

BOARD OF STUDIES
NEW SOUTH WALES

2001

**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 9–12

15 marks

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

Section III Pages 13–14

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.

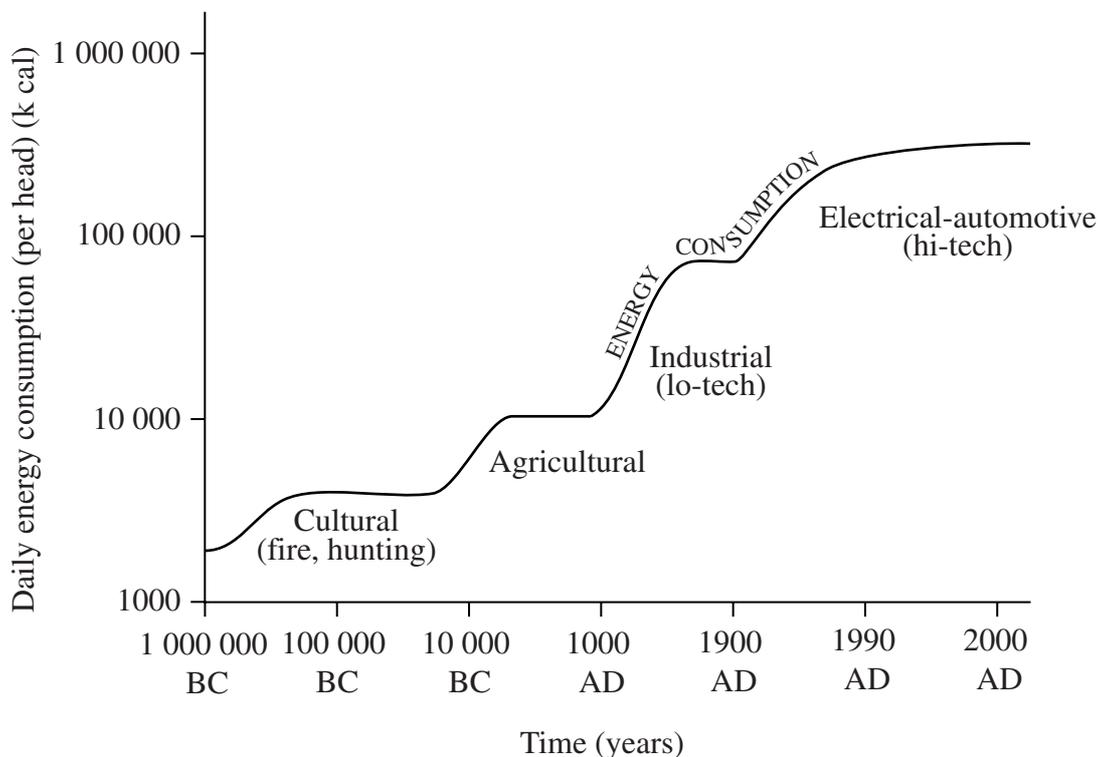
A B C D

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 best describes collaborative design?
- (A) Team members brainstorming activities to generate ideas.
 - (B) The manager of the group controlling the development of ideas.
 - (C) Team members sharing ideas and working towards a common goal.
 - (D) Each team member using their own resources and reporting back to the group.
- 2** Which of the following criteria for a moving part in an industrial product should be considered first?
- (A) Aesthetics
 - (B) Cost
 - (C) Environment
 - (D) Performance
- 3** Which of the following is the most important consideration when selecting a sustainable material for manufacturing a product?
- (A) Is it able to be recycled?
 - (B) Is it resistant to breaking?
 - (C) Is it approved by Greenpeace?
 - (D) Has it been stabilised to ultraviolet light?
- 4** Which of the following best describes an innovative product?
- (A) A re-branding of an existing product
 - (B) An effective marketing strategy for a new product
 - (C) A product that employs technology in a different way
 - (D) A discovery that improves technological understanding
- 5** Successful completion of a major design project depends on making the link between
- (A) generating ideas, high-quality making skills and ongoing evaluation.
 - (B) high-quality making skills, high quality materials and sufficient time.
 - (C) high quality equipment, high-quality making skills and a large budget.
 - (D) investigating options, high-quality making skills and the use of natural materials.

