. Answer the questions according to the following instructions.

   Section Three: Answer all of the questions within your specialised field: Wood, Metal or Textiles.

4. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.

5. Supplementary pages for the use of planning/continuing your answer to a question have been 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 One: Short answer **21 Marks**

This section contains **Four (4) questions**. Attempt **ALL** questions from this section.

Suggested working time: 20 minutes

Question 1 **2 marks**

Explain how the designer of the Alessi Sommelier Parrot corkscrew has considered the following design fundamentals, when designing this product.

- **Aesthetics**
- **Function**

Source: https://alessiaustralia.com.au/products/bar-and-wine/bottle-openers/parrot-corkscrew

Aesthetics: (1 mark)

Sample response

Shape of corkscrew
Mobility of corkscrew - flexibility
Colours used
Materials used
Overall design – shape and curves used in the corkscrew design
Quirkiness and overall appeal to create a tempting product to own

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See next page

Question 1 continued

Function: (1 mark)

Handle size – ergonomics – average hand anthropometric data

Handle shape – ergonomics – average hand anthropometric data

Materials used in handle
Corkscrew materials - – durability and strength of materials
Overall size of corkscrew- fits palm size of human hand
Size and shape of corkscrew
Size and shape of the beak as a grip on the sides of the bottle top.
Multifunction- corkscrew and bottle opener

Mark allocation: 2 marks
• 1 mark for each of aesthetics and function

Question 2 **6 marks**

All materials have unique properties that affect their performance and suitability for use in the manufacture of a product. These unique properties can be tested to ascertain the suitability of a material for an end use or purpose.

Using **materials that you are familiar with from your context area**, describe a method to **test TWO (2)** of the unique **properties** listed below.

Select **TWO (2)** of the properties listed below:

- Strength
- Dimensional stability
- Thermal properties
- Flammability
- Resilience
- Elasticity
- Drape
- Lustre
- Abrasion resistance
- Effect of alkalis

Property 1 is: _____

The material is:
_____ (1 mark)

Using text & diagrams describe the test: (2 marks)

Property 2 is: _____

The material is: _____ (1 mark)

Using text & diagrams describe the test: (2 marks)

Suitable material identified to test the nominated property	1 mark each (Total of 2 marks)
Detailed description of a suitable testing technique for the property TEXT AND DIAGRAMS	2 marks each (Total of 4 marks)
Limited description of a suitable testing technique for the property TEXT OR DIAGRAMS OR COMBINATION OF BOTH	1 mark each

Question 3 **8 marks**

Many products are designed with **planned obsolescence** in mind.

a) Give reasons why designers develop new products with planned obsolescence.(2 marks)

***Marks Distribution*:** 1 mark each for two reasons. 2 marks for a well explained reason such as that below

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Planned obsolescence or **built-in obsolescence** in industrial design is a policy of planning or designing products with a limited useful life, so they will become obsolete, that is, unfashionable or no longer functional after a certain period of time. Planned obsolescence has potential benefits for a designer because to obtain continuing use of the product the consumer is under pressure to purchase again, whether from the same manufacturer (a replacement part or a newer model), or from a competitor which might also rely on planned obsolescence.

For an industry, planned obsolescence stimulates demand by encouraging purchasers to buy sooner if they still want a functioning product.

b) Explain the effects **on society and the environment** of designing products with planned obsolescence. (6 marks)

Marks Distribution: 3 Marks for effects on Environment. 3 Marks for effects on Society.

SOCIETY:

NEGATIVES encourages a disposable mentality amongst consumers. Consumers quickly catch onto the idea of replacing products earlier than necessary to get a new look or the next best item. In fashion it encourages 'fast fashion'. **POSITIVES:** Encourages job creation for designers, material producers, goods producers and environmental scientists, engineers etc . Keeps families economically viable Encourages artistic and product ingenuity to be different and to capture a bigger market slice.

Environment:

Does not encourage environmental sustainability: Due to overuse of finite resources. Fast fashion is responsible for 6 x the amount of landfill.

Encourages ingenuity- The excess of textiles is resulting in people finding new products and inventions. For example: PET polyester is being used by companies like Gorman to produce rain jackets. Designers are embracing the environmental challenge by producing recycled garment ranges. Artis are using left over textiles to produce fashionable works of art.

Keeps environmental scientists employed finding new ways of dealing with the waste surplus

Question 4 **5 marks**

The market for irons is competitive and designers have to consider various factors in their design of these products in order to achieve a market advantage and sell their product.

a) Describe the relationship between **safety, ergonomics and function** with reference to the design of the irons, as shown in the images on the previous page. (3 marks)

Anthropometric data: human measurements – in this case for an average sized hand, fingers and grip size. Needs to be comfortable for iron handle. Also thumb size in relation to position of knobs for steam on the top of the iron. This enables for effective extra steam distribution when required without having to strain hand due to extra ironing time. The weight of the iron also needs to be considered and must match the comfort capacity of the human arm for weight.

