

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

2002

**HIGHER SCHOOL CERTIFICATE
EXAMINATION**

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Centre Number

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Student Number

Industrial Technology

Automotive 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 13–19

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 automotive 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

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

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Automotive Industries

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Centre Number

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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

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

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

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Centre Number

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Student Number

Section I (continued)

Marks

Question 3 (20 marks)

A worker has sustained a back injury while lifting a gearbox, 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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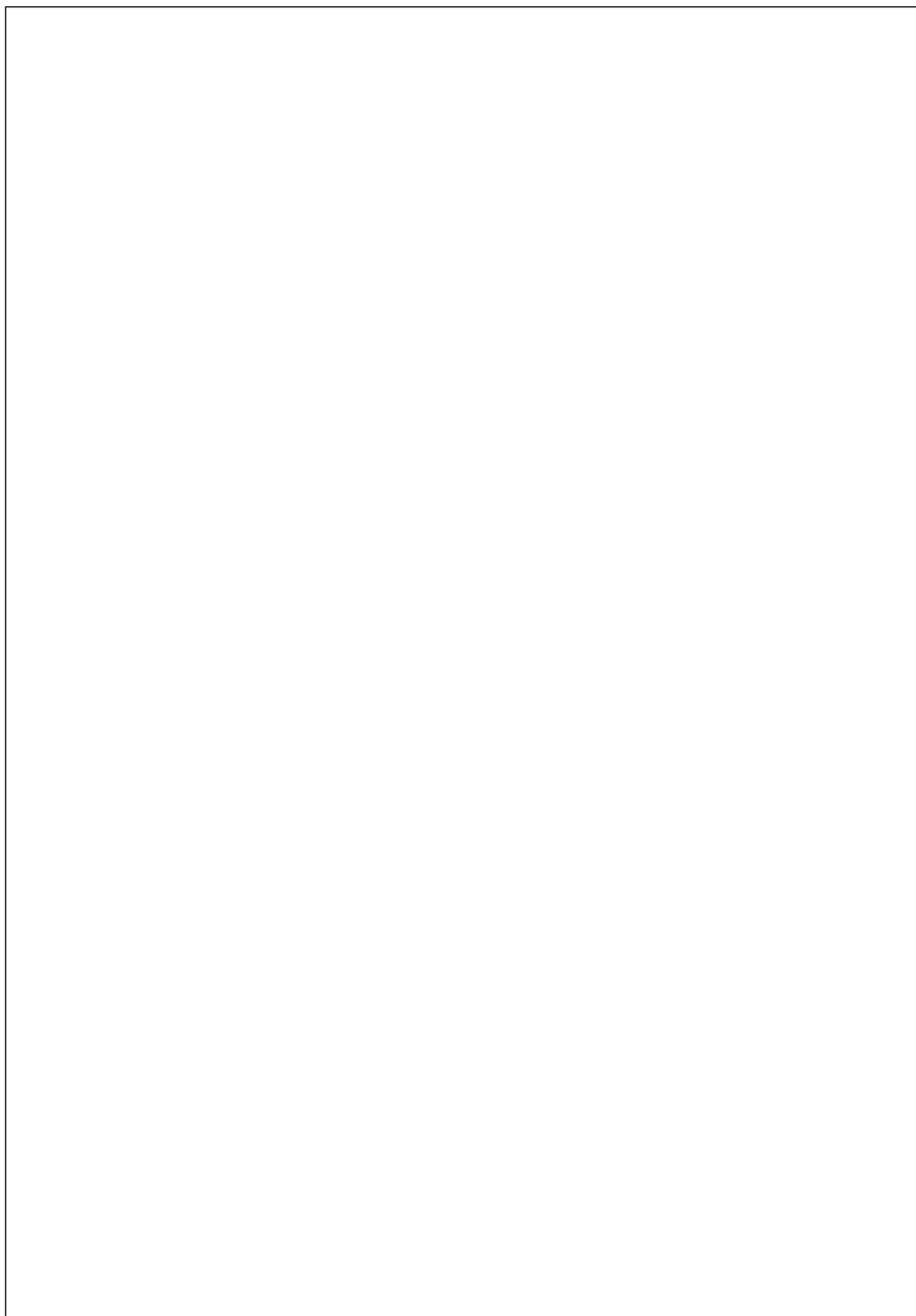
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Question 3 continues on page 10

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

A large, empty rectangular box with a thin black border, intended for the student to draw a wall chart. The box is centered on the page and occupies most of the lower half of the page.

