Western Australian Certificate of Education
ATAR course examination, 2016
Question/Answer booklet

MATERIALS
DESIGN AND
TECHNOLOGY
Section Three

Student number: In figures

In words

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Time recommended 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: 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

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<th>Number of questions available</th>
<th>Number of questions to be answered</th>
<th>Suggested working time (minutes)</th>
<th>Marks available</th>
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Total 100

Instructions to candidates

1. The rules for the conduct of the Western Australian Certificate of Education ATAR course examinations are detailed in the Year 12 Information Handbook 2016. 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 answers to the specific questions asked and to follow any instructions that are specific to a particular question.

5. Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.
Section Three: Sectionalised and extended answer 60% (67 Marks)

You are required to choose one (1) of the following options, according to the context you have studied in 2016.

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

<table>
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<tr>
<th>Context</th>
<th>Question</th>
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<td>Textiles</td>
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<td>20–27</td>
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Now turn to the relevant pages and answer the questions for the context you have studied.
(a) Name the materials test and explain the steps needed to complete this type of test.

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______________________________________________________________________________________________________________________________________________

(5 marks)
(b) The reliability of a materials test is important. Give two examples of what can affect a materials test and two examples of what the consequences of an inaccurate test might be. (4 marks)

__________________________________________________________________________

__________________________________________________________________________

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__________________________________________________________________________

(c) (i) If the material being tested in part (a) performed well, identify the material and a suitable use for it. (1 mark)

__________________________________________________________________________

__________________________________________________________________________

(ii) If the identified material performed poorly, give a suitable use for the material. (1 mark)

__________________________________________________________________________

__________________________________________________________________________

(d) Identify and explain a manipulation technique you could use to give shape to the material identified in part (c)(i). (4 marks)

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__________________________________________________________________________
Question 9  (10 marks)

(a) Identify four differences in the cellular structure of hardwoods and softwoods.  (4 marks)

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(b) Identify three characteristics of softwood trees.  (3 marks)

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(c) Give three advantages of using a softwood for furniture production.  (3 marks)

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Question 10  (12 marks)

Read the scenario below and answer all parts of this question.

At 9.12 am on 13 October 2016, Matthew had an accident in his woodwork class while using the power tool pictured below. As a result, he sustained a serious injury to his hand. The school has held an investigation into the accident.

(a) Give three possible reasons why the accident could have occurred. (3 marks)

One: ____________________________________________

Two: ____________________________________________

Three: ____________________________________________
Question 10 (continued)

(b) After the investigation was completed, the Occupational Safety and Health officer developed a risk management plan for the workshop. What was the purpose of the risk management plan? (2 marks)

(c) Identify three proactive measures that could be introduced that would better prepare students for using workshop machinery. (3 marks)

(d) Identify four safety checks that should be carried out by a student before using the machine pictured at the start of this question. (4 marks)
Question 11 (18 marks)

In the space provided, sketch the final project that you designed and manufactured this year. Identify the key features and, with the use of annotation, justify the choices for:

- materials
- manufacturing techniques used
- joining methods
- finish
- historical, social and cultural sources of design inspiration
- client/end user needs
- design features/decoration.

Sketching (4 marks)
Annotation (14 marks)
Question 12 (12 marks)

The globalisation of computer-aided drawing (CAD)/computer numerical control (CNC) technologies has had huge effects on the furniture-making industry. It has not only changed the manufacturing processes but also the way in which furniture is designed.

Considering this statement, describe three forms of CAD or CNC and outline the impacts they have had on the furniture-making industry.
Question 13

(a) Name the materials test and explain the steps needed to complete this type of test.

(5 marks)

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__________________________________________________________________________
(b) The reliability of a materials test is important. Give two examples of what can affect a materials test and two examples of what the consequences of an inaccurate test might be. (4 marks)

(c) (i) If the material being tested in part (a) performed well, identify the material and a suitable use for it. (1 mark)

(ii) If the identified material performed poorly, give a suitable use for the material. (1 mark)

(d) Identify and explain a manipulation technique you could use to give shape to the material identified in part (c)(i). (4 marks)
Question 14 (10 marks)

(a) Identify four differences between the characteristics of ferrous and non ferrous metals. (4 marks)

(b) Identify three properties of alloys. (3 marks)

(c) Give three advantages of using aluminium over steel. (3 marks)
Question 15

Read the scenario below and answer all parts of this question.

