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Centre Number

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Student Number

2009
HIGHER SCHOOL CERTIFICATE
EXAMINATION

Industrial Technology

Electronics 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, 7, 11 and 15

Total marks – 100

Section I Pages 2–9

60 marks

- Attempt Questions 1–3
- Allow about 55 minutes for this section

Section II Pages 11–18

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.

Use the following information to answer Questions 1–3.

Due to a slowing local and global economy, demand for IND-TECH’s products and services is decreasing. IND-TECH’s management has decided to investigate ways of maintaining sales.

Question 1 (20 marks)

(a) Name TWO strategies IND-TECH could consider to maintain sales. **2**

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(b) Outline possible changes IND-TECH could make to its management structure in order to improve the company’s efficiency. **3**

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Question 1 continues on page 3

Question 1 (continued)

- (c) Identify and describe a method IND-TECH could use to determine the reasons for the decrease in demand for their products and services. **4**

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- (d) IND-TECH is considering changes to their employee working hours. **4**

Discuss the impact that government legislation could have on this proposal.

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Question 1 continues on page 4

Question 1 (continued)

- (e) To improve efficiency, IND-TECH is considering implementing an emerging technology.

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Suggest an appropriate technology and analyse the possible impact of this technology on both the company and its employees.

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End of Question 1

**Industrial Technology
Electronics Industries**

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Centre Number

Section I (continued)

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Student Number

Question 2 (20 marks)

- (a) List TWO forms of effective workplace communication. **2**

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- (b) Outline personnel issues that could arise if IND-TECH were to reduce its employees' working hours. **3**

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- (c) IND-TECH plans to train its employees to be multi-skilled. **4**

Discuss how management could ensure a safe working environment during the training.

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Question 2 continues on page 6

Question 2 (continued)

- (d) Describe TWO methods IND-TECH’s management could use to determine the viability of introducing new products and services. **4**

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- (e) Evaluate the use of computer software in the design and production of new products. **7**

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End of Question 2

**Industrial Technology
Electronics Industries**

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Centre Number

Section I (continued)

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Student Number

Question 3 (20 marks)

- (a) List TWO advantages of using freehand drawings to present initial design ideas. **2**

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- (b) Why are graphics often used in OHS signage? Use an example to support your answer. **3**

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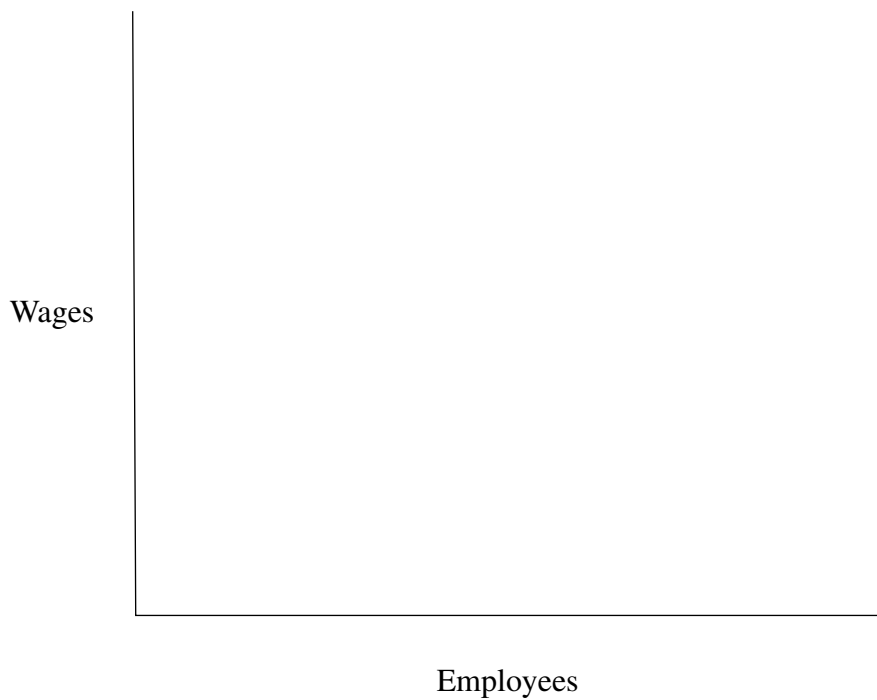
Question 3 continues on page 8

Question 3 (continued)

- (c) (i) Complete the following table to determine the weekly wages for a company. 2

<i>Employees</i>	<i>Number</i>	<i>Hourly rate (\$)</i>	<i>Hours worked</i>	<i>Weekly wages (\$)</i>
Administration staff	3	17	40	
Managers	2		40	4 400
Tradespeople		45	40	12 600
Apprentices	2	16		1 280
			<i>Total</i>	

- (ii) Using the information in the table, graph the weekly wages for each group of employees. 2



Question 3 continues on page 9

Question 3 (continued)

- (d) Describe the advantages of using word processing software to produce a management folio. 4

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- (e) Identify and evaluate the types of computer graphics that could be used in the production of IND-TECH's annual report. 7

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End of Question 3

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Industrial Technology Electronics 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.

