



2013

**HIGHER SCHOOL CERTIFICATE
EXAMINATION**

Industrial Technology

Electronics Technologies

General Instructions

- Reading time – 5 minutes
- Working time – $1\frac{1}{2}$ hours
- Write using black or blue pen
Black pen is preferred
- Draw diagrams using pencil
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of page 9

Total marks – 40

Section I Pages 2–5

10 marks

- Attempt Questions 1–10
- Allow about 20 minutes for this section

Section II Pages 9–12

15 marks

- Attempt Questions 11–15
- Allow about 35 minutes for this section

Section III Page 13

15 marks

- Attempt Question 16
- Allow about 35 minutes for this section

Section I

10 marks

Attempt Questions 1–10

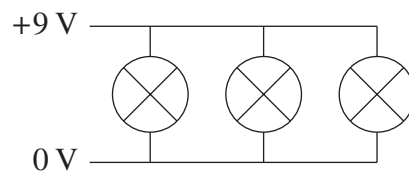
Allow about 20 minutes for this section

Use the multiple-choice answer sheet for Questions 1–10.

1 Electric current is the flow of which particles?

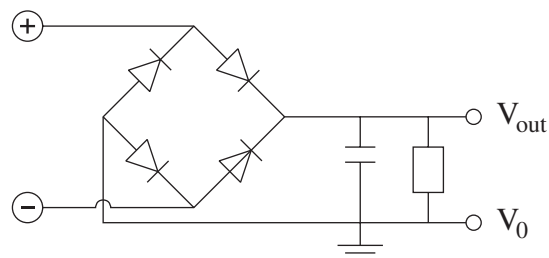
- (A) Atoms
- (B) Electrons
- (C) Neutrons
- (D) Protons

2 Which statement is true for the circuit shown?



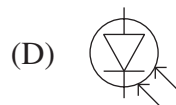
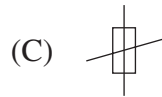
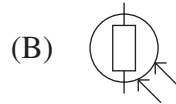
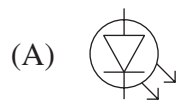
- (A) The voltage across each component is the same.
- (B) The current across each component is the same.
- (C) The voltage across each component is different.
- (D) The capacitance across each component is different.

3 What is the function of the circuit shown?



- (A) To convert AC voltage to DC voltage
- (B) To prevent voltage surges in a circuit
- (C) To reduce voltage output from a circuit
- (D) To increase voltage output from a circuit

4 Which of the following electrical symbols represents a light-dependent resistor?



5 What is the resistance in an electric kettle rated at 5 amps on a domestic 240V supply?

- (A) 5 Ω
- (B) 24 Ω
- (C) 48 Ω
- (D) 1200 Ω

6 What is the main advantage of a relay switch?

- (A) It can be manually or electromagnetically operated.
- (B) The electromagnetic switch contacts never get dirty.
- (C) Low voltage input sources allow larger voltage outputs.
- (D) High voltage inputs are reduced across the electromagnetic switch.

- 7 A teacher has planned a class project where each student is required to make a simple LED torch. The table shows the materials required and the costs.

<i>Quantity required per torch</i>	<i>Description</i>	<i>Supply Cost</i>
1	PCB board	\$1.25 each
1	12V battery	\$3.19 each
1	12V battery holder	\$0.90 each
3	Super bright white LED	\$1.10 each
1	680 ohm resistor	\$0.05 each
1	Slide switch – SPST	\$1.45 each

What is the total cost of supplying the materials for a class of 24 students?

- (A) \$10.14
 (B) \$190.56
 (C) \$243.36
 (D) \$486.72
- 8 The incomplete truth table for an AND gate is shown.

Input		Output
A	B	Q
0	0	
0	1	
1	0	
1	1	

Which of the following shows the correct outputs in column Q?

- (A)

0
1
1
1

 (B)

0
0
0
1

 (C)

1
0
0
0

 (D)

0
1
1
0

- 9** In a circuit, a thermistor is a type of resistor designed to
- (A) dissipate heat by vibration.
 - (B) burn out if power is excessive.
 - (C) prevent heat expansion in a circuit.
 - (D) change resistance with changes in heat.
- 10** What is an operational amplifier (op amp)?
- (A) A high gain linear device for use in digital circuits
 - (B) A high gain linear device for use in analog circuits
 - (C) A high gain non-linear device for use in digital circuits
 - (D) A high gain non-linear device for use in analog circuits

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**Industrial Technology
Electronics Technologies**

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Centre Number

Section II

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Student Number

15 marks

Attempt Questions 11–15

Allow about 35 minutes for this section

Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.

