Western Australian Certificate of Education
Examination, 2015

Question/Answer Booklet

MATERIALS
DESIGN AND
TECHNOLOGY
Stage 3
Section Three

Please place your student identification label in this box

Student Number: In figures

In words

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
Sections One and Two 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 the WACE examinations

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 notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor before reading any further.
Structure of the examination

The WACE Materials Design and Technology Stage 3 examination consists of a written component worth 50 per cent of the total examination score and a practical (portfolio) component worth 50 per cent of the total examination score.

Structure of this paper

<table>
<thead>
<tr>
<th>Section</th>
<th>Number of questions available</th>
<th>Number of questions to be answered</th>
<th>Suggested working time (minutes)</th>
<th>Marks available</th>
<th>Percentage of total exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section One: Short answer</td>
<td>3</td>
<td>3</td>
<td>20</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>Section Two: Extended answer</td>
<td>3</td>
<td>3</td>
<td>40</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Section Three: Candidates to choose one of the following contexts:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>5</td>
<td>5</td>
<td>90</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Metal</td>
<td>5</td>
<td>5</td>
<td>90</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Textiles</td>
<td>5</td>
<td>5</td>
<td>90</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the Year 12 Information Handbook 2015. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

   Section Three: Answer all of the questions within your specialised field: Wood, Metal or Textiles. Write your answers in this Question/Answer Booklet.

3. 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.

4. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
   - Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
   - Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the 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 2015.

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

<table>
<thead>
<tr>
<th>Context</th>
<th>Question</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>7–11</td>
<td>4–14</td>
</tr>
<tr>
<td>Metal</td>
<td>12–16</td>
<td>15–25</td>
</tr>
<tr>
<td>Textiles</td>
<td>17–21</td>
<td>26–37</td>
</tr>
</tbody>
</table>

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

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
Section Three: Wood context 60% (67 Marks)

This section contains five (5) questions. Answer all questions.

Suggested working time: 90 minutes.

Question 7 (12 marks)

Below is a picture of a hammock that has been designed for adults. The hammock has a timber frame and a textile sling.

(a) With reference to its properties, identify a suitable timber for the hammock frame. (3 marks)

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Before the final material was selected for the frame, it had to be tested to check its physical and mechanical properties.

Describe in detail a suitable testing method you could use in a school workshop that could help the designer to choose the most suitable material. Use a sketch to help explain your answer. (6 marks)

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Space for sketching
Question 7 (continued)

(c) Identify a suitable finish that could be applied to the frame and explain two properties of the finish that will protect the material from the outdoor environment. (3 marks)
Design brief

You have been asked by a local furniture company to help it design a new range of outdoor tables for its store. The company has always sold traditional styles of furniture, but in recent times it has seen its sales begin to decline. After conducting market research with a selected group of customers, it discovered that there was a trend toward more modern and stylish furniture.

Design restrictions

The outdoor table must be:
- predominantly wood
- soundly constructed
- capable of being manufactured in quantity
- safe to use
- designed to follow ergonomic design principles
- durable
- stable.

(a) List seven questions that you could ask the client to get a better idea of the limitations. (7 marks)
Question 8 (continued)

(b) Define what a trend is and explain how it can impact a target audience. (3 marks)

(c) Outline three techniques that could be used to carry out market research. (3 marks)
(d) Study the information provided in the design brief and design restrictions stated in Question 8 and use this information to produce two designs that you can present to your client. Use annotations to justify and explain the suitability of your concepts. (12 marks)
Question 9 (10 marks)

Using the drawing and price list below, calculate the material requirements and the cost of each component part for making a single chair frame. Complete the table and round your costs to the nearest cent. All sizes are in millimetres.

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
<th>Size</th>
<th>Number required</th>
<th>Total length (M)</th>
<th>Cost: ($/m)</th>
<th>Cost: sub-total</th>
</tr>
</thead>
</table>

See next page
Question 10 (10 marks)

Analyse and discuss, using examples, the relationship between lifestyle choices, consumer demand and product innovation, as shown in the diagram below.

![Diagram showing lifestyle choices, consumer demand, and product innovation]

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Question 10 (continued)
Question 11 (10 marks)

Because of the environmental degradation that societies are continuing to cause to our planet through carbon emissions, wastage and the clearing of forests, we have a responsibility to design and produce products that last longer, are made from sustainable and recyclable materials, and reduce the impact we make on our environment.

Consider the statement above and explain how the furniture industry can implement strategies to support this statement.
Question 11 (continued)

End of questions: Wood
Question 12  

Below is a picture of a hammock that has been designed for adults. The hammock has a metal frame and a textile sling.

For copyright reasons this image cannot be reproduced in the online version of this document, but may be viewed at www.myhammock.com/prodimages/cmarc-1.jpg

(a) With reference to its properties, identify a suitable metal for the hammock frame.  

(3 marks)
Question 12 (continued)

(b) Before the final material was selected for the frame, it had to be tested to check its
physical and mechanical properties.

Describe in detail a suitable testing method you could use in a school workshop that
could help the designer to choose the most suitable material. Use a sketch to help
explain your answer.

(6 marks)

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Space for sketching
(c) Identify a suitable finish that could be applied to the frame and explain two properties of the finish that will protect the material from the outdoor environment. (3 marks)

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Design brief

You have been asked by a local furniture company to help it design a new range of outdoor tables for its store. The company has always sold traditional styles of furniture, but in recent times it has seen its sales begin to decline. After conducting market research with a selected group of customers, it discovered that there was a trend toward more modern and stylish furniture.

