BOARD OF STUDIES
NEW SOUTH WALES

Centre Number

Student Number

2005

HIGHER SCHOOL CERTIFICATE EXAMINATION

Industrial Technology
Metals and Engineering 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 13–21

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 metals and engineering industry. The introduction of improved marketing strategies has increased demand for IND-TECH's products. Management is aware that a planned restructure and expansion program will impact on IND-TECH's production.

Question 1 (20 marks)

(a) Greater demand for IND-TECH's products can be met through increased production. **2**

Identify TWO ways in which increased production can be achieved.

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(b) Identify a marketing strategy, and outline how this strategy could increase the demand for a product. **3**

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Question 1 continues on page 3

Marks

Question 1 (continued)

(c) Define the term *quality control*. Explain how quality control can be used to improve IND-TECH's products. **4**

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(d) IND-TECH's management is planning to restructure its workforce. **4**

Discuss how management will ensure stable industrial relations during this operation.

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Question 1 continues on page 4

Marks

Question 1 (continued)

(e) Discuss the issues related to expanding IND-TECH in its present location rather than moving to a new location. **7**

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End of Question 1

Centre Number

Student Number

Section I (continued)

Marks

Question 2 (20 marks)

(a) List TWO advantages of *multiskilling* in industry. **2**

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(b) Explain an effect that specialisation could have on production and on the workforce. **3**

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Question 2 continues on page 6

Marks

Question 2 (continued)

(c) Explain the term *sustainable development*, and recommend ways in which IND-TECH might make its operation more sustainable. **4**

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(d) Discuss the influence of occupational health and safety (OHS) legislation on production. **4**

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Question 2 continues on page 7

Question 2 (continued)

(e) Before expanding or relocating, IND-TECH must prepare an Environmental Impact Statement (EIS). **7**

Identify and discuss issues that could be covered in this statement.

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End of Question 2

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Centre Number

Student Number

Section I (continued)

Marks

Question 3 (20 marks)

(a) Outline the purpose of a materials list in the planning or the production process. **2**

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(b) Explain why shapes and colours are used in safety symbols. Use an example to support your answer. **3**

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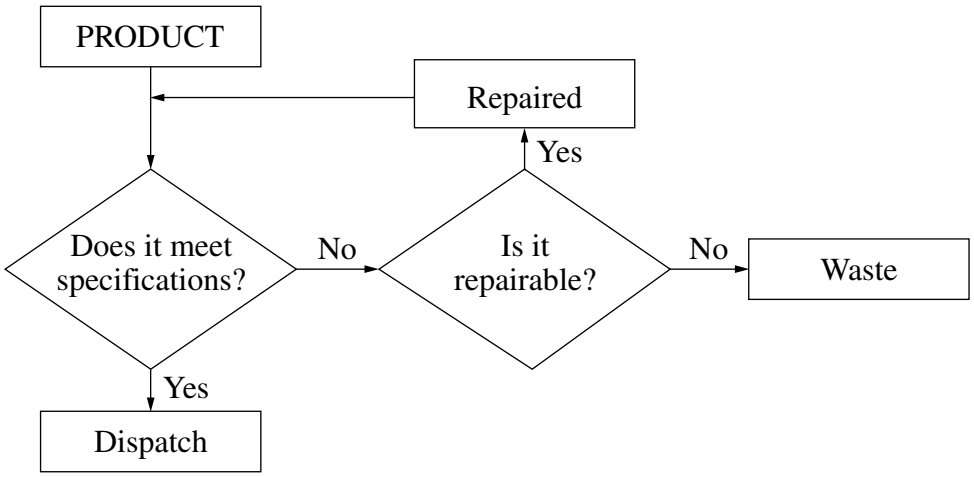
Question 3 continues on page 10

Question 3 (continued)

(c) The diagram shows a process within a production system. **4**



Identify the type of diagram used. Explain why this type of diagram is suitable for representing the steps outlined in this production system.

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Question 3 continues on page 11

Marks

Question 3 (continued)

(d) Outline the importance of function and aesthetics in the design of a product. **4**

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Question 3 continues on page 12

Question 3 (continued)

(e) IND-TECH's management has employed an external consultant to produce a report on the planned restructuring and expansion of IND-TECH. **7**

Outline the processes the consultant would follow when:

- collecting and analysing information
- identifying the problems
- recommending possible outcomes
- preparing a draft report, and
- presenting the findings.

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End of Question 3

Industrial Technology
Metals and Engineering Industries

Centre Number

Student Number

Section II

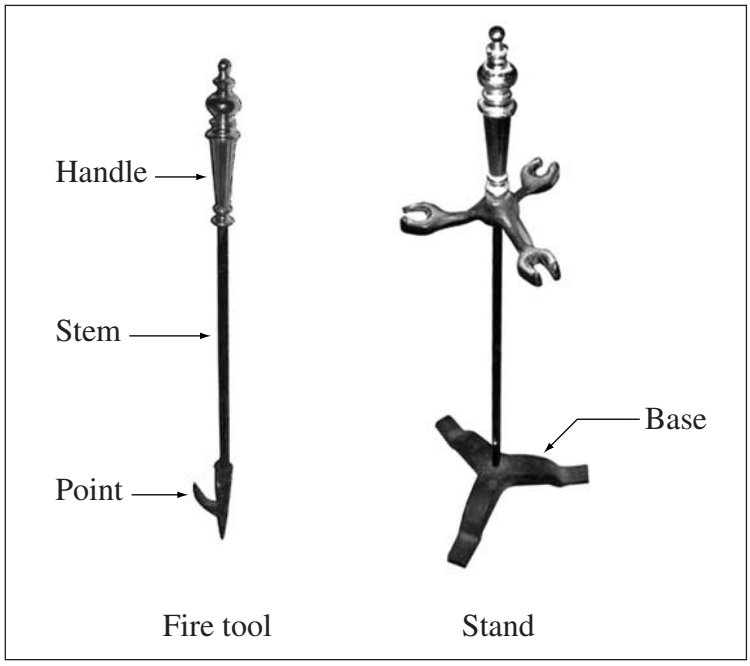
40 marks
Attempt Questions 4–5
Allow about 35 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 4 (20 marks)

IND-TECH is to mass-produce the fire tool and stand shown.



