



Western Australian Certificate of Education Examination, 2013

Question/Answer Booklet

MATERIALS DESIGN AND TECHNOLOGY

Stage 3

Section Three

Please place your student identification label in this box

Student Number: In figures

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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

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

Place a tick (✓) in one of the following boxes to indicate your specialised context

Wood

Metal

Textiles

Number of additional answer booklets used (if applicable):

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

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of total exam
Section One: Short answer	4	4	20	27	7.5
Section Two: Extended answer	4	4	40	38	12.5
Section Three: Candidates to choose one of the following contexts:					
Wood	5	5	90	78	30
Metal	5	5	90	78	
Textiles	5	5	90	78	
				Total	50

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2013*. 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.

See next page

Section Three: Sectionalised and extended answer**30% (78 Marks)**

You are required to choose **one (1)** of the following options, according to the context you have studied in 2013.

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

Context	✓	Question	Pages
Wood	<input type="checkbox"/>	9–13	4–12
Metal	<input type="checkbox"/>	14–18	13–21
Textiles	<input type="checkbox"/>	19–23	22–30

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.

See next page

Section Three: Wood context

30% (78 Marks)

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

Suggested working time: 90 minutes.

Question 9

(25 marks)

A local youth centre intends to renovate its premises, which are outdated and no longer considered fashionable by its target audience. The youth centre has invited students from around Perth to submit designs for a new outdoor bench for the courtyard area. The client has identified several requirements, it must be:

- appealing to 13–18 year olds
- suited to the outdoor environment
- ergonomically designed
- contemporary
- able to fit in with the culture of Perth.

(a) Explain why the term ‘niche market’ can be applied to this product. (3 marks)

(b) Outline the ergonomic and anthropometric detail/features that need to be considered in the design of this product. (3 marks)

See next page

- (c) Develop **two** possible design solutions for the outdoor bench to present to the client. Use detailed and appropriate three-dimensional (3D) sketches and annotations to illustrate your ideas. (9 marks)

Solution one

Solution two

Question 9 (continued)

- (d) Choose **one** of the two design solutions you developed in Question 9(c) and justify to the client why this better satisfies the requirements of the brief. (4 marks)

- (e) Propose a range of material options for your chosen final design to present to the client. (3 marks)

- (f) Identify **three** factors that would affect the costing of the final product. (3 marks)

One: _____

Two: _____

Three: _____

Question 10

(16 marks)

- (a) Review the production process for the one-off manufacture of the jewellery box shown below and make recommendations as to how it can be improved. (4 marks)

Production process

- cut 2 pieces, 400 mm long for the back and front and 2 pieces 220 mm long for the sides at 90 degrees
- cut the ends of each piece at 45 degrees
- glue and clamp the box frame together
- cut the veneered plywood for the base and lid to the same size as the box
- wait for glue to dry
- using a rebating bit on the router, rebate the top and bottom of the box to fit the plywood
- square up the corners of the box using a chisel
- cut the plywood to fit inside the rebates and glue together
- sand box up to 180 grit
- mark a cut line to separate the lid from the base on all sides, 25 mm from the top
- separate the lid using the table saw
- sand the two parts to remove pencil marks
- mark and chisel rebates for hinges
- fit hinges
- final sanding to all parts
- varnish.

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See next page

Question 10 (continued)

- (b) Assess what changes would need to be made to the production process and/or equipment to undertake the mass production of this product. (4 marks)

- (c) Advise on how the production process would need to be reviewed to ensure there was a reduction of waste in the mass production process. (4 marks)

- (d) Create a quality control checklist that would assist in evaluating the success of the production process. (4 marks)

Question 11

(22 marks)

Answer the following questions, making reference to project work you have designed this year.

- (a) Designers draw inspiration from a range of influences around them. Outline your sources of design inspiration for **one** of your projects. (3 marks)

- (b) Justify how functionality influenced the choices you made in the construction process employed for **one** project you completed this year. (4 marks)

- (c) Identify and discuss the safety features and processes required to operate a complex machine you have used this year. (4 marks)

See next page

Question 11 (continued)

- (d) State where, during the construction phase of a project, a change of process influenced the intended outcome or design brief of a project you have completed this year. (3 marks)

- (e) Evaluate by clearly showing how you used researched options in the final selection of a material you have used in a project you completed during this year. (4 marks)

- (f) Evaluate by clearly showing how you used researched options in the final selection of a finishing technique for a project you completed during this year. (4 marks)

See next page

Section Three: Metal context**30% (78 Marks)**

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

Suggested working time: 90 minutes.

Question 14**(25 marks)**

A local youth centre intends to renovate its premises, which are outdated and no longer considered fashionable by its target audience. The youth centre has invited students from around Perth to submit designs for a new outdoor bench for the courtyard area. The client has identified several requirements, it must be:

- appealing to 13–18 year olds
- suited to the outdoor environment
- ergonomically designed
- contemporary
- able to fit in with the culture of Perth.

