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Centre Number

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Student Number

2003
HIGHER SCHOOL CERTIFICATE
EXAMINATION

Industrial Technology

Plastics 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 plastics 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
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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
Plastics 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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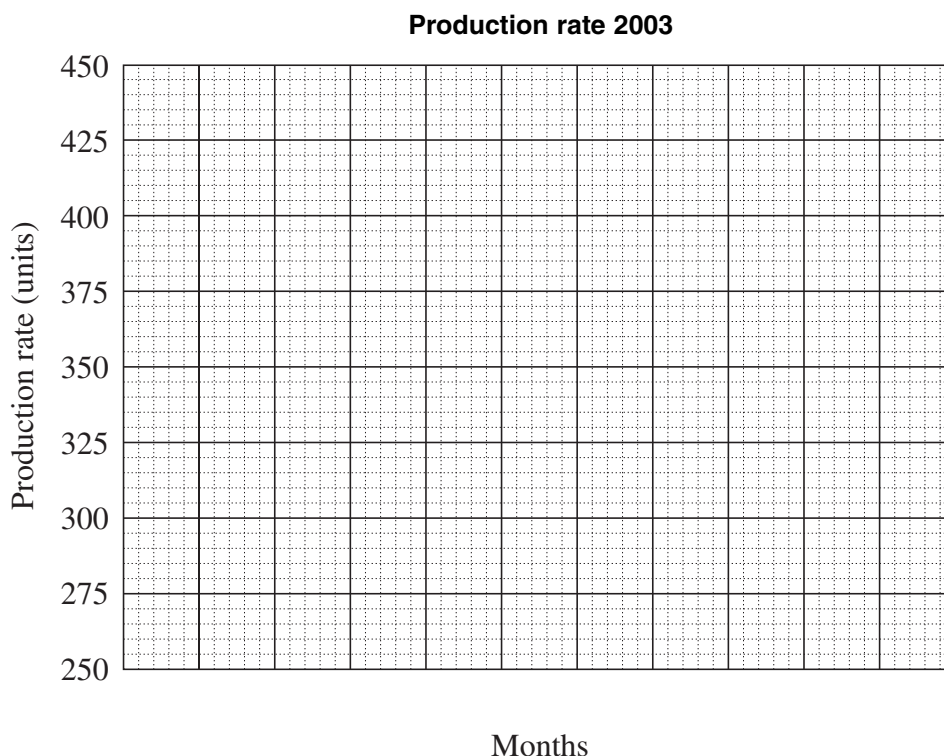
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Question 3 continues on page 11

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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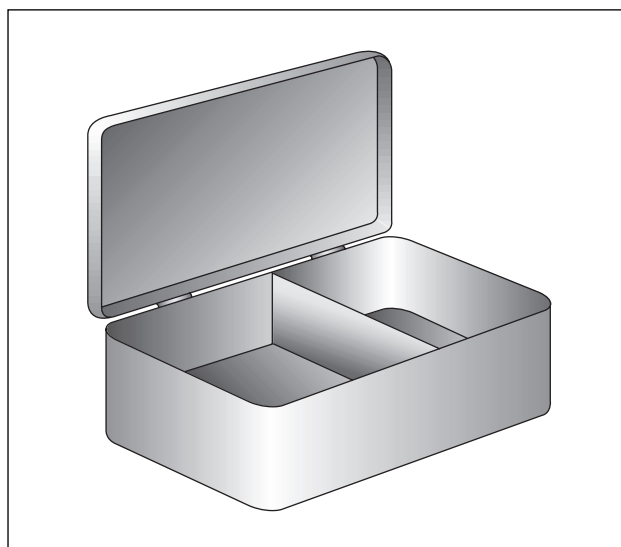
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Question 3 continues on page 12

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 a plastic lunchbox manufactured by IND-TECH.

