BOARD OF STUDIES
NEW SOUTH WALES

Centre Number

Student Number

2002

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, 13 and 17

Total marks – 100

Section I Pages 2–12

60 marks

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

Section II Pages 13–20

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

Use the following information to answer Questions 1, 2 and 3.

I-Tech, a company operating in the electronics industry, has been on the same site for a number of years. Owing to recent urban expansion and new Government legislation, the company reviews its current facilities, policies and practices.

Question 1 (20 marks)

(a) As a result of this review I-Tech needs to reduce its pollution levels.

(i) Identify TWO different forms of pollution that I-Tech might produce. **2**

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(ii) How would the forms of pollution identified in part (a) (i) affect the local community? **2**

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Question 1 continues on page 3

Marks

Question 1 (continued)

(b) I-Tech has decided to introduce an extensive recycling program.

(i) Identify the advantages and disadvantages of recycling for I-Tech. **4**

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(ii) Outline a suitable recycling program that I-Tech could introduce. **4**

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Question 1 continues on page 4

Question 1 (continued)

(c) I-Tech's review concluded that an Environmental Impact Statement (EIS) would need to be prepared. Discuss issues that would be included in the EIS. **8**

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End of Question 1

Centre Number

Student Number

Section I (continued)

Marks

Question 2 (20 marks)

(a) Employees may be involved in the treatment of workplace injuries. What essential resources must I-Tech provide for this purpose? **2**

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(b) What strategies could I-Tech implement to ensure the effective induction of new staff? **2**

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Question 2 continues on page 6

Marks

Question 2 (continued)

(c) How could I-Tech ensure that Equal Employment Opportunity (EEO) principles are followed in the company? **4**

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Question 2 continues on page 7

Marks

Question 2 (continued)

(d) Describe the possible role of unions as I-Tech considers changes to its workplace policies and practices. **4**

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Question 2 continues on page 8

Marks

Question 2 (continued)

(e) There are many issues involved in the reorganisation of I-Tech's operations. Discuss the implications of improved materials and technologies on environmental, and occupational health and safety (OHS) issues. **8**

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End of Question 2

Centre Number

Student Number

Section I (continued)

Marks

Question 3 (20 marks)

A worker has sustained a back injury while lifting a box of components, resulting in admission to the local hospital. As a result of this accident, I-Tech's OHS committee is to review current work practices.

(a) Outline the procedures that the OHS committee would use to obtain information for this review. **4**

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(b) As a result of the review, the OHS committee needs to prepare and present a report for management. Outline the use of computer software in the preparation and presentation of this report. **4**

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Question 3 continues on page 10

Marks

Question 3 (continued)

(c) Design a wall chart, incorporating text and graphics, that could be used to inform all employees of the procedure to follow should they witness a workplace accident. Use the spaces provided. **8**

WALL CHART

Question 3 continues on page 11

Question 3 (continued)

Working space for part (c) if required.

Question 3 continues on page 12

Marks

Question 3 (continued)

(d) How should I-Tech's management inform all employees about the OHS committee's recommendations regarding the new work practices? **2**

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(e) During the past year, FOUR accidents have occurred resulting in losses to the company. These losses are detailed in the table. **2**

Complete the table and calculate the average cost to the company per accident.

Item	*Number*	*Cost*	*Total*
Ambulance fees	3	$136.00	
Days lost	23	$111.00	
Hire of temporary staff	15	$130.00	
Visits to doctor	5	$45.00	
	Total cost		

Average cost to the company per accident $.....

End of Question 3

Industrial Technology
Electronics Industries

Centre Number

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) All electric and electronic circuits require power sources.

A low-powered DC light beacon needs to be located at a remote site.

(i) Name an appropriate power source that could be used for this beacon. **1**

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(ii) State ONE advantage and ONE disadvantage of this power source. **2**

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(iii) This beacon is to be connected to an AC power source. Explain how this power source is converted to a DC supply. **3**

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Question 4 continues on page 14

Marks

Question 4 (continued)

(b) Outline basic safety precautions that need to be considered when using power sources. Explain why they are necessary. **6**

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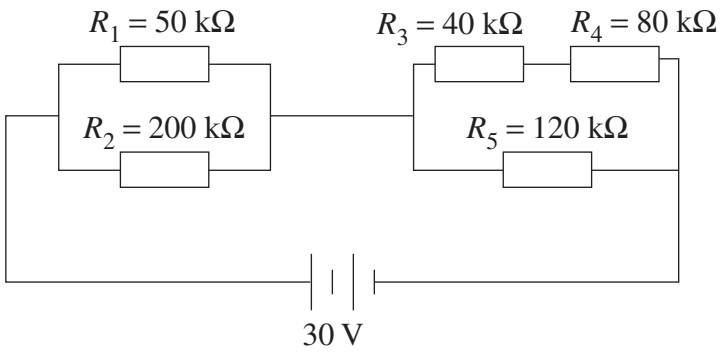
Question 4 continues on page 15

Marks

Question 4 (continued)

(c) **8**



Using the following formulae, determine the current flowing through resistor R_3. Show all necessary calculations.