- 6 When an architect begins the process of designing a residential house, what is the primary factor to be considered?
- (A) The client's budget
 (B) The needs of the client
 (C) The aspect of the house
 (D) The aesthetics of the house
- 7 The graph shows estimates of average daily energy consumption per head over the last million years.



Which of the following does the graph illustrate?

- (A) Energy is needed to maintain and run all forms of technology.
 (B) Humans are using energy inefficiently and need to reduce the use of technology.
 (C) Technology, through increased efficiency, has reduced the energy consumption per head.
 (D) As the nature of technology has changed, the amount of energy per head has increased.

- 8** Which would be the most appropriate method of presenting a new steam iron to a potential client?
- (A) A mock-up
 - (B) A prototype
 - (C) A technical illustration
 - (D) A computer-generated 3D model

- 9** A fast-food outlet wishes to decrease the long-term environmental impact of the packaging it uses.

Which strategy would be the most appropriate?

- (A) Reduce the amount of packaging
 - (B) Design the packaging for reuse by the company
 - (C) Carry out life cycle analysis on a range of packaging
 - (D) Manufacture the packaging from recyclable material
- 10** The increasing rate of emergence of new technologies can cause rapid obsolescence of existing products.

Which of the following is the most appropriate design response in the long term?

- (A) Use cheaper materials to reduce the price
- (B) Add more functions to the existing technology
- (C) Restyle existing products to maintain their market share
- (D) Modularise components of products for possible replacement

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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 question in the spaces provided.

Question 11 (15 marks)

Please turn over

Question 11 (15 marks)

Use the stimulus material to answer Question 11.

The Freeplay wind-up radio is the invention of Trevor Bayliss. Bayliss was listening to a radio program at his home in England about the problems of health education in Africa, where the spread of AIDS has caused an increasing and urgent crisis. The program indicated that radio was seen as the best medium to convey healthcare information to help counteract the growing epidemic. The healthcare information was intended for people who lived in poor rural communities in remote locations.

Freeplay Radios

www.ogormans.co.uk

**Freeplay wind-up radio for mail order anywhere. Trevor Bayliss
invented the freeplay wind-up radio in 1994**





**Wind-up Radio
Model FPR2**

- Freeplay self-powered wind-up radio with solar panel
- Made of rugged durable ABS plastic
- Economical – no batteries
- FM 88–108MHz AM 520–1700kHz
- Plays for 60 minutes on a full wind
- **Our price £58.00 (\$A 150)**

Parcel Force 24 hours £7.50
Airmail Order On Line

The Freeplay FPR2 wind-up radio uses a unique texture carbon steel spring that drives a DC generator through a power transmission gearbox. 60 winds will provide full energy storage allowing playing times of up to 60 minutes. A clear crisp sound is produced from a 4" silverdome speaker with an audio output of 5 watts.

Advertisement downloaded from the Internet

‘The radio intended for the deprived has become a toy for the affluent.’
‘The biggest irony is the very guys it was designed for can’t afford it.’

Extracts from the *Toronto Star* newspaper about the Freeplay radio

Question 11 continues on page 11

Question 11 (continued)

- (a) Outline reasons why this radio may be appropriate for poor rural communities in remote locations. **2**

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- (b) Discuss TWO of the following design factors as they relate to the Freeplay radio: **4**

- Cost
- Ergonomics
- Function

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Question 11 continues on page 12

Question 11 (continued)

- (c) Critically analyse the ethical and environmental issues relating to the Freeplay radio. **5**

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- (d) (i) Describe forms of protection that designers such as Trevor Bayliss have available to them to prevent competitors copying their designs. **2**

