

B O A R D O F S T U D I E S
NEW SOUTH WALES

2003

**HIGHER SCHOOL CERTIFICATE
EXAMINATION**

Design and Technology

General Instructions

- Reading time – 5 minutes
- Working time – $1\frac{1}{2}$ hours
- Write using black or blue pen
- Write your Centre Number and Student Number at the top of page 5

Total marks – 40

Section I Pages 2–4

10 marks

- Attempt Questions 1–10
- Allow about 15 minutes for this section

Section II Pages 5–8

15 marks

- Attempt Question 11
- Allow about 35 minutes for this section

Section III Pages 9–11

15 marks

- Attempt ONE question from Questions 12–14
- Allow about 40 minutes for this section

Section I

10 marks

Attempt Questions 1–10

Allow about 15 minutes for this section

Use the multiple-choice answer sheet.

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample: $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9
A B C D

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D

If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word **correct** and drawing an arrow as follows.

A B C D
correct ↙

- 1** Which of the following terms best describes the analysis of a design from its conception to disposal?

 - (A) Just in time
 - (B) Obsolescence
 - (C) Ongoing evaluation
 - (D) Life-cycle assessment

- 2** Which of the following criteria are the most suitable when designing a tent for family camping?

 - (A) Does it have flyscreens, does it have a floor and is it durable?
 - (B) Is it lightweight, is it compact for storage and can one person erect it?
 - (C) Is it aesthetically pleasing, is the entry door functional and is it cost effective?
 - (D) Does the tent achieve the stated brief, is it functional and is its size appropriate?

- 3** Success of an innovative product often depends on entrepreneurial activity. Which of the following best describes entrepreneurial activity?

 - (A) Conducting a cost benefit analysis and an environmental evaluation
 - (B) Conducting a feasibility study and life-cycle assessment
 - (C) Decision-making, identifying opportunities and risk-taking
 - (D) Designing the manufacturing system for the product

- 4** The dual-flush toilet was introduced in 1980 following a series of droughts, when water conservation became an issue of public concern.

Which of the following is a primary factor impacting on the success of the Australian innovation of the dual-flush toilet?

 - (A) Cultural relevance
 - (B) Emerging technology
 - (C) Industrial patents
 - (D) Appropriate timing

- 5** Which of the following terms refers to the ability of a product to remain functional in its environment?

 - (A) Durability
 - (B) Portability
 - (C) Recyclability
 - (D) Sustainability

- 6 Which of the following is most important in order for a design team to work collaboratively?
- (A) All team members communicate regularly and electronically.
 - (B) All team members share ideas and work together on a design brief.
 - (C) Each team member uses their own resources and reports back to the team.
 - (D) The team leader controls all decisions and communicates them to the team.
- 7 The adoption of a new artificial fibre in an innovative wound dressing is an example of the use of
- (A) an innovative prototype.
 - (B) an emerging technology.
 - (C) a sustainable technology.
 - (D) health and safety legislation.
- 8 In which of the following situations is the widespread social acceptance of a new technology most likely?
- (A) The technology is high-tech.
 - (B) The technology has a global application.
 - (C) The technology makes an existing task easier.
 - (D) The technology changes the way we do things.
- 9 The method utilised to manufacture a new product is usually determined by which of the following?
- (A) Strength needs of the components
 - (B) Standards that apply to the product
 - (C) Amount of energy required for manufacture
 - (D) Estimated number of units to be produced
- 10 A new 'eco converter' has been developed to reduce harmful emissions from cars and trucks by 85%. However, as with many new and emerging technologies, the installation cost is very high.
- How could government agencies most successfully facilitate the introduction of the device?
- (A) By subsidising anyone who installs it
 - (B) By making it available at cost price to fleet owners
 - (C) By legislating that all cars and trucks be fitted with one
 - (D) By imposing an embargo until a long-term feasibility study has been carried out

Design and Technology

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Centre Number

Section II

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Student Number

15 marks

Attempt Question 11

Allow about 35 minutes for this section

Answer the questions in the spaces provided.

Question 11 (15 marks)

Please turn over

Question 11 (15 marks)

The articles below highlight some issues related to fruit picking and handling.