Question 3 continues on page 11

Question 3 (continued)

Working space for part (c) if required.

Question 3 continues on page 12

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.

<i>Item</i>	<i>Number</i>	<i>Cost</i>	<i>Total</i>
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

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Centre Number

Section II

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Student Number

40 marks

Attempt Questions 4–5

Allow about 35 minutes for this section

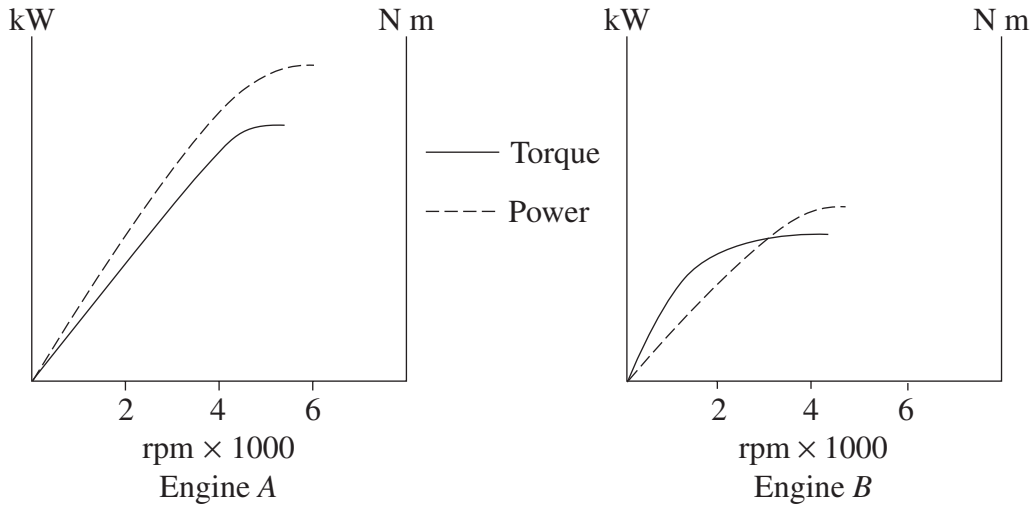
Answer the questions in the spaces provided.

Question 4 (20 marks)

Please turn over

Question 4 (20 marks)

(a) Dynamometer printouts for Engine A and Engine B are shown using the same scale.



- (i) Which engine produces the most power? **1**
- (ii) Which engine produces the most torque at 1000 rpm?..... **1**
- (iii) Which engine would be more suitable for use in a small truck? Give reasons for your answer, referring to the dynamometer printouts. **3**

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Question 4 continues on page 15

Question 4 (continued)

- (b) Automotive manufacturers produce cars with engine outputs in excess of 200 kW. Explain how these levels of power can be produced in modern small-capacity and large-capacity engines. **3**

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- (c) Describe the purpose of a car's engine management system, identify its components, and explain how it controls the engine's operation. **4**

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Question 4 continues on page 16

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Student Number

Section II (continued)

Marks

Question 5 (20 marks)

- (a) Outline how automotive manufacturers deal with the problem of rust in car bodies. **2**

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- (b) Automotive manufacturers have recognised that their products must use less fuel. Significant reductions can be gained through improved aerodynamics and the use of light-weight materials.

- (i) Identify and describe the main features of modern automotive design that have led to improved aerodynamic efficiency. **3**

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- (ii) Identify and describe the main features of materials used in automotive design that have led to reductions in weight. **3**

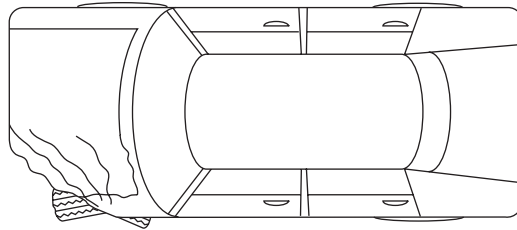
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Question 5 continues on page 18

Question 5 (continues)

- (c) A car travelling at 50 km/h has been involved in an accident. Damage is to the passenger-side front of the car, as indicated in the diagram.

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Identify THREE panels that would need repair or replacement, and outline possible damage to the other components of the car.

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Question 5 continues on page 19

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