(a) Explain why the term 'niche market' can be applied to this product. (3 marks)

(b) Outline the ergonomic and anthropometric detail/features that need to be considered in the design of this product. (3 marks)

See next page

Question 14 (continued)

- (c) Develop **two** possible design solutions for the outdoor bench to present to the client. Use detailed and appropriate three-dimensional (3D) sketches and annotations to illustrate your ideas. (9 marks)

Solution one
Solution two

See next page

- (d) Choose **one** of the two design solutions you developed in Question 14(c) and justify to the client why this better satisfies the requirements of the brief. (4 marks)

- (e) Propose a range of material options for your chosen final design to present to the client. (3 marks)

- (f) Identify **three** factors that would affect the costing of the final product. (3 marks)

One: _____

Two: _____

Three: _____

Question 15

(16 marks)

- (a) Review the production process for the one-off manufacture of the ornate garden seat shown below and make recommendations as to how it can be improved. (4 marks)

Production process

- cut 16 mm round tube for main frame as specified in the cutting list
- bend large curve to leg components
- weld cross brace to both leg components
- bend large curve to the back brace frame
- weld into place the short cross bar of the seat to the back brace frame on both sides
- weld the long cross bars of the seat to the back brace frames
- weld into place the support bars along the seat
- measure and cut the metal lattice sheet
- weld the metal lattice sheet to the seat base
- cut required lengths of 12 mm round bar for the backrest panel
- measure and cut the metal lattice sheet for the backrest
- weld the components of the backrest together
- weld backrest assembly to the back brace frame
- measure and cut 12 mm round bar for the armrests
- scroll the shape for the armrests
- weld the armrests to the backrest and seat frames
- source and weld the end caps to the legs, backrest frame and armrests.

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- (b) Assess what changes would need to be made to the production process and/or equipment to undertake the mass production of this product. (4 marks)

- (c) Advise on how the production process would need to be reviewed to ensure there was a reduction of waste in the mass production process. (4 marks)

- (d) Create a quality control checklist that would assist in evaluating the success of the production process. (4 marks)

Question 16

(22 marks)

Answer the following questions, making reference to project work you have designed this year.

- (a) Designers draw inspiration from a range of influences around them. Outline your sources of design inspiration for **one** of your projects. (3 marks)

- (b) Justify how functionality influenced the choices you made in the construction process employed for **one** project you completed this year. (4 marks)

- (c) Identify and discuss the safety features and processes required to operate a complex machine you have used this year. (4 marks)

See next page

- (d) State where, during the construction phase of a project, a change of process influenced the intended outcome or design brief of a project you have completed this year. (3 marks)

- (e) Evaluate by clearly showing how you used researched options in the final selection of a material you have used in a project you completed during this year. (4 marks)

- (f) Evaluate by clearly showing how you used researched options in the final selection of a finishing technique for a project you completed during this year. (4 marks)

Section Three: Textiles context

30% (78 Marks)

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

Suggested working time: 90 minutes.

Question 19

(25 marks)

A clothing designer/manufacturer has been approached by a 26-year-old female client who is experiencing problems in purchasing dresses to wear to work, due to her figure type. The client works as a secretary in a legal office. She prefers clothing that is classic in style with a fashionable component.

The client is of average height, with a pear-shaped figure. She has a long body in proportion to her height. She has large upper arms and an average build. Her hair is dark brown with gold highlights and she has blue eyes and a pale complexion.

- (a) Explain why the term 'niche market' can be applied to this product. (3 marks)

- (b) Outline the ergonomic and anthropometric details/features that need to be considered in the design of this product. (3 marks)

- (c) Develop **two** possible design solutions for the work apparel to present to the client. Use detailed and appropriate sketches and annotations to illustrate your ideas. (9 marks)

Solution one

Solution two

See next page

Question 19 (continued)

- (d) Choose **one** of the two design solutions you developed in Question 19(c) and justify to the client why this better satisfies the requirements of the brief. (4 marks)

- (e) Propose a range of material options for your chosen final design to present to the client. (3 marks)

- (f) Identify **three** factors that would affect the costing of the final product. (3 marks)

One: _____

Two: _____

Three: _____

Question 20**(16 marks)**

- (a) Review the production process for the one-off manufacture of the Empire style long gown shown below and make recommendations as to how it can be improved. (4 marks)

Production process:

This classic Empire style long gown is made using a combination of shiny satin and chiffon fabric. The gown features a satin bodice and chiffon skirt. The bodice is lined with chiffon and the skirt with satin. The sleeves are satin and unlined.

The following instructions are for sewing the bodice and skirt sections. All seams are open seams and have a 1.5 cm seam allowance.

