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Centre Number

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Student Number

2004
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 13–19

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 metals and engineering 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

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.

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End of Question 1

2004 HIGHER SCHOOL CERTIFICATE EXAMINATION
Industrial Technology
Metals and Engineering Industries

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Centre Number

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Student Number

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

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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2004 HIGHER SCHOOL CERTIFICATE EXAMINATION
Industrial Technology
Metals and Engineering Industries

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Centre Number

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Student Number

Section I (continued)

Question 3 (20 marks)

Marks

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



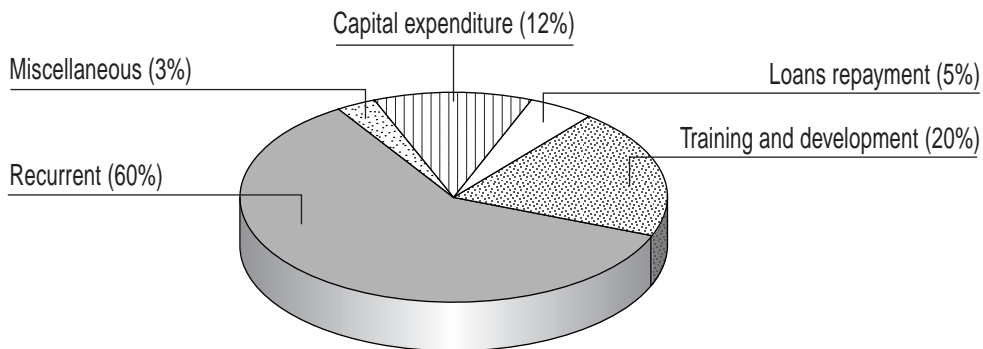
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- (b) The graph shows IND-TECH's expenditure in the year following the introduction of the new technologies. **2**



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

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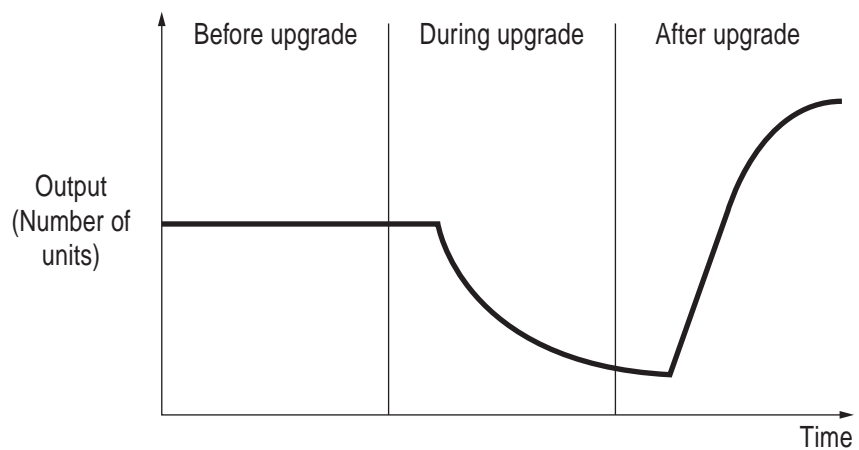
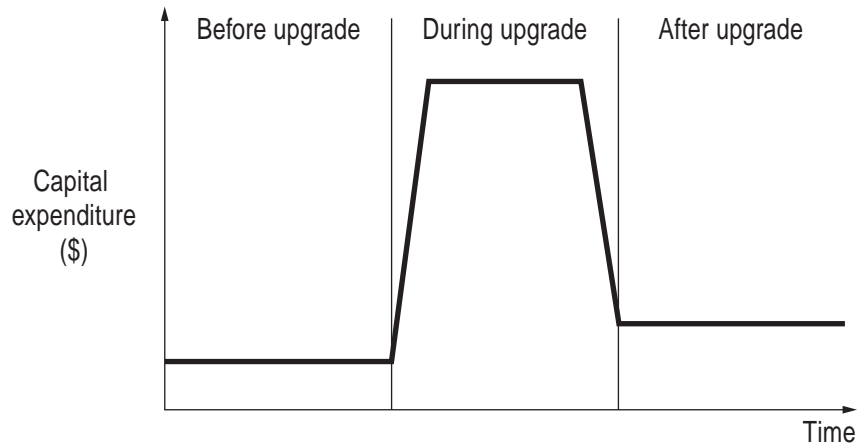
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Question 3 continues on page 10

