BOARD OF STUDIES
NEW SOUTH WALES

Centre Number

Student Number

2004

HIGHER SCHOOL CERTIFICATE EXAMINATION

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

IND-TECH is a company in the automotive industry employing a mix of male and female employees. Management has decided to investigate the viability of introducing new technologies to stimulate productivity and expansion in the market.

Question 1 (20 marks)

(a) Identify an example of a new technology that IND-TECH could investigate. **1**

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(b) Outline the implications of the introduction of new technologies on IND-TECH's existing technologies. **3**

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Question 1 continues on page 3

Marks

Question 1 (continued)

(c) Describe ways in which IND-TECH's management could evaluate the viability of introducing new technologies. **4**

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(d) Explain how the introduction of new technologies could stimulate IND-TECH's productivity. **4**

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Question 1 continues on page 4

Question 1 (continued)

(e) Propose and justify ways in which IND-TECH could measure the efficiency of new technologies after they have been introduced. **8**

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End of Question 1

Industrial Technology
Automotive Industries

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Section I (continued)

Marks

Question 2 (20 marks)

(a) Identify sources of finance that IND-TECH may use to support the introduction of the new technologies. **2**

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(b) Outline possible changes to the production manager's responsibilities when new technologies are introduced. **2**

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Question 2 continues on page 6

Marks

Question 2 (continued)

(c) The introduction of new technologies may enhance IND-TECH's position in the product market. **4**

Discuss how the introduction of new technologies could improve the marketability of IND-TECH's products.

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(d) As a result of the introduction of new technologies, a number of IND-TECH's employees are identified as being redundant and are to be dismissed. **4**

Outline the industrial rights of these employees, and identify appropriate action that can be taken by them.

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Question 2 continues on page 7

Question 2 (continued)

(e) IND-TECH's management proposes to retrain their female employees to be specialist users of the new technologies. **8**

Analyse this proposal and discuss the responsibilities of IND-TECH's management towards all its employees.

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End of Question 2

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Question 3 (20 marks) **Marks**

(a) Identify the sign shown and state how IND-TECH's employees should respond to it. **2**

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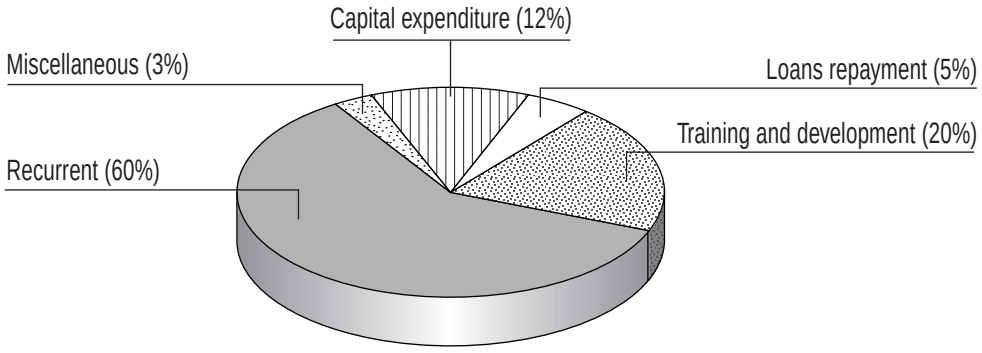
(b) The graph shows IND-TECH's expenditure in the year following the introduction of the new technologies. **2**



Identify reasons for the proportion being spent on training and development.