8



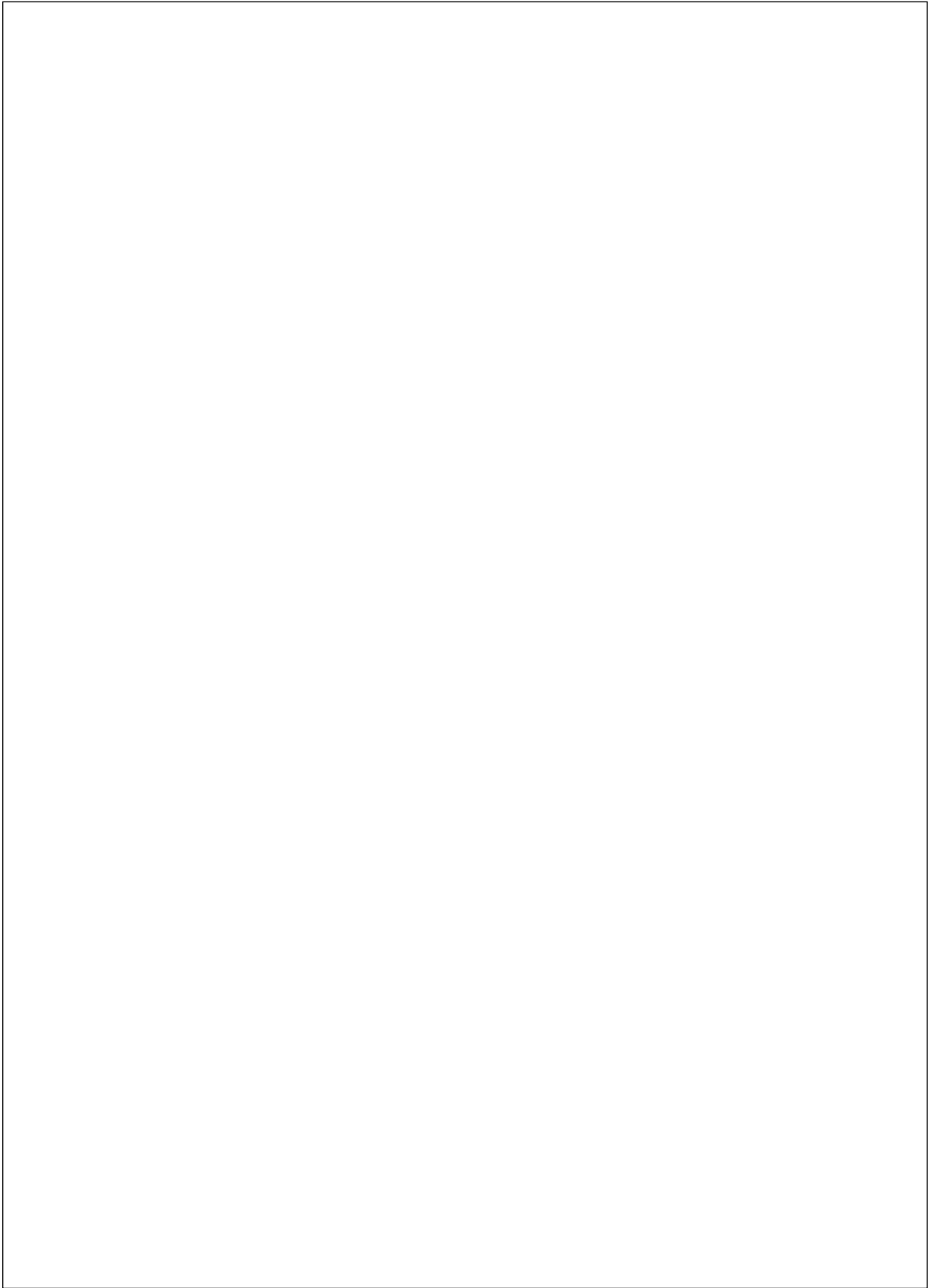
Plastic lunchbox

Based on your study of the plastics industry, use the space provided on page 13 to graphically represent the processes used to produce the lunchbox 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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Industrial Technology
Plastics Industries

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Student Number

Section II

40 marks

Attempt Questions 4–5

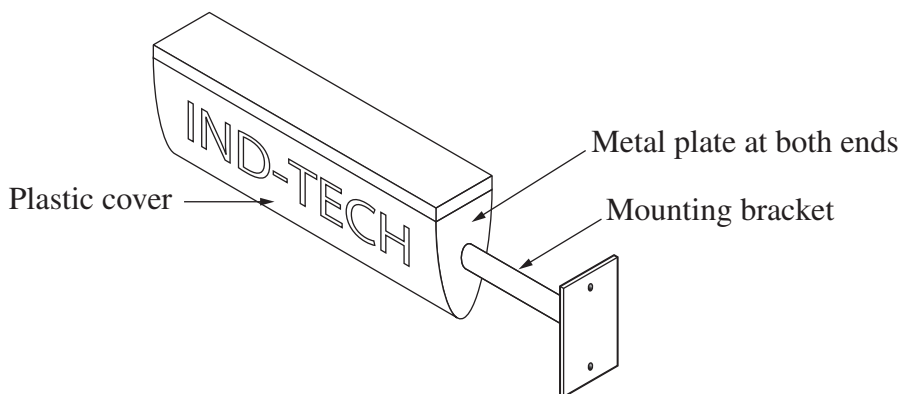
Allow about 35 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 4 (20 marks)

- (a) A plastics fabricating company is to manufacture a cover for the fluorescent advertising sign shown in the diagram.



- (i) Suggest a suitable material for the plastic cover. 1

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- (ii) Identify a suitable moulding process that would produce the word IND-TECH as raised letters on the surface of a thin sheet of plastic. 1

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Question 4 continues on page 18

Question 4 (continued)

(b) A boatbuilder has been commissioned to construct a one-off high performance sailing skiff using foam-sandwich construction that needs to be both lightweight and strong.

(i) Recommend a suitable resin for the skiff. 2

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(ii) Identify and distinguish between suitable core materials that could be used in the manufacture of the skiff. 4

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(iii) Identify TWO suitable reinforcing fabrics that could be used with the resin and core material, and assess the performance of each for use in the skiff. 4

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Question 4 continues on page 19

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Plastics Industries

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Student Number

Section II (continued)

Marks

Question 5 (20 marks)

A sailboard is to be made from a thermoplastic material with a lightweight core.

- (a) (i) Identify a suitable polymer for the outside layer of the sailboard. **1**

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- (ii) Identify a suitable polymer for the lightweight core. **1**

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- (b) The outside layer and the core material have different properties. Compare the properties of the polymers you have identified in part (a). **3**

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Question 5 continues on page 22

Question 5 (continued)

- (c) A metal mould is to be manufactured to make the outside layer of the sailboard. **3**
Outline the characteristics that need to be considered in the design of the mould.

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- (d) The fins of the sailboard are to be produced separately and attached at a later stage. Describe a suitable process that could be used to manufacture the sailboard fins. **4**

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Question 5 continues on page 23

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