

BOARD OF STUDIES
NEW SOUTH WALES

2004

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

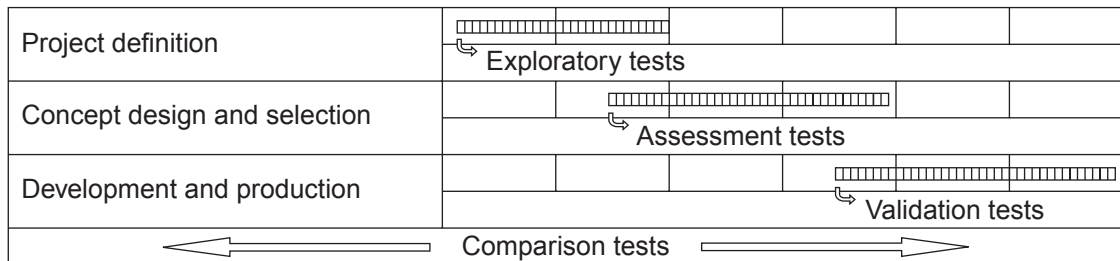
If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word *correct* and drawing an arrow as follows.

A B C D
correct →

- 1** When is a design solution most appropriate?
- (A) When it is recyclable
 - (B) When it meets the budget
 - (C) When it is multifunctional
 - (D) When it meets the needs of the client
- 2** Which of the following lists of functional criteria is the most appropriate when developing a new diary for HSC students?
- (A) Colour, weight and size
 - (B) Weight, size and ease of use
 - (C) Content, attractiveness and cost
 - (D) Cost, references and ease of use
- 3** A design team is developing a new cinema complex.
- For the complex to be finished on time and within budget, which of the following is the most effective strategy for the design team?
- (A) Employ a financial controller and project manager.
 - (B) Develop a management plan and evaluate it regularly.
 - (C) Ensure every team member has an email address and project management software.
 - (D) Appoint a project manager and give all team members a copy of the management plans.
- 4** When designers are involved in the development of new communication products, which of the following should be their most ethical consideration?
- (A) Can it be recycled?
 - (B) Does it meet Australian standards?
 - (C) Will the device become fashionable?
 - (D) Can it be used to copy other people's information?
- 5** Designers have been asked to submit proposals for the redevelopment of a local park. Which of the following is the successful proposal most likely to include?
- (A) A needs analysis and a model
 - (B) An advertising campaign for the new park
 - (C) A costing of the plants, seating and play equipment required
 - (D) A safety analysis of the workshop in which the equipment will be constructed

- 6 Which of the following can result in innovation?
- (A) Energy, cost, creativity and differentiation
 - (B) Research, ergonomics, durability and reliability
 - (C) Research, creativity, ergonomics and recyclability
 - (D) Creativity, combination, differentiation and adaptation

7 This chart shows a project development process.



What type of test would be used to evaluate actual functionality of the project?

- (A) Assessment
 - (B) Comparison
 - (C) Exploratory
 - (D) Validation
- 8 What has been the effect of new communication techniques on the process of designing?
- (A) Increased speed in production of prototypes
 - (B) Increased costs due to installation of new technology
 - (C) Increased collaboration on design product development
 - (D) Increased flexibility in the creation of design solutions
- 9 A designer has been commissioned by Pencil Smart Pty Ltd to design a new solar-powered pencil sharpener.
- What is an ethical way to ensure the integrity of the intellectual property for the new design?
- (A) The designer applies for copyright.
 - (B) Pencil Smart applies for a patent.
 - (C) The designer researches existing designs.
 - (D) The designer applies for a patent.
- 10 Which of the following economic issues influence trends in design and production?
- (A) Skill of the workforce, salaries and inflation
 - (B) Income, employment patterns and market size
 - (C) Subsidies, company image and the environment
 - (D) Employment patterns, income and working conditions

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.

Marks

Question 11 (15 marks)

- (a) During the development of design projects, designers conduct or draw upon research, and communicate the results to a range of audiences. **2**

Outline ONE research method you used when developing your major design project. Describe how the results of this research impacted on the decisions you made.

