

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

**2002**

**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 9

## Total marks – 40

**Section I** Pages 2–5

### 10 marks

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

**Section II** Pages 9–11

### 15 marks

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

**Section III** Pages 13–15

### 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* ↙

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- 1 A design team is developing a product containing a new technology. Which of the following steps would come first in the design process?
- (A) Produce extensive data on product reliability.
  - (B) Ensure that the designs are ergonomically sound.
  - (C) Ensure that the products are environmentally friendly.
  - (D) Conduct market research and identify the competition.
- 2 Which of the following is the most effective approach to communicating design ideas?
- (A) Use a rendered sketch to capture audience attention.
  - (B) Use the most modern communication technology available.
  - (C) Use presentation techniques that are relevant to the audience.
  - (D) Use a combination of techniques such as Powerpoint, Prototypes and CAD.
- 3 Which of the following best describes the key to successful innovation?
- (A) Introducing the innovation at the right time
  - (B) Protecting the designer's intellectual property
  - (C) Financial backing for development of the innovation
  - (D) Using up-to-date technology in producing the innovation
- 4 Which of the following best describes ergonomics?
- (A) The relationship between a measure of energy and its use
  - (B) The relationship between energy use and technology function
  - (C) The relationship between the work environment and its human users
  - (D) The relationship between an object's aesthetic appeal and its technology function

- 5** What is the purpose of a design brief?
- (A) To estimate product design costs
  - (B) To provide guidelines to a designer
  - (C) To assist in the marketing of a new product
  - (D) To act as a legal document between client and designer
- 6** Which of the following best describes an ethical designer?
- (A) One who designs products only for the developing world
  - (B) One who designs products that are environmentally appropriate
  - (C) One who follows proper procedures to protect their intellectual property
  - (D) One who designs products that are aimed at encouraging excessive consumption
- 7** Which of the following best describes a global product?
- (A) A product that is standardised, with minor cultural variations
  - (B) A product using emerging technologies and sustainable materials
  - (C) A product that has been designed by an international team of designers
  - (D) A product that appeals to all consumers regardless of socioeconomic level
- 8** Which of the following is necessary for the market success of a product?
- (A) It is designed for disassembly.
  - (B) It is affordable to the target market.
  - (C) It is judged to be stylish and fashionable.
  - (D) It is innovative and different from competitive products.

9 A company wants to purchase a portable data projector. The company ranked the following performance criteria in order of importance:

- 1 It must be lightweight and portable.
- 2 It must be easy to use.
- 3 It must be relatively cheap to run.

Test results revealed the following information about four projectors (the more stars, the better the performance).

<i>Criteria</i>	BRAND			
	<i>Gidget</i>	<i>Widget</i>	<i>Didget</i>	<i>Fidget</i>
Brightness	***	****	****	**
Cost per hour	35 cents	25 cents	62 cents	51 cents
Portability	***	***	**	****
Ease of use	Very easy to use	Easy to use	Very easy to use	Complex to use

Which projector best fits the criteria?

- (A) Gidget
- (B) Widget
- (C) Didget
- (D) Fidget

10 ‘Vagus-nerve stimulators cut down on epileptic seizures (fits), but nobody knows why.’

This quote demonstrates which of the following about technology?

- (A) It is important to know why things work before they are used.
- (B) Technology is always running ahead of what people know about it.
- (C) It is not necessary to know why technology works before it is used.
- (D) Researching and testing the effects of technology before it is used are very important.

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Centre Number

Section II

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Student Number

15 marks

Attempt Question 11

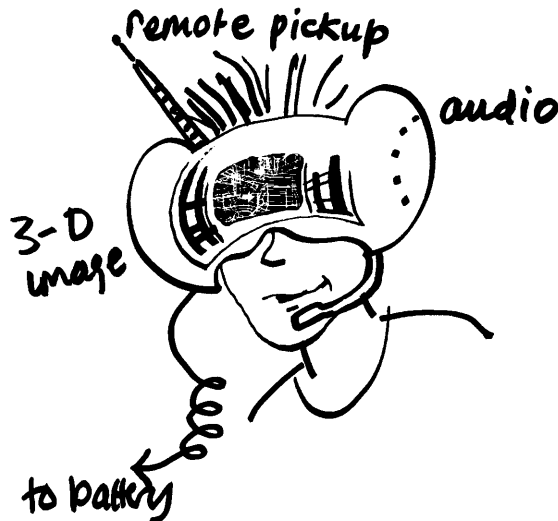
Allow about 35 minutes for this section

Answer the question in the spaces provided.

Marks

Question 11 (15 marks)

Frankie Fastrack has developed a concept for a virtual reality playstation.



Conceptual sketch

You have been given the task of managing Frankie's ideas from concept to the marketplace. Using your understanding of project management, answer parts (a)–(d).

- (a) Outline the key elements required in project management.

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Question 11 continues on page 10

Question 11 (continued)

- (b) Explain how good project management can enhance product quality. **3**

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- (c) By referring to the playstation project, explain how evaluation could be established and carried out for TWO features of the project. **4**

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**Question 11 continues on page 11**



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## 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.

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Marks

#### Question 12 (15 marks)

Read the following case study of an innovation. Use this case and your own case study of innovation to answer parts (a)–(c).

**Australian sparks new innovation: The ‘light chip’**

Australian researchers have developed a technique to convert electrical signals on silicon into light, which some suggest could spark the next revolution in computing. The conversion of such electrical signals into light in devices such as microchips will enable computers to transmit data at the speed of light, resulting in almost unlimited computing power. ‘Much work remains to be done, but we believe this opens up a new window of opportunity for Australia in the global computer industry, which is worth billions of dollars a year’ said Professor Green (University of NSW).

- (a) Describe TWO ways in which developers of such a new innovation can protect their rights to the idea or process. **2**
- (b) Identify the key factors involved in the success (or otherwise) of your own case study of an innovation. Explain how these factors might impact on the success or otherwise of the ‘light chip’ innovation. **5**
- (c) Critically assess some of the possible environmental, economic and social implications of this new ‘light chip’ innovation. **8**

**OR**

**Question 13** (15 marks)

Some changes in the process of shopping that have occurred over time are indicated in the diagram.



- (a) Using the illustrations above, outline how TWO changes in technology have affected the way people have shopped over time. **2**
  
- (b) Explain how changing social and economic trends have impacted on the way people shop. Draw on examples illustrated above and other technologies you have studied. **5**
  
- (c) Critically assess the advantages and disadvantages of cashless shopping in terms of ethics and the environment. **8**

**OR**

**Question 14** (15 marks)

Use this picture of a mobile phone to answer parts (a)–(c).



(a) Outline TWO issues you would need to consider when designing graphics and text for a mobile phone display screen. 2

(b) Safety of a technology can be identified at two levels, personal and environmental. Two possible safety issues with mobile phones have been identified. These are: 5

- personal effects of waves from the phone, possibly causing a cancer hazard;
- environmental disposal of toxic components at the end of the life of the phone.

Explain design features that could be used to reduce the impact of these two safety issues in mobile phones. Support your answer using examples from other technologies.

(c) The combining together of different technologies has made mobile phones possible, for example long-life rechargeable batteries and LCD screens. 8

Critically assess the role of the combining together of different technologies as a significant way in which technology develops and evolves. Use the technologies in mobile phones and ONE other product or system that you have studied to exemplify and support your assessment.

**End of paper**

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