



ATAR course examination, 2022

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	31	15
Section Two Extended answer	4	4	40	42	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 2022: 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% (31 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**(9 marks)**

- (a) In the table below, state **one** purpose and **one** characteristic of each drawing technique listed. (6 marks)

Drawing technique	Purpose	Characteristic
Rapid concept sketching		
3D presentation drawings		
2D working/technical drawings		

- (b) Identify **three** ways in which information and communication technology (ICT) has changed drawing techniques. (3 marks)

One: _____

Two: _____

Three: _____

See next page

Question 2

(14 marks)

- (a) Name a machine that you have used this year and outline **four** safety checks to be performed before using the machine, in order to reduce risks. (8 marks)

Name of machine: _____

One: _____

Two: _____

Three: _____

Four: _____

- (b) Identify **three** steps to be followed in carrying out a risk management plan. (3 marks)

One: _____

Two: _____

Three: _____

- (c) List **three** legal implications for designers when designing material products for the consumer market. (3 marks)

One: _____

Two: _____

Three: _____

Question 3

(8 marks)



The Green Planet Dubai, which opened in 2016, is an immersive science centre with an indoor Equatorial Rainforest.

With reference to the image above, outline **two** principles and **two** elements of design used in the design of the building.

Principles

One: _____

Two: _____

Elements

One: _____

Two: _____

End of Section One

See next page

Section Two: Extended answer

25% (42 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

(18 marks)

- (a) Using **five** design fundamentals, compare the features of the water bottles shown below. (10 marks)

Bottle One

Main material:
Stainless steel
\$38.00



Bottle Two

Main material:
Silicone
\$25.00

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One: _____

Two: _____

Three: _____

Four: _____

Five: _____

- (b) Using a cultural inspiration, draw a rapid concept sketch to illustrate how Bottle One in part (a) could be adapted to appeal to a niche market. (4 marks)

Niche market: _____	(1 mark)
Cultural inspiration: _____	(1 mark)
Rapid concept sketch:	(2 marks)

- (c) Explain the relationship between product innovation, lifestyle choices and consumer demand. (4 marks)

Question 5

(10 marks)

- (a) Describe **two** construction techniques or processes that can be carried out with computer numerically-controlled (CNC) technologies. (4 marks)

One: _____

Two: _____

- (b) Outline **three** ways in which CNC processes are effective in managing the environmental impacts of production. (6 marks)

One: _____

Two: _____

Three: _____

Question 6

(8 marks)

- (a) Discuss the difference between production planning and production management by identifying the components of each stage. (5 marks)

- (b) Describe how production planning is linked to the final evaluation of the product. (3 marks)

Question 7

(6 marks)

The Suez Canal is the main shipping route for consumer goods between Europe and the Southern Hemisphere. In March 2021, the Suez Canal was blocked for six days after a container ship ran aground. More than 700 ships were waiting to pass through the Suez Canal when the ship was finally freed.

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<https://www.cnbc.com/2021/03/26/satellite-images-of-ship-ever-given-in-suez-canal-shows-work-underway.html>

Discuss how this problem could influence globalisation for local, national **and** international industries.

ACKNOWLEDGEMENTS

- Question 3** Cheong, D. (2016). [Photograph of The Green Planet - Dubai]. Retrieved April, 2022, from https://www.architectmagazine.com/project-gallery/the-green-planet_o
- Question 4** Left image: [Photograph of black stainless steel bottle with straw]. (n.d.). Retrieved April, 2022, from https://m.media-amazon.com/images/I/71vu+R1PflL._AC_SY879_.jpg
Right image: [Photograph of blue collapsible water bottles]. (n.d.). Retrieved April, 2022, from <https://i.linio.com/p/678aa859b726ceaa094e11c15b1fc71a-product.jpg>
- Question 7** Maxar Technologies. (2021). [Satellite image of Evergreen container ship blocking the Suez Canal March 2021]. Retrieved April, 2022, from <https://www.cnbc.com/2021/03/26/satellite-images-of-ship-ever-given-in-suez-canal-shows-work-underway.html>

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