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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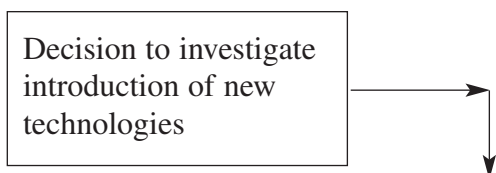
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Question 3 continues on page 11

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

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Industrial Technology
Metals and Engineering Industries

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Centre Number

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Student Number

Section II

40 marks

Attempt Questions 4–5

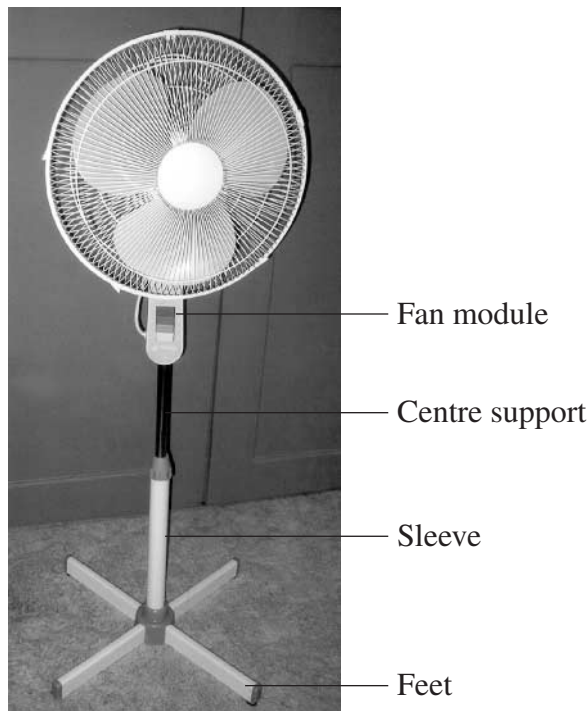
Allow about 35 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 4 (20 marks)

IND-TECH has been contracted to mass produce the metal parts of a pedestal fan. The sleeve and centre support are made from metal tubing which is to be finished to the manufacturer's specifications.



- (a) (i) Outline a method that could be used to form the centre support tube from flat sheet. **2**

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Question 4 continues on page 14

Question 4 (continued)

- (ii) Outline a method that could be used to form the centre support tube from bar stock. 2

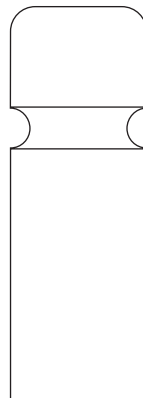
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- (b) The centre support tube has a section at the top (as shown) to restrict movement of the fan module. Explain how this shape is formed. 4