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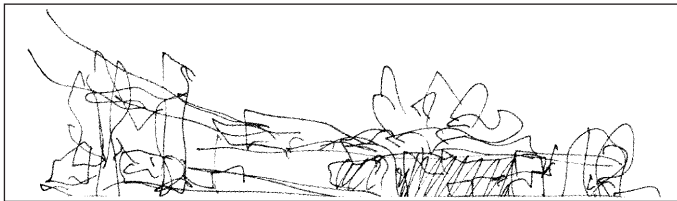
Question 11 continues on page 6

Question 11 (continued)

The following images represent the design development of a new art gallery. Use this stimulus material to answer parts (b)–(c).

- (b) Select FOUR of the communication techniques shown below. In the spaces provided identify a different, appropriate audience for each technique.

2



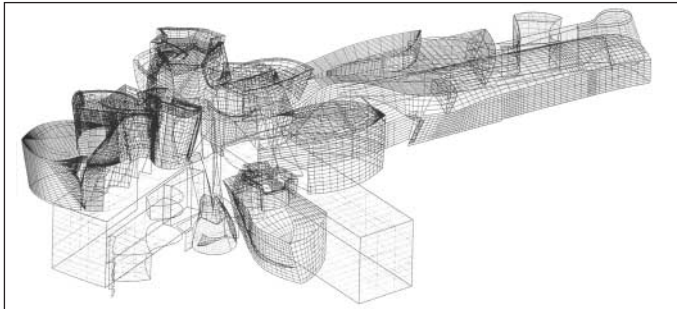
Initial sketch for building concept

Audience:



Conducting surveys in local community

Audience:



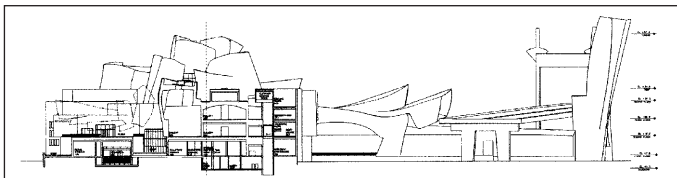
3D wire frame CAD representation of complete building

Audience:



Paper and sticky-tape model

Audience:



Cross-section view of building showing location of furniture

Audience:



Photo of final building

Audience:

Gehry Talks, 2003, Architecture and Process, Thames and Hudson, London, UK. Reproduced with the permission of Rizzoli/Universe International Publications, USA.

Question 11 continues on page 7

Question 11 (continued)

- (c) (i) Explain why communication techniques vary throughout the design development of the art gallery. **3**

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- (ii) Explain how design teams may respond to, and communicate, the results of research in a project such as the art gallery. **3**

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Question 11 continues on page 8

Question 11 (continued)

(d) Justify the communication processes that you used to develop your major design project from initial ideas to concept stage. Explain how these are similar or different to those used by designers in a commercial setting. 5

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End of Question 11

2004 HIGHER SCHOOL CERTIFICATE EXAMINATION
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.

Marks

Question 12 (15 marks)

Little miracles in daily life

Energy-efficient windows

Window glass is the greatest source of heat gain and also a source of significant heat loss. Nano-particle impregnated films applied either to the surface or as a laminate between layers of glass allow the window systems to be tuned to environmental conditions and be highly energy efficient. The new glazing is also switchable between transparent and opaque. It is also possible to create glass that produces electricity without a significant loss of transparency.

Metal roof sheets treated with coatings to boost heat loss or promote heat gain to suit the climate and environment.

All surfaces in kitchen impregnated with nano-particles to self-sterilise by wiping with damp cloth.

Translucent fabric sun control and shading devices woven from nano-impregnated fibres.

Microwaved modified wood, impregnated with resins containing ultraviolet filters. Timber window frames used to reduce heat gain and loss through conduction.

Furniture fabrics protected against sun damage using ultraviolet blockers incorporated in fabric fibres.

Reproduced with the permission of *Sydney Morning Herald*

Changing tiny particles to improve a material's properties is known as nanotechnology.

