



ATAR course examination, 2023

Question/Answer booklet

MATERIALS DESIGN AND TECHNOLOGY

Sections One and Two

Please place your student identification label in this box

WA student number: In figures

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In words

Time allowed for this paper

Reading time before commencing work: ten minutes

Working time: two and a half hours

Time suggested 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

Number of additional
answer booklets used
(if applicable):

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

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.

Sections One and Two: Answer all questions.
- 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 One: Short answer**15% (30 Marks)**

This section has **three** questions. Answer **all** questions. Write your answers in the spaces provided.

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.

Suggested working time: 20 minutes.

Question 1**(10 marks)**

- (a) Describe the role of client values and beliefs in the design process. (3 marks)

- (b) Outline **two** factors that influence the development of trends in product design. (4 marks)

One: _____

Two: _____

Question 1 (continued)

- (c) Concern for the environment is a current social trend. Name **one** traditional product that has been altered to fit this trend and outline how it has been changed. (3 marks)

Question 2

(8 marks)

Outline how **two** elements and **two** principles of design have been used in the artwork on the wheat silos shown below.



Element one: _____

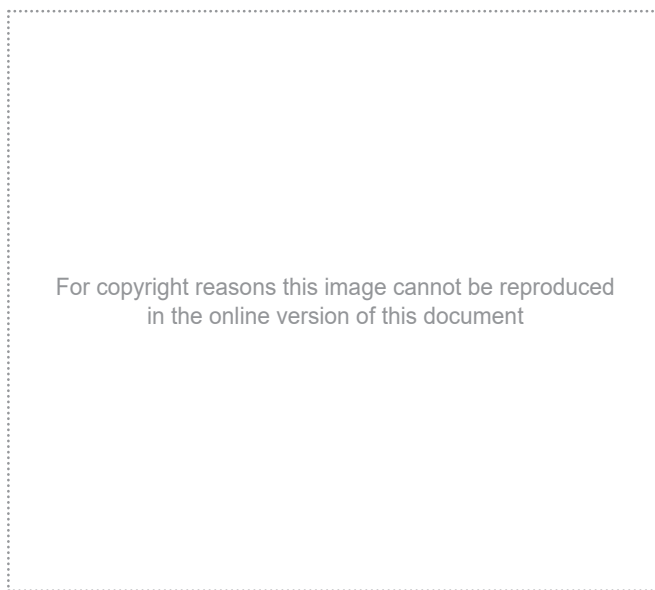
Element two: _____

Principle one: _____

Principle two: _____

Question 3

(12 marks)



- (a) Outline how **four** design fundamentals were used to design the electric bicycle pictured above. (8 marks)

One: _____

Two: _____

Three: _____

Four: _____

- (b) Explain the role of performance criteria in the design process of a product. (4 marks)

End of Section One

See next page

Section Two: Extended answer

25% (39 Marks)

This section has **four** questions. Answer **all** questions. Write your answers in the spaces provided.

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.

Suggested working time: 40 minutes.

Question 4

(11 marks)

- (a) List **four** items that are included in a risk assessment document for a piece of new equipment. (4 marks)

One: _____

Two: _____

Three: _____

Four: _____

- (b) Identify **three** actions that can be taken if a hazard cannot be fixed or eliminated. (3 marks)

One: _____

Two: _____

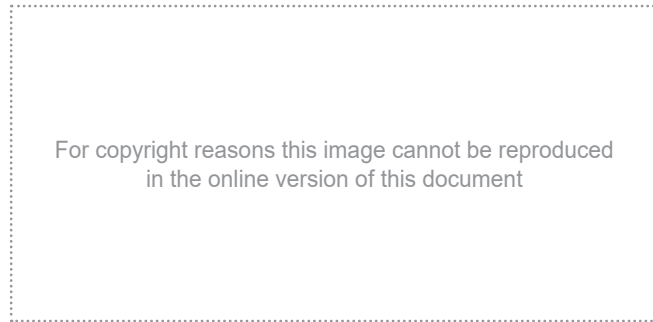
Three: _____

(c) Explain how the use of ergonomics can impact the safety of a workplace. (4 marks)

