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Centre Number

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Student Number

2003
HIGHER SCHOOL CERTIFICATE
EXAMINATION

Industrial Technology

Electronics Industries

General Instructions

- Reading time – 5 minutes
- Working time – $1\frac{1}{2}$ hours
- Write using black or blue pen
- Draw diagrams using pencil
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of this page and pages 5, 9, 17 and 21

Total marks – 100

Section I Pages 2–13

60 marks

- Attempt Questions 1–3
- Allow about 55 minutes for this section

Section II Pages 17–23

40 marks

- Attempt Questions 4–5
- Allow about 35 minutes for this section

Section I

60 marks

Attempt Questions 1–3

Allow about 55 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 1 (20 marks)

IND-TECH is a large company situated in the inner city, operating in the electronics industry specialising in high quality products and/or services. For a variety of reasons the company has decided to purchase and relocate to a new site, 200 km from its present inner city site.

- (a) Identify TWO issues that may have influenced the decision to relocate. **2**

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- (b) Outline TWO environmental responsibilities that must be dealt with when IND-TECH vacates the present site. **2**

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Question 1 continues on page 3

Question 1 (continued)

- (c) Discuss TWO factors that IND-TECH should consider when choosing the alternative site. **4**

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- (d) Identify and describe TWO occupational health and safety (OHS) issues that IND-TECH would need to review/develop for the new workplace. **4**

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Question 1 continues on page 4

Industrial Technology
Electronics Industries

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Centre Number

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Student Number

Section I (continued)

Marks

Question 2 (20 marks)

Management at IND-TECH has decided to upgrade the level of mechanisation as part of its relocation.

- (a) Define the term *mechanisation*. 2

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- (b) Outline an aspect of IND-TECH's operations that could be investigated for upgraded mechanisation. 2

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Question 2 continues on page 6

Question 2 (continued)

- (c) Describe TWO methods of evaluating the effects of upgraded mechanisation on IND-TECH's operation. **4**

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- (d) Upgraded mechanisation will require staff training. Outline the advantages for IND-TECH and its workers of accessing training programs. **4**

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Question 2 continues on page 7

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**Industrial Technology
Electronics Industries**

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Centre Number

Section I (continued)

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Student Number

Question 3 (20 marks)

Please turn over

Question 3 (20 marks)

- (a) The following extract is from a draft report that was produced using computer software.



Half-Yearly Production Report
January 2003 – June 2003

<i>Production rate summary</i>		
<i>Month</i>	<i>Year</i>	<i>Production rate (units)</i>
January	2003	270
February	2003	300
March	2003	325
April	2003	335
May	2003	340
June	2003	370

Growth in production is due to:

- Improved technology
- Better training
- Fewer accidents in the workplace
- Increased access to raw materials

Page 1

- (i) Name a computer software application that could have been used to produce this report. **1**

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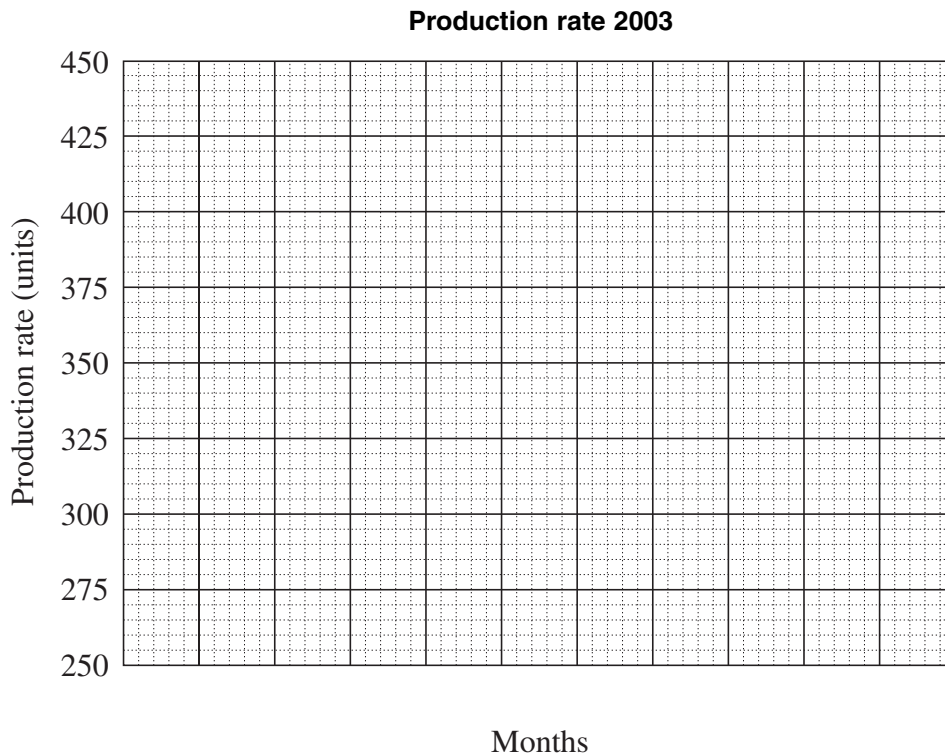
- (ii) Identify FOUR formatting features that have been used in the production of this report. **2**