Question 11 (2 marks)

List TWO common faults that could be identified by a visual inspection of a PCB circuit that is not working. **2**

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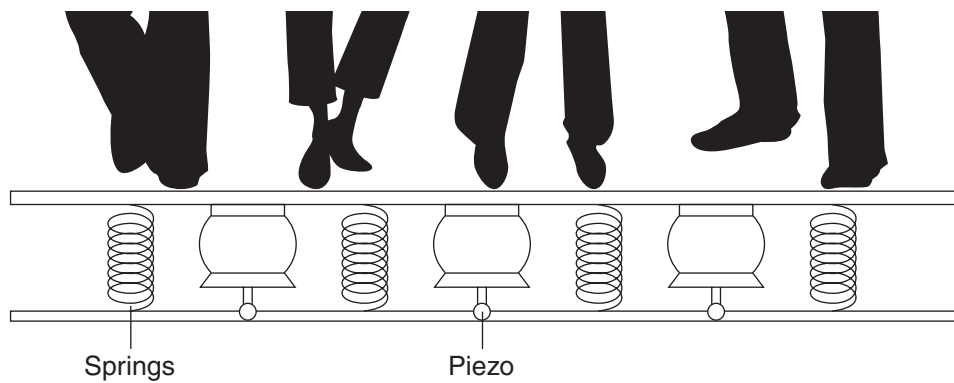
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Question 12 (3 marks)



The diagram shows the sprung floor of a dance club that uses piezo devices to create lighting effects as people dance.

3

Explain how the piezo devices are used to achieve this effect.

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Question 13 (3 marks)

Describe the operation of a stepped motor and provide an example of its application.

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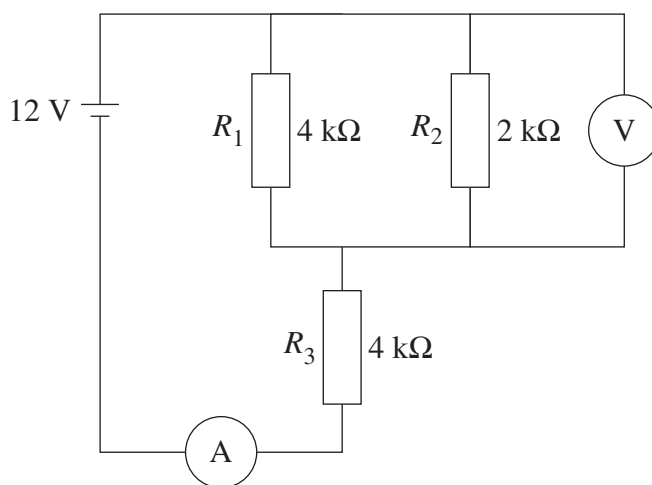
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Question 14 (3 marks)

Calculate the readings on the voltmeter and ammeter in the circuit below. Show your working.

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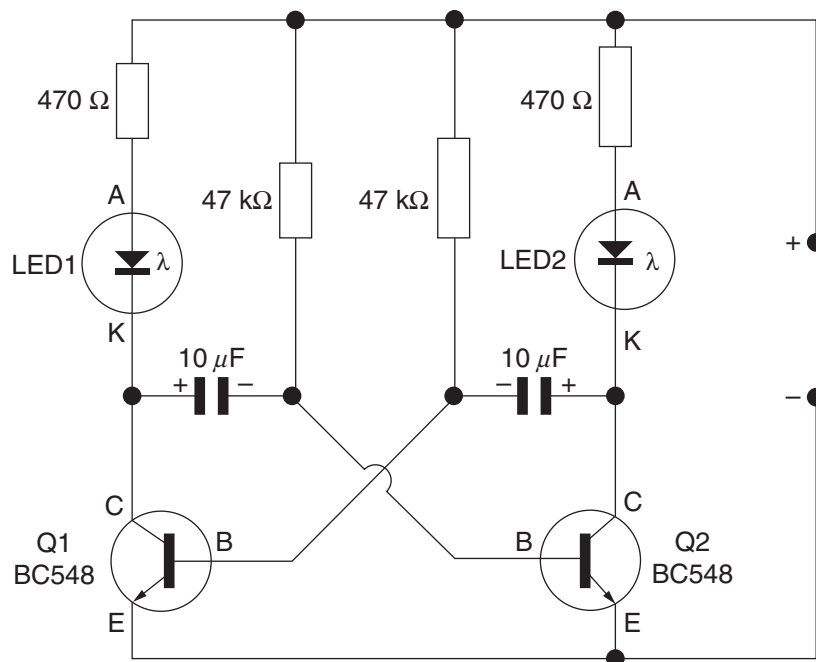
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Question 15 (4 marks)

Explain the functions of both the transistors and the capacitors in this flasher circuit.

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Industrial Technology Electronics Technologies

Section III

15 marks

Attempt Question 16

Allow about 35 minutes for this section

Answer the question in a writing booklet provided. Extra writing booklets are available.

Question 16 (15 marks)

- | | | |
|-----|---|----------|
| (a) | Explain why a company should comply with safety standards. | 6 |
| (b) | Assess strategies that a company could implement to establish and maintain a safe work culture. | 9 |

End of paper

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