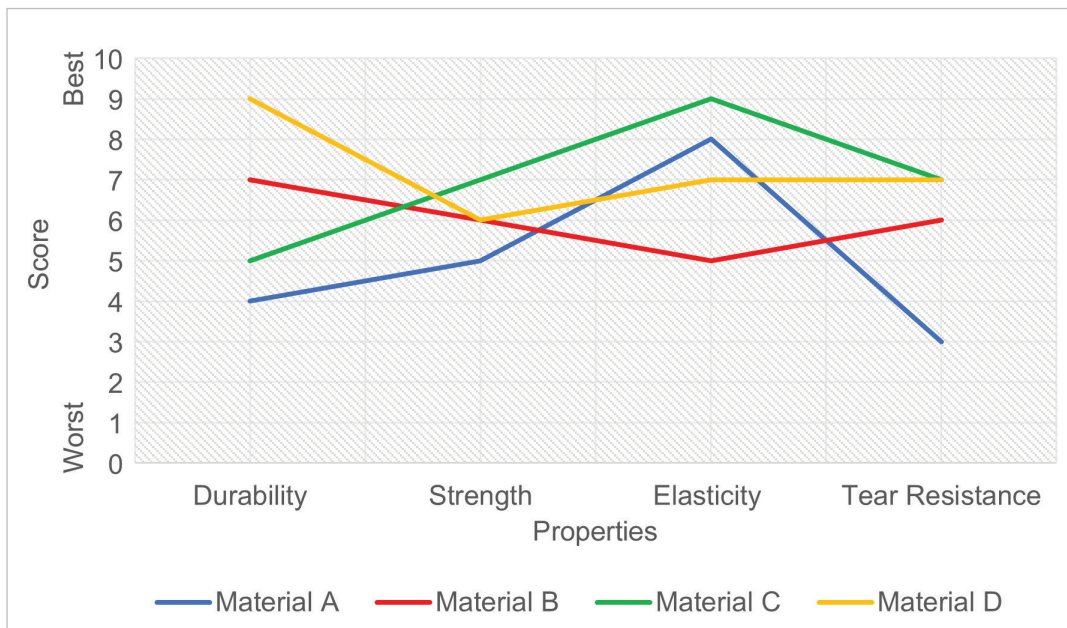
Question 5

(9 marks)

During the design of the swimming goggles pictured, the designer had to consider four different materials for the waterproofing seal around the outside. The waterproofing seal is the material between the mask and the user's face and is used to prevent water entering the goggles. To ensure that the designer selected the most suitable material, the material's properties were tested.



- (a) Using the results from the graph below, identify and explain which material would be the most suitable for the seal of the swimming goggles. (5 marks)



- (b) Outline **two** factors, other than material properties, that can influence the selection of materials for products. (4 marks)

One: _____

Two: _____

Question 6

(13 marks)

- (a) Outline **three** impacts on the environment that designers aim to minimise when designing a product. (6 marks)

One: _____

Two: _____

Three: _____

- (b) Identify **three** ways manufacturers can reduce waste during production. (3 marks)

One: _____

Two: _____

Three: _____

- (c) Explain how designers plan to minimise waste at the end of a product's life cycle. (4 marks)

ACKNOWLEDGEMENTS

- Question 2** Adapted from: Green, A. (n.d.). [Photograph of Merredin silo art by Kyle Hughes-Odgers]. Retrieved May, 2023, from <https://www.australiansiloarttrail.com/merredin#&gid=1429948764&pid=3>
- Question 3** Fiido. (n.d.). [Photograph of red Fiido Q1 seated electric scooter]. Retrieved May, 2023, from <https://www.electromotion.com.au/products/fiido-q1?variant=41231126954155>
- Question 5** Adapted from: Aouloves. (n.d.). [Photograph of swim goggles]. Retrieved May, 2023, from <https://www.amazon.com.au/AouloveS-Goggles-Leaking-Vision-Swimming/dp/B0BFHRMR9J>
- Question 7** Adapted from: Australian Made. (n.d.). [Image of Australian Made logo on swing tags with string]. Retrieved May, 2023, from <https://australianmade.com.au/campaigns/australianmadeweek/>

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