- (a) Using examples from either the stimulus material, or your own studies, identify **TWO** applications of nanotechnology, and describe their impact on society. **3**
- (b) 'Emerging technologies often lead to innovations that improve our quality of life.' **4**
- Explain how **TWO** different factors influence the successful development of such innovations. Use examples to show how and when this might occur.
- (c) Critically analyse the ethical and legal implications of new and emerging technologies. **8**

OR

Question 13 (15 marks)

Aussie excellence

	<p>Aussie Excellence at My Thuan Bridge, Vietnam</p>
<p>Living in an industrial culture, we have learned to expect and even demand solutions to new and newly perceived problems, innovative ideas and changes to the products we use. Whether our desire is for more novelty, fashion, comfort, efficiency, economy, safety or environmental friendliness, a complex process of innovation has to be initiated and managed by an organisation (or collaborative group) to introduce this change.</p>	<div>  </div> <div> <p>With its gracefully tapered towers and fine blue-sheathed multistrand cables supporting a slender bridge deck, the elegance of Vietnam's new My Thuan Bridge disguises its strength and significance.</p> </div> <div> <p>The high-level river crossing of four traffic lanes and two pedestrian footways has transformed the lives of the 16 million people living in the fertile Mekong Delta.</p> </div> <p>Akubra Hats</p> <p>Akubra hats have been Australia's quality hats since the early 1900s, ever since Arthur P. Steward set up to make a hat to meet the needs of this bustling new colony. Australians in the earlier days, much like the Americans in the West, needed better hats than usual, and, like the Americans, they had to make them for themselves. Akubra hats stood the test of life on the cattle stations and droving routes. Akubra hats still stand the test, not only in Australia, but throughout the world. You will see them wherever you travel.</p> <div>  </div>

<http://www.billabong.com> and <http://products.billabong-usa.com/products/category.asp?categoryID=1>

<http://www.davidmorgan.com/akubra.html>

Australian designers have achieved global success and gained a reputation for quality design.

- | | |
|--|----------|
| (a) Clarify, using examples from either the stimulus material above or your own studies, how the consideration of design factors can lead to design quality. | 3 |
| (b) Explain how safety and environmental issues influence the selection of resources for quality design. Use examples to support your answer. | 4 |
| (c) Critically analyse success and failure in design, using examples to support your answer. | 8 |


OR

Question 14 (15 marks)

Living greener

*Reducing waste for the planet's sake. <http://www.mhcs.health.nsw.gov.au/health-public-affairs/mhcs/pub>. Reproduced by permission of Multicultural Health Communications Service.

Water-wise

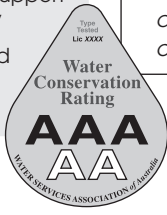



Water-saving showerhead


- advertisement subsidised by TV station
- price reduced by support from water authority
- installation subsidised by water authority

Despite living on the driest continent, Australians are among the highest consumers of water per capita.

*Unless we shrink the mountain of waste produced each year, we'll turn our planet into a garbage dump.







Non-toxic products

Reusable shopping bag

- government sponsored advertisements
- account to shoppers who use it
- 25c levy on each plastic bag used


Can consumers kick their plastic bag habit?

Each year Australians throw away six billion plastic bags. That's 12 000 bags a minute, most discarded after one use.

The bags clog waterways and kill thousands of sea birds, sea mammals and fish each year. Turtles, dolphins and killer whales mistake them for jellyfish and die of intestinal blockage.

Bags contaminate kerbside recycling, can hang around for up to 1000 years, and cause problems for landfill.

Plastic bags will be no go in Mogo
September 1, 2003



Calico-operating ... a Mogo shopper, Deb Brookes, has joined the town's environmental campaign to dump plastic bags and cottoned on to calico to carry her purchases.

Major chain launches plastic bag tax
September 15, 2003

One of Australia's major retailers today announced it will impose the nation's first ever levy on disposable plastic bags.

Bunnings Warehouse, in an initiative with Keep Australia Beautiful, will add a 10 cent levy to disposable plastic bags distributed in its 176 stores throughout the country.

© Pat Scalar/Fairfax Photos

<http://www.theage.com.au/articles/2002/09/15/1032054710415.html>

- (a) Using examples from either the stimulus material, or your own studies, identify TWO design products that have been developed as a response to environmental issues, and clarify their environmental impact. 3
- (b) For successful implementation of environmental solutions, social and cultural change is necessary. 4
- Discuss this statement, using examples.
- (c) Critically analyse ethical and environmental issues for designers responding to 'living greener'. 8

End of paper

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