$V = IR$

$R_T = R_1 + R_2 + R_3 + \ldots$

$\dfrac{1}{R_T} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3} + \ldots$

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End of Question 4

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Question 5 (20 marks)

Please turn over

Marks

Question 5 (20 marks)

(a) Figure 1 shows an electronic component being tested with the use of a meter.

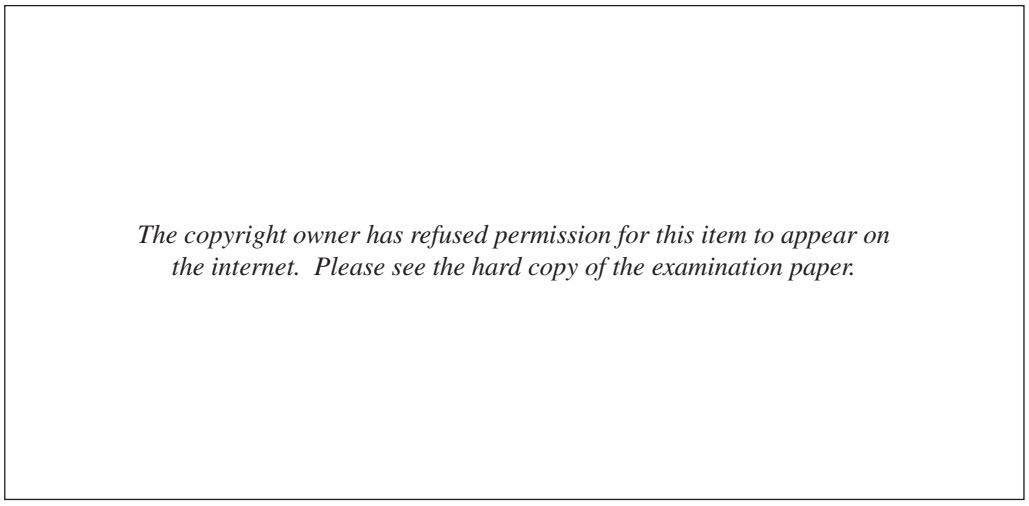

Figure 1

(i) Identify the meter used in this test. **1**

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(ii) Explain what the meter reading should verify. **2**

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(iii) Describe the function of part *B* shown in Figure 1, and the precautions that need to be taken to protect the component under operational conditions. **3**

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Question 5 continues on page 19

Marks

Question 5 (continued)

(b) Figure 2 illustrates a transistor circuit of a NOR logic gate. **6**

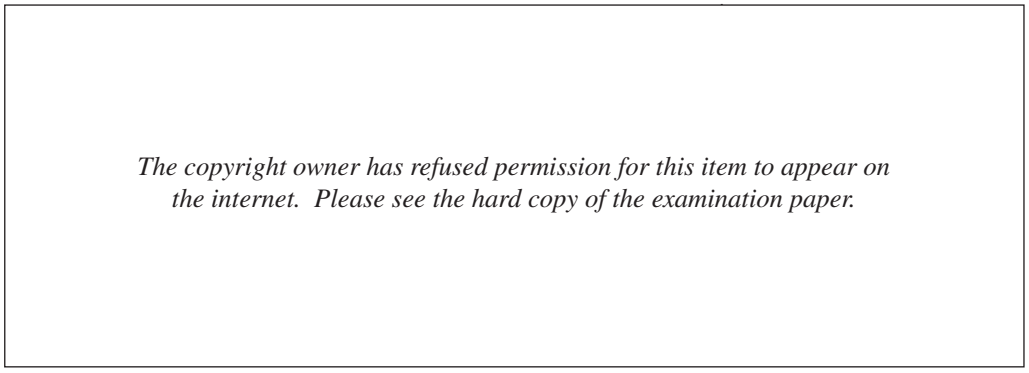

Figure 2

For this circuit complete the truth table shown and describe how this circuit acts as a NOR gate.

Input A	*Input B*	*Output* Q_0
High	Low	
Low	High	
High	High	
Low	Low	

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Question 5 continues on page 20

Marks

Question 5 (continued)

(c) Outline the advantages and disadvantages of analogue and digital meters. **8**

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