Ergonomics- fit between human body and workplace. In this case the comfortable fit between fingers, hand and the iron handle- comfortable use without straining. Also comfortable weight without straining.
Safety: safe design/safe materials/ safe action- eg iron handle shape must be suitable for human hand to enable safe ironing without strain. Also the position of the handle in relation to the hot plate has been considered as it is well away- therefore protecting the user form being burned.
Marks distribution

1 mark for defining /explaining each design fundamental- anthropometric data, ergonomics, safety and for explaining the relationship between these in achieving a safe, functional iron.

(b) Before producing a design specification for an iron, the designer would have researched various **design fundamentals.**
Explain why the following factors affecting design would be researched when designing an iron. (2 marks)

(i) Environment: (1 mark)

The materials used in the manufacture of the iron. Their lifespan, their effects on the environment during use and their disposability. In short, their carbon footprint.

Plastics- their effect on the environment during their production using petrochemicals, their effect on the environment in use (electricity and hydrocarbons into the atmosphere) and their disposability at end of life. Plastics can not be melted down and form landfill

Metals: effect on environment in production, during use and at the end of life. Metals can be melted down

Power usage during life of product. .Wattage is an issue to be considered. The more power used – the less environmentally sustainable the product is.

(ii) Economics: (1 mark)

The cost of the materials to produce and labour costs need to be considered in the pricing of the product, so the product meets the requirements for the place in the market place for which it is to fit. The after costs also deserve consideration. These include its expected lifespan and its cost on the environment for the future.

End of Section 1

Section Two: Extended Answer **30 marks**

This section has **THREE (3) questions**. Answer **all** questions. Write your answers in the spaces provided.

Suggested working time: 40 minutes

Question 5 **8 marks**

a) When planning the production of a practical project in a **school studio** or workshop it is important that the **plan allows resources to be used efficiently**.

Identify and discuss the factors that must be considered in connection with each of the following: (4 marks)

use of time 2 marks

- Need to create a production plan that includes time management and deadlines to ensure the product is made on time
- Time management planning allows time to be used effectively and monitored during progress
- Deadlines need to be met for creating prototypes, fitting toiles, completing final garments
- by identifying target dates for various components – the designer / manufacturer is kept on track to complete the garment on time.
- Time is money in production – minimise time spent to increase profitability

use of materials 2 marks

- suitability of materials is considered for the design
- testing suitability and construction processes ensures design will be successful
- materials list must list all materials required to complete a garment – this ensures all resources are purchased at one time – efficiently
- Costing the materials required to manufacture a product enables the designer / manufacture to meet budget restrictions set by the client.
- Only required materials will be purchased – minimising waste of resources
- This minimises environmental impacts and increases sustainability of production of a product
- If too much waste results from production – it increases the cost of the garment and reduces profits

b) Compare the factors identified in part (a) with the equivalent **planning procedures** for a **production run in an industrial manufacturing situation**. Explain the **additional factors which would need to be considered in an industry manufacturing situation.** (4 marks)

i. **use of time** (2 marks)

- Deadlines need to be met for *preparing patterns, making samples*, creating prototypes, fitting toiles, *ordering & purchasing bulk materials*, completing garments, *transport considerations, supplying the market*
- by identifying target dates for various components – the designer / manufacturer is kept on track to complete *all the various aspects of the manufacturing process on time*.
- Time is money in production – minimise time spent to increase profitability
- *Penalties often exist for late delivery / supply of a produc*

ii. **use of materials** (2 marks)

- Costing the materials required to manufacture a product enables the designer / manufacture to meet budget restrictions set by the client.
- *Determining minimum use of materials through layout plans*
- *Ordering & purchasing materials – often sourced from overseas – takes time*
- *Transport costs have to be considered – bulk orders*
- *Only required materials, notions etc will be purchased – minimising waste of resources*
- *Excess resources will often be used in other garments runs – features, decorative techniques etc.*
- This minimises environmental impacts and increases sustainability in the production of a product
- Minimise Product waste and maximise materials use to – increased costs will result in reduced profits

Question 6 **5 marks**

'The designer's ability to predict evolving and directional changes in demand by consumers will depend on their ability to draw on, interpret and analyse **information from a large and ever increasing range of sources.**'

In light of this statement, **what type of information** will the designer draw on to help identify and predict the **needs and wants of the consumer and the market**?

Current market trends – other designers – leading fashion designers themes & trends

Fashion trend websites – what colours, silhouettes etc are going to be fashionable in the next season

Fashion trend websites – what are the themes that will underpin next fashion season?