- Cut out fabric pieces.
- Gather fronts along centre seam edge to a length of 4 cm. Stitch centre front seam. Stitch darts in the back bodice. Stitch side seams and shoulder seams of dress bodice.
- Repeat for lining.
- Stitch lining to neck edge of bodice, right sides facing. Turn lining to inside and press neckline edges. Baste the lining to the outer bodice along the Empire line seams.
- Sew centre back seam of skirt, leaving open above the base of the zipper.
- Sew side skirt panels to centre back panels and overlock. Sew side seams and overlock. Repeat for lining.
- Place skirt against skirt lining, wrong sides together, and baste along the top edge.
- Join bodice to skirt and press seam allowances upward.

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See next page

Question 20 (continued)

- (b) Assess what changes would need to be made to the production process and/or equipment to undertake the mass production of this product. (4 marks)

- (c) Advise on how the production process would need to be reviewed to ensure there was a reduction of waste in the mass production process. (4 marks)

- (d) Create a quality control checklist that would assist in evaluating the success of the production process. (4 marks)

Question 21

(22 marks)

Answer the following questions, making reference to project work you have designed this year.

- (a) Designers draw inspiration from a range of influences around them. Outline your sources of design inspiration for **one** of your projects. (3 marks)

- (b) Justify how functionality influenced the choices you made in the construction process employed for **one** project you completed this year. (4 marks)

- (c) Identify and discuss the safety features and processes required to operate a complex machine you have used this year. (4 marks)

Question 21 (continued)

- (d) State where, during the construction phase of a project, a change of process influenced the intended outcome or design brief of the project you completed this year. (3 marks)

- (e) Evaluate by clearly showing how you used researched options in the final selection of a material you have used in a project you completed during this year. (4 marks)

- (f) Evaluate by clearly showing how you used researched options in the final selection of a finishing technique for a project you completed during this year. (4 marks)

ACKNOWLEDGEMENTS

Section One

- Question 3(a)** Adapted from: *Pool chair* [Image]. (n.d.). Retrieved March, 2013, from www.artsss.net/20-different-outdoor-furniture-shapes-to-consider-when-decorating-a-patio/

Section Two

- Question 7(a)** Adapted from: *Modern office furniture* [Image]. (n.d.). Retrieved March, 2013, from www.furniturestrend.com/modern-wood-office.html/modern-wood-office-furniture

Adapted from: *Metal table* [Image]. (n.d.). Retrieved March, 2013, from www.bodew.com/modern-stylish-metal-furniture/modern-stylish-metal-furniture/metal-table-furniture/

Adapted from: *Racing swimsuit* [Image]. (n.d.). Retrieved March, 2013, from www.ebay.com/itm/NWT-YINGFA-972-1-COMPETITION-TRAINING-RACING-SWIMSUIT-L-US-MISS-6-Sz32-CLASSIC-/221028012765?pt=US_CSA_WC_Swimwear&hash=item33764bd2dd

- Question 8** Adapted from: *Antique rocking cradle on rollers* [Image]. (n.d.). Retrieved March, 2013, from www.ebay.com/itm/Lovely-Solid-Wood-Antique-Jenny-Ginny-Lind-Baby-Child-Rocking-Cradle-on-Rollers-/190737782543?pt=LH_DefaultDomain_0&hash=item2c68db970f#ht_16113wt_826

Adapted from: *Iron baby cradle* [Image]. (n.d.). Retrieved March, 2013, from www.ebay.com/itm/Antique-French-Iron-BABY-Cradle-Shabby-Country-French/261147221373?pt=LH_DefaultDomain_0&hash=item3ccd965d7d

Adapted from: *Baby pyjamas* [Image]. (n.d.). Retrieved March, 2013, from <http://babyclothes.about.com/od/sleepwear/a/Understanding-The-U-S-Cpsc-Childrens-Sleepwear-Regulations.htm>

Section Three

- Question 10(a)** Adapted from: *Gentlemen's box by Gene Treanor* [Image]. (n.d.). Retrieved March, 2013, from [www.australianwoodcraft.com.au/Jarrah%20box%20for%20WesWesP335%20X%20255%20X%20115.-01-08-2010%20\(2\).JPG](http://www.australianwoodcraft.com.au/Jarrah%20box%20for%20WesWesP335%20X%20255%20X%20115.-01-08-2010%20(2).JPG)

- Question 13** Quotation from: Yang, L. (2012, December 13). Textile makers in Taiwan create a high tech market. *International Herald Tribune*, p. 14.

- Question 15(a)** Adapted from: *Metal garden bench* [Image]. (n.d.). Retrieved March, 2013, from <http://svagocasual.en.made-in-china.com/product/MqDJJCevuCbrE/China-Outdoor-Furniture-Metal-Bench-21-SV-49B-.html>

- Question 18** Quotation from: Yang, L. (2012, December 13). Textile makers in Taiwan create a high tech market. *International Herald Tribune*, p. 14.
- Question 20(a)** Adapted from: *Empire-style gown* [Image]. (n.d.). Retrieved March, 2013, from www.burdastyle.com/pattern_store/patterns/empire-gown-122012
- Question 23** Yang, L. (2012, December 13). Textile makers in Taiwan create a high tech market. *International Herald Tribune*, p. 14.

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