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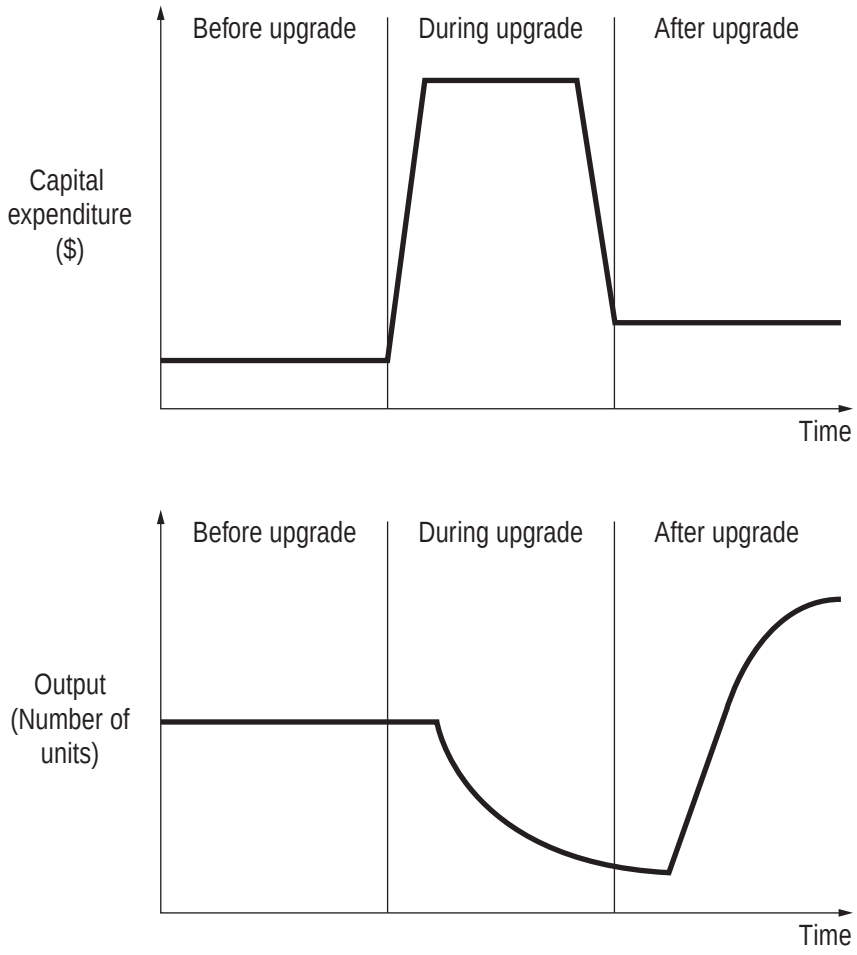
Question 3 continues on page 10

Question 3 (continued)

(c) The graphs below illustrate IND-TECH's capital expenditure and output before, during and after the introduction of new technologies. **4**



Explain the reasons for the changes in capital expenditure and output during and after the upgrade phases.

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Question 3 continues on page 11

Marks

Question 3 (continued)

(d) Complete the diagram to show a sequence plan for the introduction of the new technologies at IND-TECH. **4**

Introduction of new technologies plan

Question 3 continues on page 12

Question 3 (continued)

(e) With the introduction of new technologies, IND-TECH proposes to use an external agency to assess the possible changes to the work environment. **8**

Outline the issues that could be identified. Propose and justify methods that IND-TECH's management could use to effectively communicate these issues to its employees.

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End of Question 3

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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) Explain why diesel power is used for heavy transport vehicles. **2**

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(b) List the stages of operation of a four-stroke diesel engine. **2**

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Question 4 continues on page 14

Marks

Question 4 (continued)

(c) Some modern four-cylinder engines have two inlet valves and one exhaust valve per cylinder. Why is this arrangement used, and what are its advantages? **4**

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(d) Compare the fuel systems in fuel injected and carburetted petrol engines. **4**