At 9.12 am on 13 October 2016, Jaime had an accident in her metalwork class while using the power tool pictured below. As a result, she sustained a serious injury to her hand. The school has held an investigation into the accident.

(a) Give three possible reasons why the accident could have occurred. (3 marks)

One: ______________________________________________________________________

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____________________________________________________________________________

Two: ______________________________________________________________________

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____________________________________________________________________________

Three: _____________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________
Question 15 (continued)

(b) After the investigation was completed, the Occupational Safety and Health officer developed a risk management plan for the workshop. What was the purpose of the risk management plan? (2 marks)

(c) Identify three proactive measures that could be introduced that would better prepare students for using workshop machinery. (3 marks)

(d) Identify four safety checks that should be carried out by a student before using the machine pictured at the start of this question. (4 marks)
Question 16 (18 marks)

In the space provided, sketch your final project that you designed and manufactured this year. Identify the key features and, with the use of annotation, justify the choices for:

- materials
- manufacturing techniques used
- joining methods
- finish
- historical, social and cultural sources of design inspiration
- client/end user needs
- design features/decoration.

Sketching (4 marks)
Annotation (14 marks)
Question 17 (12 marks)

The globalisation of computer-aided drawing (CAD)/computer numerical control (CNC) technologies has had huge effects on the furniture-making industry. It has not only changed the manufacturing processes but also the way in which furniture is designed.

Considering this statement, describe three forms of CAD or CNC and outline the impacts they have had on the furniture-making industry.
Question 18  (15 marks)

(a) Name the materials test and explain the steps needed to complete this type of test.  
(5 marks)

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(b) The reliability of a materials test is important. Give two examples of what can affect a materials test and two examples of what the consequences of an inaccurate test might be. (4 marks)

(c) (i) If the material being tested in part (a) performed well, identify the material and a suitable use for it. (1 mark)

(ii) If the identified material performed poorly, give a suitable use for the material. (1 mark)

(d) Identify and explain a manipulation technique you could use to give shape to the material identified in part (c)(i). (4 marks)
Question 19

(a) Identify **four** differences between cellulosic and protein fibres. (4 marks)

(b) Identify **three** characteristics of manufactured fibres. (3 marks)

(c) Give **three** advantages of using a fibre blend. (3 marks)
At 9.12 am on 13 October 2016, Carly had an accident in her textiles class while using the machine pictured below. As a result, she sustained a serious injury to her hand. The school has held an investigation into the accident.

(a) Give three possible reasons why the accident could have occurred. (3 marks)

One: __________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

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Two: __________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

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Three: __________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________
Question 20 (continued)

(b) After the investigation was completed, the Occupational Safety and Health officer developed a risk management plan for the workshop. What was the purpose of the risk management plan? (2 marks)

(c) Identify three proactive measures that could be introduced that would better prepare students for using machinery. (3 marks)

(d) Identify four safety checks that should be carried out by a student before using the machine pictured at the start of this question. (4 marks)
Question 21  

In the space provided, sketch the final project that you designed and manufactured this year. Identify the key features and, with the use of annotation, justify the choices for:

- materials
- manufacturing techniques used
- joining methods
- finish
- historical, social and cultural sources of design inspiration
- client/end user needs
- design features/decoration.

Sketching (4 marks)  
Annotation (14 marks)
The globalisation of computer-aided drawing (CAD)/computer numerical control (CNC) technologies has had huge effects on the garment-construction industry. It has not only changed the manufacturing processes but also the way in which garments are designed.

Considering this statement, describe three forms of CAD or CNC and outline the impacts they have had on the garment-construction industry.
MATERIALS DESIGN AND TECHNOLOGY

Additional working space

Question number: ________________
Additional working space

Question number: ____________
ACKNOWLEDGEMENTS

Question 3  Image 1

Image 2

Question 5  Sculpture

Image

Question 10  Image adapted from: DeWalt. (2016). *Advanced DeWalt D26203 1/4in 8mm plunge routers variable speed***. Retrieved June, 2016, from www.amazon.co.uk/Advanced-DeWalt-D26203-Routers-Variable/dp/B00I9FG9TE


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