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- (ii) Explain, using an example, ONE factor that has impacted on the success of an innovative product you have studied. **2**

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End of Question 11

Design and Technology

Section III

15 marks

Attempt ONE question from Questions 12–14

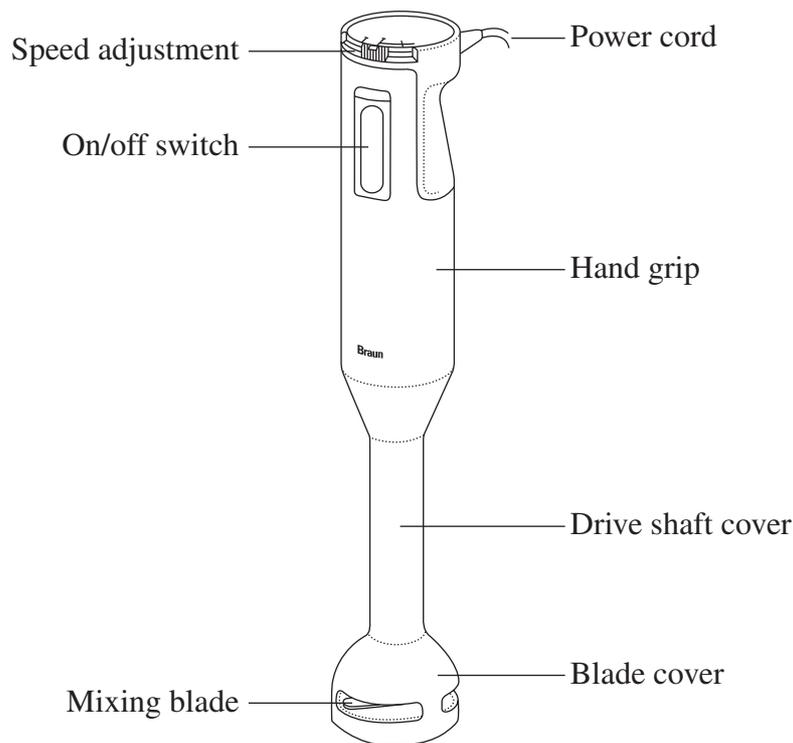
Allow about 40 minutes for this section

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

Marks

Question 12 (15 marks)

The influential German designer of Braun appliances, Dieter Rams, believes that the form of a product should express its function. The diagram shows a hand blender that can be used to process food.



- (a) Describe how THREE features of the blender reflect its function. 3
- (b) Explain the health and safety issues that a designer of such a hand blender would have to consider. 4
- (c) Analyse how social change and new technology have influenced the design of the hand blender OR another product that you are familiar with. Give examples to support your answer. 8

OR

Please turn over

Question 13 (15 marks)

In the early 1960s the AT&T company developed the 'Touch-Tone' push-button dialling technology for phones. In order to make sure the consumers would accept the new technology, the research and development group had to research the likes and dislikes of the users. The most important areas that needed to be investigated included:

- Button patterns
- Button size and shape
- Button spacing
- Springiness of the buttons

For ONE of the areas listed above:

- (a) Describe a research method you could use to determine consumer preferences for the key pad design. **3**
- (b) Design a results sheet that could be used to record the consumer preference data collected. Explain why this is an appropriate format. **4**
- (c) Analyse the ethical considerations when collecting, storing and using market research data. Give examples to support your answer. **8**

OR

Question 14 (15 marks)

Communication and the nature of the 'information age' are rapidly changing. Technologies that were previously considered advanced are becoming commonplace and new and emerging technologies are revolutionising the way in which we approach everyday tasks.

- (a) Identify a new or emerging technology, and describe features that distinguish it from existing technology. **3**
- (b) Explain the likely social and economic impacts of this new or emerging technology. **4**
- (c) Analyse the important factors that would need to be involved in moving emerging technologies into a successful innovation in the marketplace. Give examples to illustrate your answer. **8**

End of paper