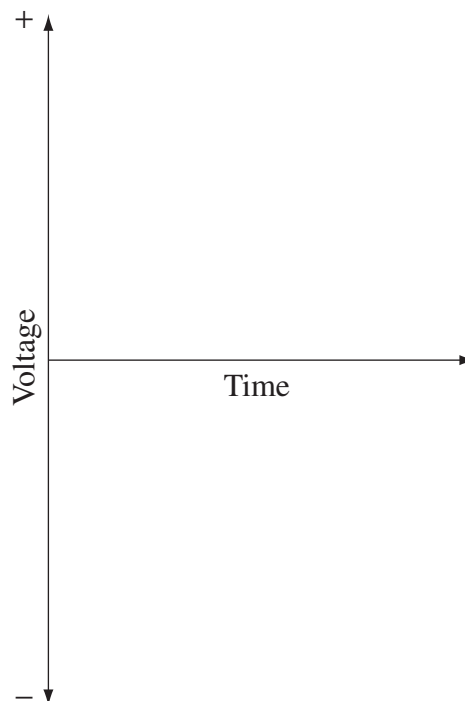
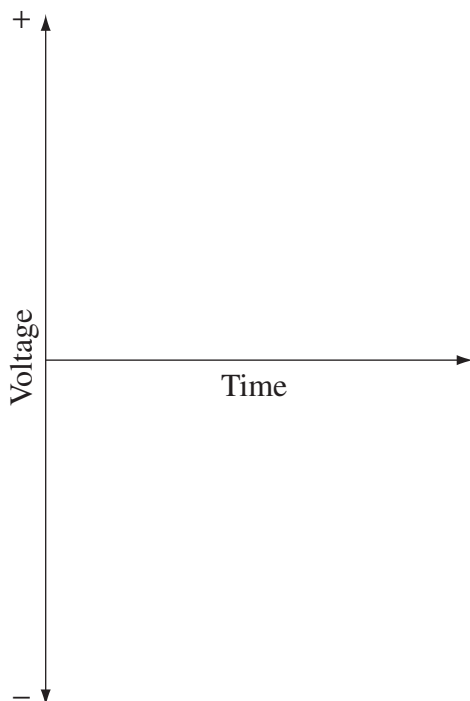
Question 4 (20 marks)

- (a) What units are used to measure electrical potential and electron flow? 2

Electrical potential:

Electron flow:

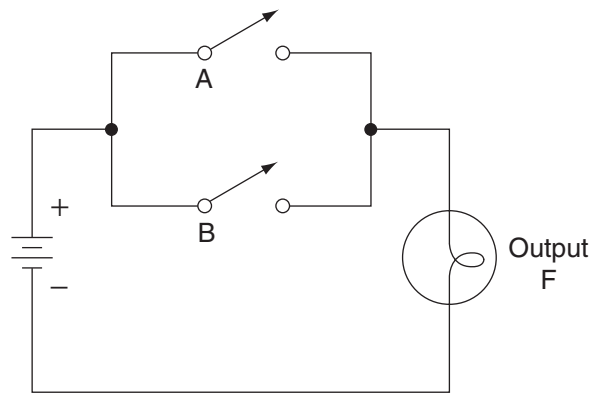
- (b) Sketch and label the characteristic shape of BOTH a digital signal and an analogue signal on the axes below. 3



Question 4 continues on page 12

Question 4 (continued)

- (c) The circuit shown is controlled by two input switches A and B. The output of the circuit is a small globe labelled F. The circuit is powered by a battery.



- (i) Complete the truth table shown.

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A	B	F
0	0	0
0	1	
1	0	
1	1	

- (ii) What is the name for a logic gate with this truth table?