Injured fruit pickers sue farmers

This year has seen a dramatic rise in seasonal fruit pickers seeking compensation for broken bones, back and shoulder pain and other lifting-related injuries. It seems that falling off ladders, and heavy fruit-picking bags, are the primary causes of the accidents, up 10% from last year. Union representatives for the unskilled pickers say inappropriate equipment is to blame but growers claim lack of care is the issue and that expensive new bags, ladders and boxes would increase fruit prices at the supermarkets.

Bruised fruit adds pain

Lower yields of apples and pears due to the drought are not the only concern of orchard growers this year. A new study has revealed that up to 20% of the crop can be bruised by careless picking. Most pickers are paid by the quantity of fruit they pick, so careful handling gets little attention. Fruit dropped into bags, and careless transfer from bag to crate resulted in over 90% of all bruising. The remaining 10% is caused when the full crates are transferred by tractor to the packing sheds for sorting and chilling.



Question 11 continues on page 7

Question 11 (continued)

- (a) Outline TWO design opportunities related to the issues in the articles. 2

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- (b) (i) Develop ONE of these design opportunities into a design idea, using the table below. 2

<i>Design idea:</i>	
Factors to consider	Justification for the factor
1
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2
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- (ii) Identify the target market for your design idea in part (b) (i) and the method you will use to analyse the needs of this target market. 1

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- (iii) Explain how you will ensure that your design idea meets those needs throughout its development. 2

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Question 11 continues on page 8

Question 11 (continued)

(c) Research stimulates creativity. Explain TWO research methods you could use to develop your design idea (from part (b)) from concept to prototype. **3**

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(d) Designers often utilise a range of agencies/support programs to facilitate their design development. Explain the role of TWO of those agencies, and how you could use them in your development of this design. Use examples of designers/designs you have studied, and their use of these agencies, to support your answer. **5**

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End of Question 11

Design and Technology

Section III

15 marks

Attempt ONE question from Questions 12–14

Allow about 40 minutes for this section

Answer the question in a writing booklet. Extra writing booklets are available.

Question 12 (15 marks) **Marks**

Creativity is not confined to individuals traditionally considered to be creative. All people are capable of being creative, and most people's creative abilities can be enhanced through motivational stimuli.

Consider the above statement. With reference to a designer/designers you have investigated, or designing you have been involved in, answer the following questions.

- (a) Describe how initial design ideas may be inspired from motivational stimuli. Use examples to support your answer. **3**
- (b) 'Creativity in design is not limited to the initial idea, as it should be evident throughout the design process.' **4**
Explain where and how this occurs.
- (c) Critically analyse the role that ongoing evaluation has in the successful implementation of creative design. Use examples to support your answer. **8**





OR

Question 13 (15 marks)

Use the stimulus material to answer Question 13.

Consciously or not, the design of products and processes is the main determinant of environmental impact. The engineers and environmental managers at a factory can reduce an emission here or make less waste there, but there are limits to how much improvement can be made in those ways. Design is the key intervention point for making radical improvements in the environmental performance of products — and all their by-products as well!

EDWIN DATSCHEFSKI, *Total Beauty*, 2000

 <p>I wake up and put on my fleece top made from recycled plastic bottles.</p>	 <p>I strap on my thermic quartz watch, which runs on my body heat.</p>	 <p>Then I get into my hybrid engine car, which I run on electric power through the suburbs, before switching to petrol to go down the motorway to work.</p>
 <p>The chair is made from only aluminium and polypropylene, both over 99% pure, and is held together with only five screws, making it very recyclable.</p>	<p>A sustainable day</p>  <p>I contribute a few ideas, drawing them on the flipchart with soya bean crayons.</p>	 <p>I choose a packaging-free burrito wrap and an eat-the-stick ice lolly.</p>

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- (a) Identify TWO sources of sustainable energy and describe how each has a positive impact on the environment.
3
- (b) Choose ONE example from the stimulus material, and explain the process the designer would most likely have used to identify environmental problems and to make appropriate design decisions.
4
- (c) Critically analyse the ethical and environmental implications of sustainable product design. Use examples to support your answer.
8

OR

Question 14 (15 marks)

‘Emerging electronic technologies have a significant impact on our daily lives.’



The illustrations and photographs above demonstrate technological change and social interaction. Use these and/or other examples to answer the following questions.

- (a) Describe TWO ways in which electronic games have changed the social habits of teenagers. **3**
- (b) Discuss the ethical issues related to TWO electronic communication technologies. **4**
- (c) Critically analyse how emerging communication technologies impact on the way people interact. Use examples to support your answer. **8**

End of paper

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