Design restrictions

The outdoor table must be:
- predominantly metal
- soundly constructed
- capable of being manufactured in quantity
- safe to use
- designed to follow ergonomic design principles
- durable
- stable.

(a) List seven questions that you could ask the client to get a better idea of the limitations. 

(7 marks)
(b) Define what a trend is and explain how it can impact a target audience. (3 marks)

(c) Outline three techniques that could be used to carry out market research. (3 marks)
(d) Study the information provided in the design brief and design restrictions stated in Question 13 and use this information to produce two designs that you can present to your client. Use annotations to justify and explain the suitability of your concepts.

(12 marks)
Question 14 (10 marks)

Using the drawing and price list below, calculate the material requirements and the cost of each component part for making a single chair frame. Complete the table and round your costs to the nearest cent. All sizes are in millimetres.

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
<th>Size</th>
<th>Number required</th>
<th>Total length (M)</th>
<th>Cost: ($/m)</th>
<th>Cost: sub-total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part A</td>
<td>1400 x 25 x 25 x 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part C</td>
<td>350 x 20 x 20 x 1.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part B</td>
<td>420 x 25 x 25 x 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part D</td>
<td>400 x 25 x 25 x 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part E</td>
<td>350 x 20 x 20 x 1.8</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
Question 15 (10 marks)

Analyse and discuss, using examples, the relationship between lifestyle choices, consumer demand and product innovation, as shown in the diagram below.

![Diagram of lifestyle choices, consumer demand, and product innovation]

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See next page
Question 16 (10 marks)

Because of the environmental degradation that societies are continuing to cause to our planet through carbon emissions, wastage and the clearing of forests, we have a responsibility to design and produce products that last longer, are made from sustainable and recyclable materials, and reduce the impact we make on our environment.

Consider the statement above and explain how the metal industry can implement strategies to support this statement.
Section Three: Textiles context 60% (67 Marks)

This section contains **five (5)** questions. Answer **all** questions.

Suggested working time: 90 minutes.

**Question 17** (12 marks)

Below is a picture of a hammock that has been designed for adults. The hammock has a timber frame and a textile sling.

For copyright reasons this image cannot be reproduced in the online version of this document, but may be viewed at www.myhammock.com/prodimages/cmarc-1.jpg

(a) With reference to its properties, identify a suitable textile for the hammock sling. (3 marks)

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(b) Before the final material was selected for the sling, it had to be tested to check its physical and mechanical properties.

Describe in detail a suitable testing method you could use in a school workshop that could help the designer to choose the most suitable material. Use a sketch to help explain your answer. (6 marks)

Space for sketching
Question 17 (continued)

(c) Identify a suitable finish that could be applied to the textile and explain two properties of the finish that will protect the material from the outdoor environment. (3 marks)

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Question 18 (25 marks)

Design brief

You have been asked by a local clothing company to help it design a new range of outdoor clothing for its store. The company has always sold traditional styles of clothes, but in recent times it has seen its sales begin to decline. After conducting market research with a selected group of customers, it discovered that there was a trend toward more modern and stylish clothes.

Design restrictions

The outdoor clothing must:
- be well constructed
- be capable of being manufactured in quantity
- be water and wind resistant
- be wrinkle resistant
- be durable
- have good thermal properties.

(a) List seven questions that you could ask the client to get a better idea of the limitations. (7 marks)

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Question 18 (continued)

(b) Define what a trend is and explain how it can impact a target audience. (3 marks)

(c) Outline three techniques that could be used to carry out market research. (3 marks)
(d) Study the information provided in the design brief and design restrictions and use this information to produce **two** designs that you can present to your client. Use annotations to justify and explain the suitability of your concepts. (12 marks)

Design 1

Design 2
Question 19

Using the drawing, the data table and the price list below, calculate the material requirements and the cost of making a size 12 garment in View A from 150 cm wide polyester delustred satin, fully lined with a nylon net petticoat. Complete the table and round your costs to the nearest cent.

For copyright reasons this image cannot be reproduced in the online version of this document.
<table>
<thead>
<tr>
<th>Materials</th>
<th>Quantity</th>
<th>Cost per unit</th>
<th>Cost per garment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyester delustred satin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lining</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fusible interfacing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nylon net petticoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 cm Open-ended bodice zip</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 cm Skirt zip</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Question 20 (10 marks)

Analyse and discuss, using examples, the relationship between lifestyle choices, consumer demand and product innovation, as shown in the diagram below.

Lifestyle choices

Consumer demand

Product innovation
Because of the environmental degradation that societies are continuing to cause to our planet through carbon emissions, wastage and the clearing of forests, we have a responsibility to design and produce products that last longer, are made from sustainable and recyclable materials, and reduce the impact we make on our environment.

Consider the statement above and explain how the textiles industry can implement strategies to support this statement.

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End of questions: Textiles
Additional working space

Question number: ________________
ACKNOWLEDGEMENTS

Section One

Question 1


Question 2
Figure 1  Mobile phone [Image]. (n.d.). Retrieved January 21, 2015, from http://cdn0.mos.techradar.futurecdn.net/art/mobile_phones/Huawei/AscendMate/Review/huawei-mate5-420-90.jpg

Section Two

Question 4


Question 5


Section Three


Question 17  

Question 19  
Adapted from: Simplicity Creative Group. (n.d.). *Simplicity dress pattern* [Image].