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Question 3 continues on page 11

Question 3 (continued)

- (iii) (1) Use the information from the production report to: 3
 - produce a graph that shows the monthly production rate (indicate the months on the horizontal axis);
 - graph the average monthly production rate (January–June).
- (2) Assuming the production trend continues, indicate on the graph the predicted production rate for September 2003. 2



- (b) Materials handling injuries make up 40% of workplace injuries. Describe a procedure IND-TECH could implement to communicate improved materials handling strategies to its employees. 4

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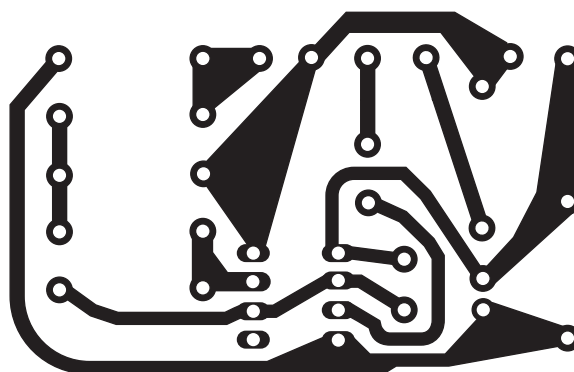
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Question 3 continues on page 12

Question 3 (continued)

- (c) In its new location, IND-TECH has an opportunity to reorganise its production system to make use of increased mechanisation and to improve efficiency. Shown below is an electronic circuit board manufactured by IND-TECH.

8



Circuit board

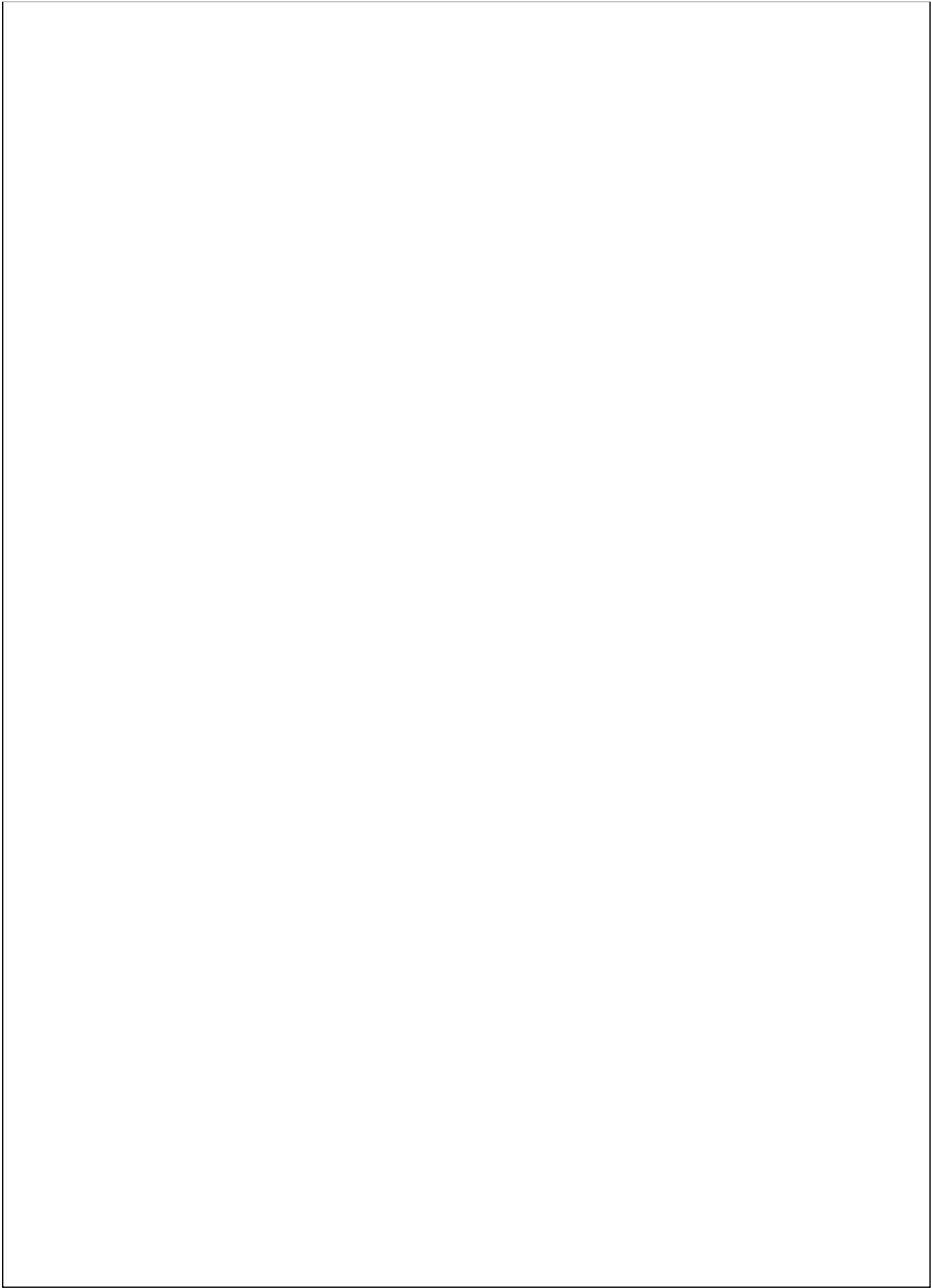
Dick Smith Kit 2624.