Innovative and new material trends at fashion expos

Online research of new materials

Online surveys

Market research – look at other like products on the market

Market research – competitors, other designers, online websites, catalogues, magazines,

Runway shows of USA and Europe as they are a season ahead of Australia.

Conduct informal interviews of target audience – what do they want?

Conduct informal or formal survey of the target audience

Look at design influences used by other designers

Trends in fabrics

Trends in other areas of design – eg. architecture, interior design

Question 7 **(17marks)**

Marc Newson's Lockheed Lounge was originally handmade as a one-off piece for his graduation exhibition at Sydney College of the Arts.

See next page

Question 7 continued

The Lockheed Lounge

The Lockheed Lounge was designed by Marc Newson in 1986. The chaise lounge has continuous curve shapes formed around a reinforced fibreglass shell. The lounge is clad in aluminium sheets that are beaten to shape and fitted by hand with blind rivets. The lounge has three legs with slightly curved feet, one at the front and two at the rear.

Source: Marc Newson (designer) http://www.marc-newson.com

a) Identify and explain **TWO (2) elements of design** that Marc Newson has used in the design of the Lockheed Lounge. (4 marks)

Sample response
• 2 marks for each correctly identified and explained element of design - a considered, detailed explanation
Elements of design – Colour (Value), Line, Shape (Size), Texture

E.g. **Texture** – The lounge has been constructed using Aluminium cladding – the texture of the aluminium is a shiny, lustrous metal that reflects the light and this would reflect the surroundings a little like a mirror. It is very slippery surface to feel and sit upon. The rivets attaching the cladding give the impression of rougher surface areas that might catch on your clothing when sliding across the lounge. The rivets are formed into lines and rectangles creating a pattern on the surface of the aluminium chair.

Mark allocation: 4 marks

b) Identify and explain **TWO (2) principles of design** that Marc Newson has used in the design of the Lockheed Lounge. (4 marks)

c) **Sample response**
d) • 2 marks for each correctly identified and explained principle of design - a considered, detailed explanation
e) Principles of design – rhythm, repetition, contrast, balance, proportion, radiation, gradation,
Explanation:

E.g.contrast: the shape of the rounder edges of the base and top end of the seat contrast with the finer shapes of the legs creating visual interest. The stippled surface of the lounge contrasts with the shiny aluminium cld finsih.

See next page

f) The Lockheed Lounge was originally made as a one-off design. Due to its popularity it was then produced as a commercial design in a limited edition. Identify **ONE (1) stage of the 'Technology Process'** that Marc Newson may have worked through to make the product. Discuss in **detail the activities** that Marc Newson would have undertaken **in that stage of the Technology Process**.

(3 marks)

g) **Sample response**

Any of the following stages

- Design proposal/statement of intent
- Investigation -Research – inspiration, brainstorm, client data collection, surveys
- Devising - Development of ideas and concepts, illustration & annotation
- Production – testing, sampling, prototype, product
- Evaluation – ongoing evaluation, product testing – audience, survey, final evalution

Design proposal/statement of intent

In order for Marc Newson to be clear about his design he would need to identify an opportunity that he could work towards. From there he would need to outline the context, constraints and considerations to ensure that he is clear on the direction to take. Then the development of performance criteria to help evaluate how well the design, planning and final product satisfies the design brief need to be established. Research is a crucial area of this stage, so that before the 'Development of ideas' and 'Production' stages Newson is clear about all the possible ideas, materials, tools and processes and how they might assist in the design of the piece.

Mark allocation: 3 marks

- 1 mark for TP stage identified
- 2 marks for a detailed explanation of what is happening during that stage

h) Identify the manufacturing system that would be most suited for the commercial production of the Lockheed Lounge: **low volume production or mass production**. Give reasons for your answer. (2 marks)

Sample response

Low-volume production

Mark allocation: 1 mark

- 1 mark for 'low-volume production'

Reasons

Sample response

If the item is being produced as a limited edition, a small number of items are produced over a given time frame. This is a high-end designer product and so would not be mass-produced.

i) New and emerging technologies are important tools for designers. If the Lockheed Lounge were to be designed and created today, identify and explain **a new and emerging technology** that Marc Newson would be able to use to assist in either the design or production of the piece. (4 marks)

Rapid 3D prototyping is a new technology that would allow the designer to create a scaled 3D model of the piece. By doing this, the designer would be able to see if the proportions of the piece would work before creating a full-scale prototype. This would allow changes in the piece before construction was to begin, saving time and money for the designer.

Mark allocation: 4 marks

- 1 mark for naming a new and emerging technology
- 3 marks for a detailed explanation and how Newson could utilise the technology