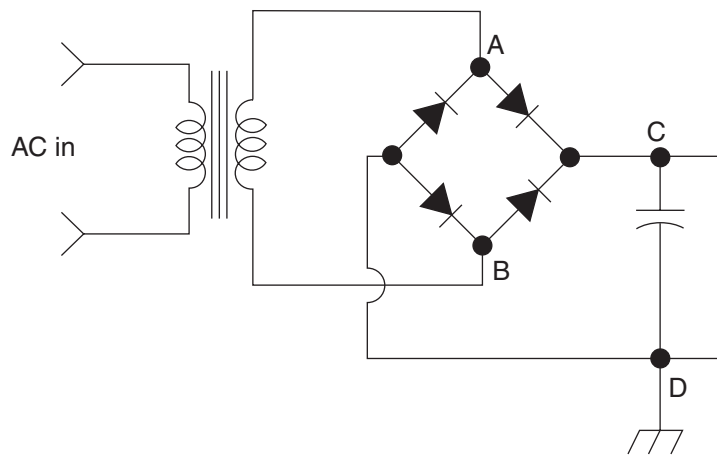
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Question 4 continues on page 13

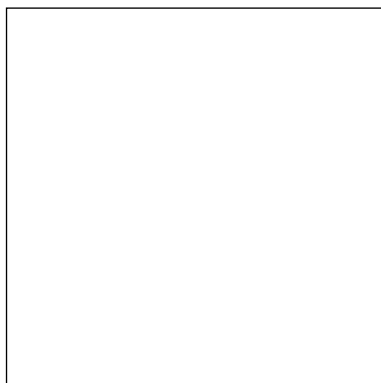
Question 4 (continued)

(d) The circuit shown is for a power supply.

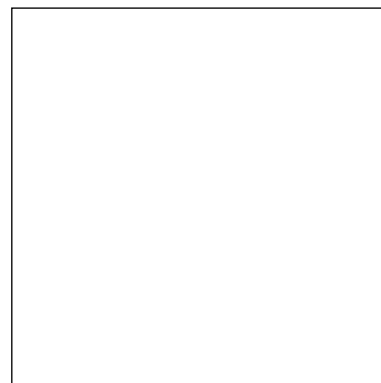


- (i) Sketch the output waveform seen on a cathode ray oscilloscope screen when the probes are connected across the points specified. 2

A and B



C and D



- (ii) What are the functions of the capacitor and the bridge diodes in the circuit? 2

Capacitor:

Bridge diodes:

Question 4 continues on page 14

Question 4 (continued)

- (e) High intensity light emitting diodes (LEDs) are now being used in many low voltage lighting applications.

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Evaluate LED technology in terms of power requirements, light output and cost. Use examples to illustrate your answer.

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End of Question 4

**Industrial Technology
Electronics Industries**

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Centre Number

Section II (continued)

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Student Number

Question 5 (20 marks)

- (a) Name TWO different types of variable resistors. **2**

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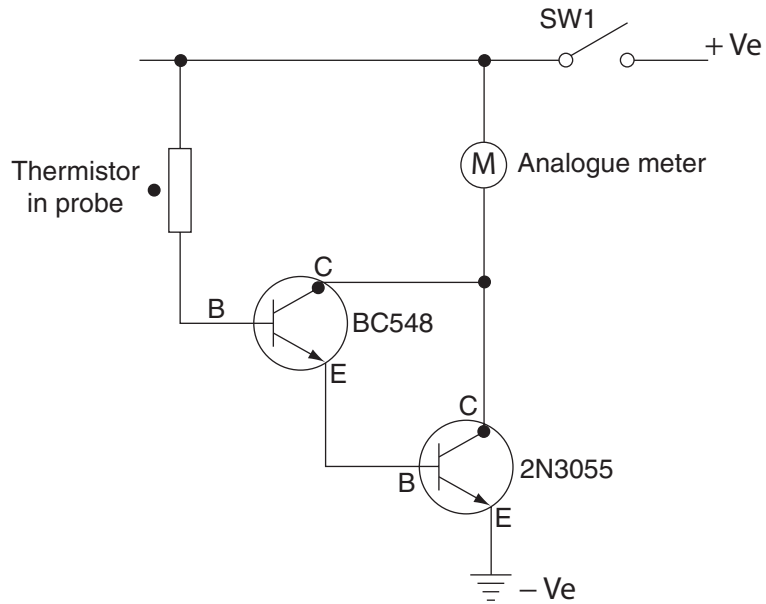
- (b) How does the operation of a stepped (stepper) motor differ from that of an ordinary free running (direct current) motor? **3**

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Question 5 continues on page 16

Question 5 (continued)

- (c) The circuit shown is for a portable temperature gauge, using a thermistor in a plastic probe attached to an analogue meter.



- (i) Outline the function of the thermistor in this circuit. 2

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- (ii) What is the relationship between the operation of the general purpose transistor and that of the power transistor? 2

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Question 5 continues on page 17

Question 5 (continued)

(d) Compare the operation of a solenoid and a relay as electrical switching devices. **4**

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Question 5 continues on page 18