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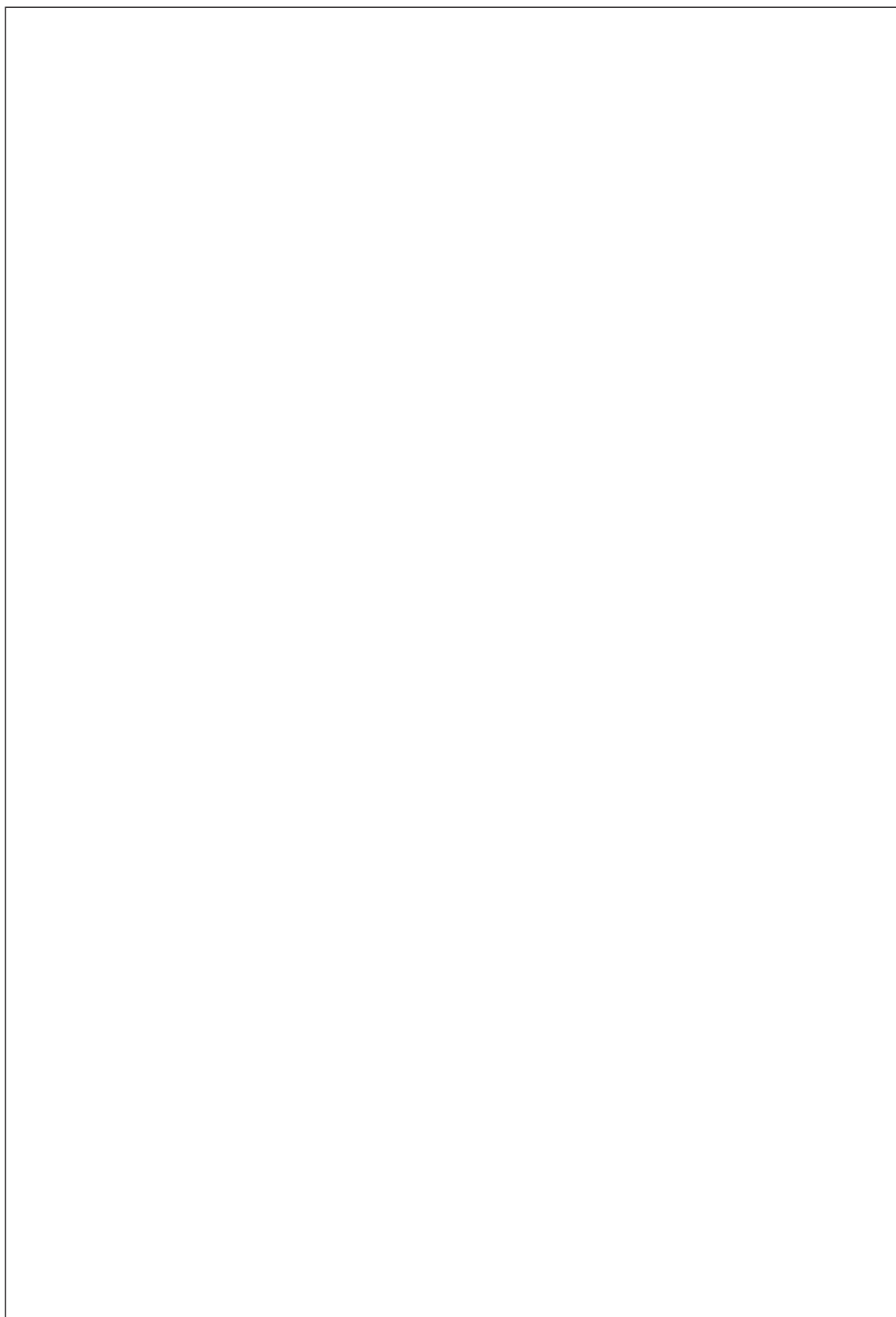
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Question 4 continues on page 15

Question 4 (continued)

- (c) For transportation purposes, the sleeve is to be detached from the feet. With the use of sketches, propose a method that could be used to join the feet to the sleeve. All sketches must be fully labelled. **4**



Question 4 continues on page 16

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Centre Number

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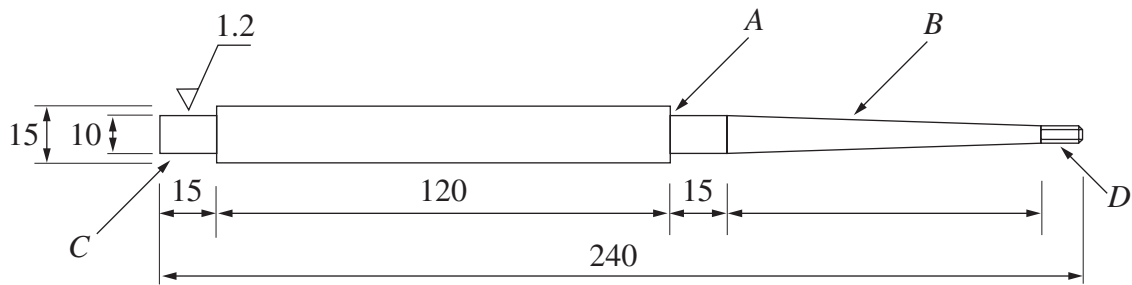
Student Number

Section II (continued)

Marks

Question 5 (20 marks)

The fan motor spindle shown is to be manufactured from steel.



- (a) Identify a suitable machine to manufacture the spindle and indicate a reason for your choice. **2**

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- (b) Outline the processes used to machine the shoulder at A. **2**

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Question 5 continues on page 18

Question 5 (continued)

- (c) A taper is to be formed at *B*. Identify and describe TWO methods of setting up a machine to form a taper. 4

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- (d) The motor bearings will be seated at *C* with a press fit. Identify a method that is used to produce the surface at *C*. Explain how the manufacturers could guarantee that the specifications have been met. 4

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Question 5 continues on page 19

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