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Student Number

2006
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

Use the following information to answer Questions 1 and 2.

IND-TECH is a company in the automotive industry. Competition from cheap imports has led the company to investigate organisational changes to prevent closure. The present workforce is to be retained.

Question 1 (20 marks)

- (a) Identify organisational changes that IND-TECH could make to become more competitive. **2**

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- (b) Outline reasons why IND-TECH would want to keep their present workforce. **3**

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Question 1 continues on page 3

Question 1 (continued)

- (c) Discuss how retraining some of the workforce could help IND-TECH remain competitive. 4

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- (d) Outline possible roles for unions during the organisational change. 4

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Question 1 continues on page 4

Question 1 (continued)

- (e) Discuss equity issues that would need to be considered when changing IND-TECH's organisation. **7**

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End of Question 1

Industrial Technology
Automotive Industries

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Student Number

Section I (continued)

Marks

Question 2 (20 marks)

- (a) Identify ways in which IND-TECH's costs could be reduced through recycling. **2**

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- (b) Name an emerging technology, and outline how it could improve IND-TECH's production system. **3**

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Question 2 continues on page 6

Question 2 (continued)

- (c) What is *mass production*? How could mass production help IND-TECH compete with cheap imports? **4**

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- (d) Describe safe material handling practices and how these practices could improve efficiency and reduce costs for IND-TECH. **4**

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Question 2 continues on page 7

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Industrial Technology
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Student Number

Section I (continued)

Marks

Question 3 (20 marks)

- (a) List TWO characteristics of Occupational Health and Safety (OHS) signage that would help employees to understand safe working procedures. **2**

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- (b) Outline the advantages of using computer software graphics to create company documentation. **3**

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Question 3 continues on page 10

Question 3 (continued)

(c) An extract from a catalogue is shown.

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39 PCE SOCKET SET 1/2" DRIVE

Includes: FRP Ratchet, Universal Joint,
3" Wobble Extension, 5" & 10" Extensions,
3/8"F:1/2"M T-Bar Adaptor

Sizes AF:
3/8", 7/16", 1/2", 9/16", 5/8", 11/16",
3/4", 13/16", 7/8", 15/16", 1",
1-1/16", 1-1/8", 1-3/16", 1-1/4"

Sizes Metric:
10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,
21, 22, 23, 24, 27, 30, 32 mm



Discuss the advantages of displaying graphics AND text in this catalogue extract.

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Question 3 continues on page 11

Question 3 (continued)

(d) An extract from a Material Safety Data Sheet (MSDS) for toner is shown.

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| <p>Section VI – Health Hazard Data</p> <hr/> <p><i>Health Hazards (Acute and Chronic):</i> This material when used as intended, does not represent a health or safety hazard.</p> <hr/> <p><i>Signs and Symptoms of Exposure:</i> Nil</p> <hr/> <p><i>Medical Conditions:</i> None when used as described by product literature.</p> |
| <p>Section VII – Precautions for Safe Handling and Use</p> <hr/> <p><i>Steps to be Taken in Case Material is Released or Spilled:</i> Loose toner can be removed using a vacuum cleaner. Residue can be removed with soap and cold water. After removal of loose toner, garments may be washed or dry-cleaned.</p> <hr/> <p><i>Waste Disposal Method:</i> Do not incinerate. No special techniques beyond normal practice. Ensure conformity with federal, state or local regulations.</p> <hr/> <p><i>Precautions to be taken in Handling and Storing:</i> Avoid inhalation of excessive dust. Store below 30°C.</p> |

Outline reasons why these sheets are produced, and their relevance for IND-TECH.

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Question 3 continues on page 12

Question 3 (continued)

- (e) Justify why consistent terminology and standards are essential when calculating and ordering materials, and writing reports.

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End of Question 3

Industrial Technology Automotive Industries

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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) Explain the term *drag* as used in automotive design.

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(b) Outline the purpose of Compulsory Third Party (CTP) insurance.

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Question 4 continues on page 14

Question 4 (continued)

- (c) Identify and explain technologies used in automotive design to improve safety. **4**

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- (d) Describe the advantages of a tuned exhaust system on a modern internal combustion engine compared with a standard manifold. **4**

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Question 4 continues on page 15

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Industrial Technology
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Student Number

Section II (continued)

Marks

Question 5 (20 marks)

- (a) Explain the need to notify the Roads and Traffic Authority (RTA) of any structural design modifications to vehicles. **2**

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- (b) Outline the benefits of having the crankshaft supported by five bearings, rather than three bearings, in a four-cylinder engine block. **3**

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Question 5 continues on page 18

Question 5 (continued)

- (c) Explain the advantages and disadvantages of both carburation and fuel injection systems in petrol engines. 4

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- (d) Identify and describe ways in which the overall efficiency of a small electric vehicle can be improved. 4

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Question 5 continues on page 19

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