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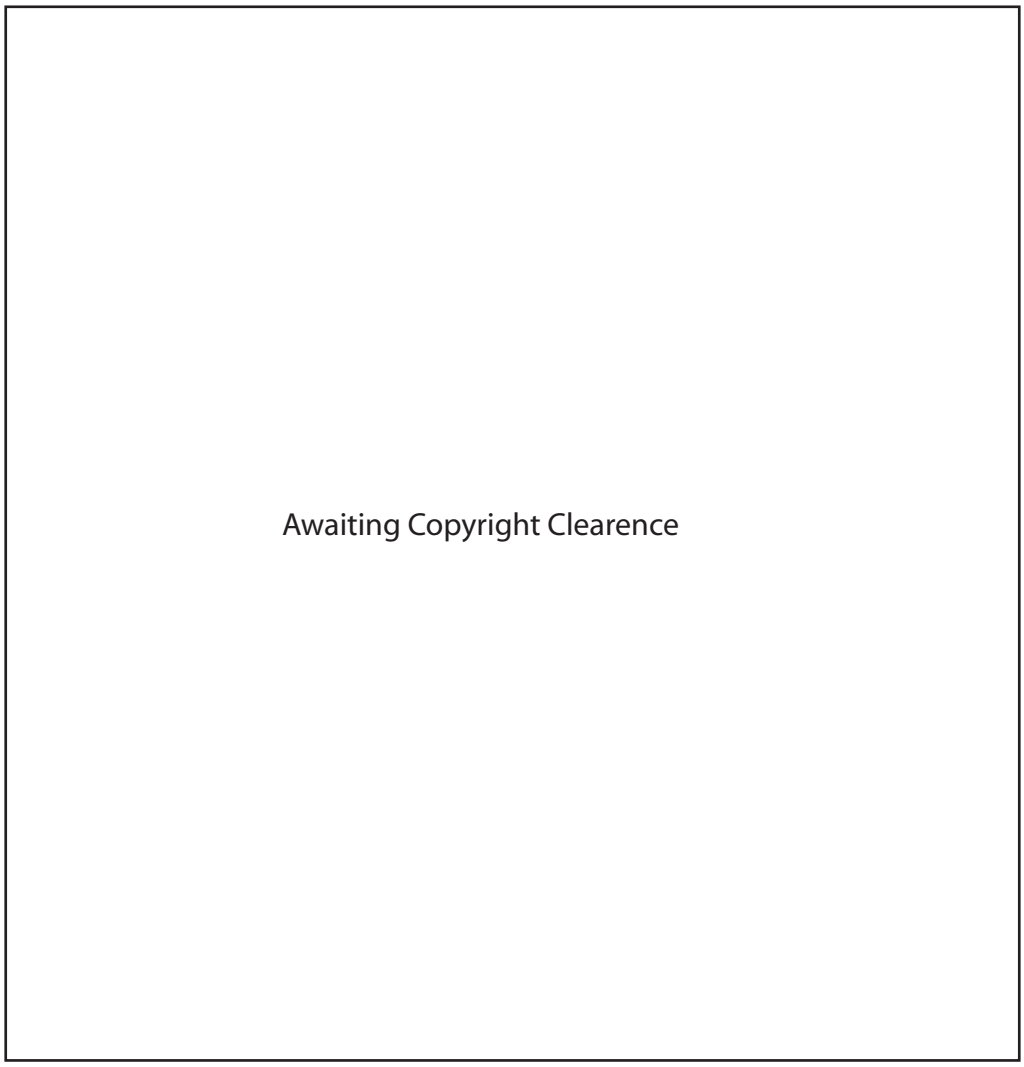
Question 4 continues on page 15

Marks

Question 4 (continued)

(e) The alternator is part of a vehicle's electrical system. With reference to the diagram, describe the purpose and operation of an alternator. **8**



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Question 4 continues on page 16

Question 4 (continued)

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End of Question 4

Centre Number

Student Number

Section II (continued)

Marks

Question 5 (20 marks)

(a) Explain why there are regulations governing motor vehicle emissions. **2**

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(b) Explain why vehicles have to be registered under government regulations. **2**

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(c) Discuss why compressed natural gas is being used extensively in public transport vehicles such as buses. **4**

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Question 5 continues on page 18

Marks

Question 5 (continued)

(d) Explain why designers use aerodynamic testing in modern vehicle design. **4**

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Question 5 continues on page 19

Question 5 (continued)

(e) Explain why there is an increased use of plastics in the design of modern vehicles. Give examples to support your answer. **8**

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