(a) The base of the stand is manufactured from cast iron. State TWO reasons for the suitability of cast iron. **2**

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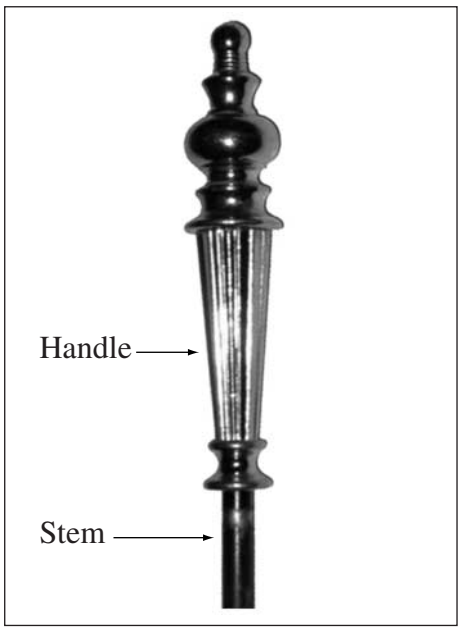
Question 4 continues on page 14

Question 4 (continued)

(b) Name a manufacturing method for the brass handle, and give TWO reasons for the suitability of this method. **3**



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Question 4 continues on page 15

Question 4 (continued)

(c) The handle is attached to the stem using a screw thread. **4**

Identify and describe a process for mass-producing the thread on the stem. State TWO advantages of producing a thread by this process.

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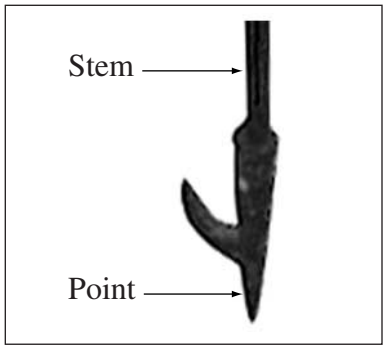
(d) The point from a fire tool is manufactured by sand casting. Describe the preparation of the sand mould and the casting process. **4**



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Question 4 continues on page 16

Marks

Question 4 (continued)

(e) Industrial finishes are to be applied to the brass handles of the fire tools. **7**

Describe TWO different finishing processes that could be used for the brass handles. Outline the advantages and/or disadvantages of each finishing process.

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End of Question 4

Marks

Question 5 (20 marks)

IND-TECH is to manufacture the galvanised boat trailer shown.

(a) Rolled hollow section (RHS) is to be used for the manufacture of the trailer. **2**

Outline TWO reasons for its use.

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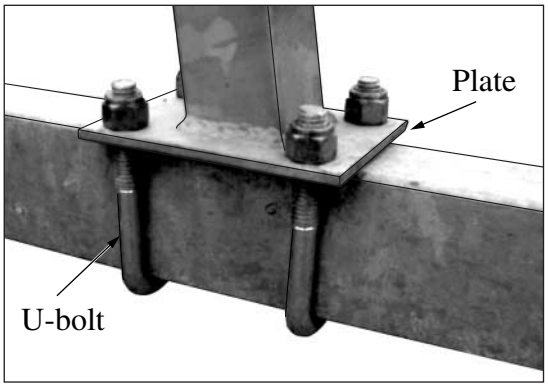
Question 5 continues on page 18

Marks

Question 5 (continued)

(b) Outline the processes used to manufacture the plate and U-bolts shown. **3**



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Question 5 continues on page 19

Marks

Question 5 (continued)

(c) Describe an industrial process that could be used to manufacture the mudguard from 2400 mm × 1200 mm × 1.5 mm sheet metal. **4**

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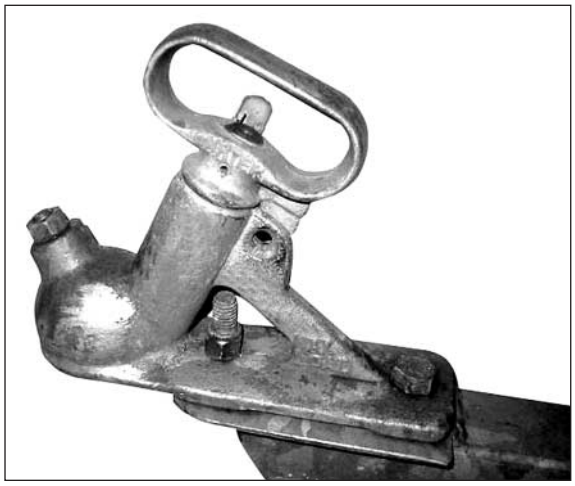
Question 5 continues on page 20

Marks

Question 5 (continued)

(d) The cast iron tow-ball coupling is attached to the draw bar with bolts. **4**



Explain why this method is preferred to welding.

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Question 5 continues on page 21

Marks

Question 5 (continued)

(e) The roller-support bracket and axle shown are to be manufactured from mild steel. **7**

Describe the processes involved in manufacturing and finishing the bracket and axle.

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