Based on your study of the electronics industry, use the space provided on page 13 to graphically represent the processes used to produce the electronic circuit board shown. In your answer you should:

- show the sequencing of the components and/or processes;
- name each piece of equipment used;
- state the process carried out with each piece of equipment;
- indicate where quality control would occur, and what would be checked.

Question 3 continues on page 13

Question 3 (continued)



End of Question 3

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Student Number

Section II

40 marks

Attempt Questions 4–5

Allow about 35 minutes for this section

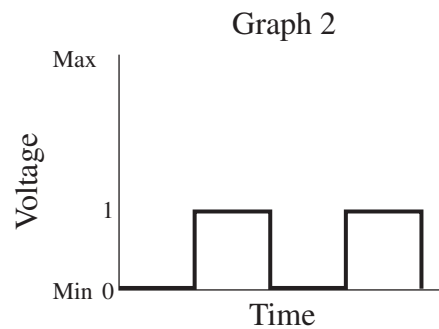
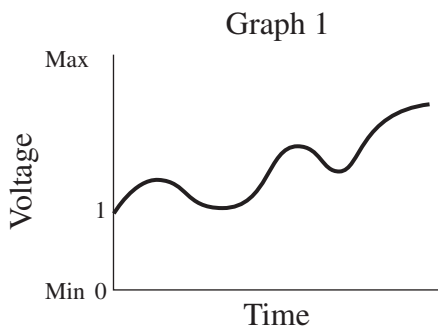
Answer the questions in the spaces provided.

Marks

Question 4 (20 marks)

- (a) Identify the signals represented in graphs 1 and 2.

2



Signal:

Signal:

- (b) The following table summarises the input-output conditions for a digital-to-analogue integrated circuit converter. Using the information provided, complete the table.

2

<i>Digital input</i>	<i>Analogue output</i>
0001	1 V
0011	
	5 V

Question 4 continues on page 18

Question 4 (continued)

- (c) Identify a function of a capacitor in an electronic circuit, and describe how the capacitor is charged. 4

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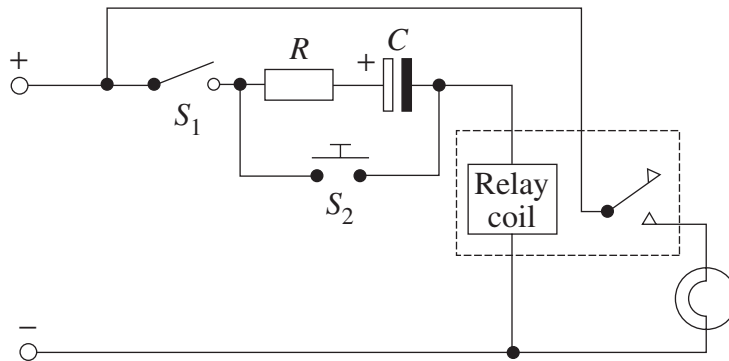
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- (d) Explain the operation of the circuit shown. 4



James Garratt, 1991, *Design and Technology*, Cambridge University Press, Melbourne.
Acknowledgements permission has been obtained by Cambridge University Press.

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Question 4 continues on page 19

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Student Number

Section II (continued)

Marks

Question 5 (2 marks)

- (a) A transistor component is found to be failing due to overheating under operational conditions. Identify strategies that could be implemented to overcome this problem. 2

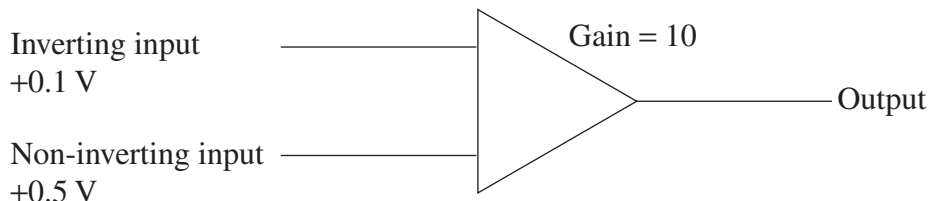
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- (b) A schematic diagram of an operational amplifier is shown. Use the input and gain information to determine the output. 2



James Garratt, 1991, *Design and Technology*, Cambridge University Press, Melbourne.
 Acknowledgements permission has been obtained by Cambridge University Press.

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Question 5 continues on page 22

Question 5 (continued)

- (c) Describe an integrated circuit (IC), and outline the main advantages of using ICs in electronic circuit design. **4**

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- (d) Describe how an operator would set up and use an oscilloscope to measure voltage across an electronic component. **4**

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Question 5 continues on page 23

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