

GCSE Combined Science: Trilogy

Worksheet: Standard circuit diagram symbols

TIME 30 min	TOTAL 29 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Standard circuit diagram symbols

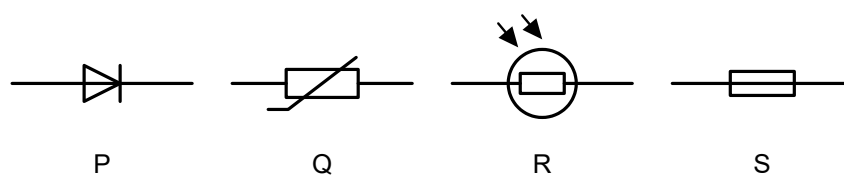
NAME _____ **CLASS** _____ **DATE** _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Figure 1 shows four circuit symbols, P, Q, R and S.

Figure 1



0 1 . 1

Name component P.

.....

.....

.....

[1 mark]

0 1 . 2

Which symbol represents a light-dependent resistor (LDR)?

Tick (✓) **one** box.

P

☐

Q

☐

R

☐

S

☐

[1 mark]

0 1 . 3

Name component Q.

.....

.....

.....

.....

[1 mark]

0 1 . 4

Draw the circuit symbol for a variable resistor.

.....

.....

.....

.....

[1 mark]

0 2

0 2 . 1

Which component allows current to flow in one direction only, and also emits light?

Tick (✓) **one** box.

Diode

☐

LED

☐

Resistor

☐

Thermistor

☐

[1 mark]

0 2 . 2

Which **two** components have a resistance that changes with the surrounding conditions (light or temperature)?

Tick (✓) **two** boxes.

LDR

☐

Fuse

☐

Thermistor

☐

Switch

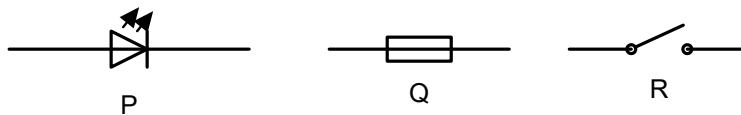
☐

[2 marks]

0 3

Figure 2 shows three circuit symbols, P, Q and R.

Figure 2



0 3 . 1

Name component P.

.....

.....

.....

.....

[1 mark]

0 3 . 2

Name component Q.

.....

.....

.....

.....

[1 mark]

0 3 . 3

Which component allows current to flow through it in one direction only?

Tick (✓) **one** box.

P

☐

Q

☐

R

☐

[1 mark]

0 3 . 4

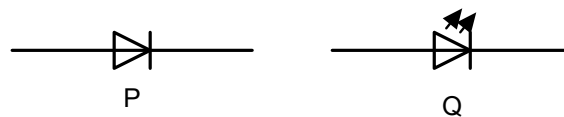
Draw the circuit symbol for a battery made from two cells.

[1 mark]

0 4

Figure 3 shows two circuit symbols, P and Q.

Figure 3



0 4 . 1

Which symbol, P or Q, represents a light-emitting diode (LED)? Give a reason for your answer.

[2 marks]

0 4 . 2

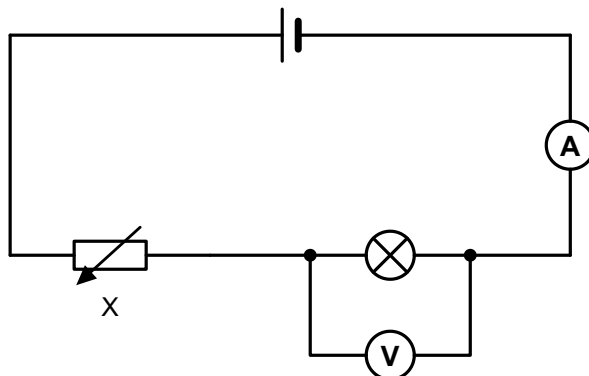
State the difference in appearance between the circuit symbol for a single cell and for a battery of cells.

[2 marks]

0 5

A student set up the circuit shown in Figure 4.

Figure 4



0 5 . 1

Name component X.

.....

.....

.....

[1 mark]

0 5 . 2

Give the purpose of component X in the circuit.

.....

.....

[1 mark]

0 5 . 3

How is the ammeter connected in the circuit?

Tick (✓) **one** box.

in parallel with the cell

in parallel with the lamp

in series with the lamp

☐

☐

☐

[1 mark]

0 5 . 4

Explain why the voltmeter must be connected in parallel with the lamp.

.....

.....

.....

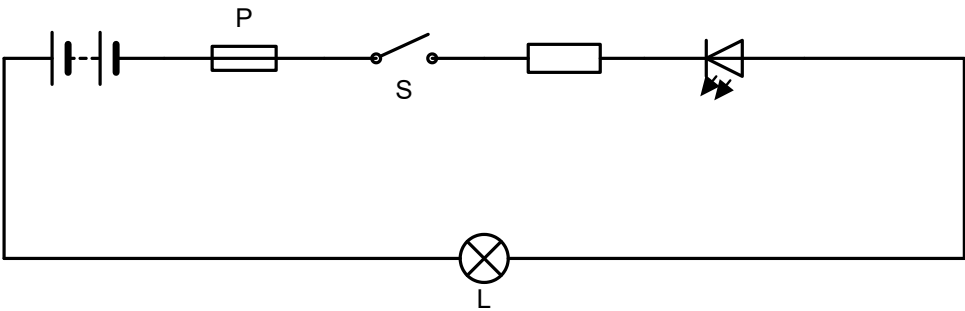
.....

[2 marks]

0 6

Figure 5 shows a series circuit containing a battery, a component P, a switch S, a resistor, an LED and a lamp L.

Figure 5



0 6 . 1

Name component P.

.....

.....

.....

[1 mark]

0 6 . 2

When switch S is closed, the LED and the lamp light.
Explain what would happen if the battery were connected the other way round.

.....

.....

.....

.....

[2 marks]

0 6 . 3

While the circuit is working, the thin wire inside component P melts and breaks.
Explain what happens to the LED and the lamp.

.....

.....

.....

.....

[2 marks]

.....

0 7

A technician describes a circuit: a battery is connected in series with a switch, a fuse, a resistor and an LED. The LED is connected so that it lights when the switch is closed.

0 7 . 1

Draw a circuit diagram for this circuit, using the correct circuit symbols.
Draw the battery with its positive terminal at the top.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4 marks]

END OF QUESTIONS

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Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Standard circuit diagram symbols · 29 marks

Question 1 (4 marks)

01.1 [1 mark]

Answer: Diode

- diode (1)

Notes: Do not accept LED.

01.2 [1 mark]

Correct: R

01.3 [1 mark]

Answer: Thermistor

- thermistor (1)
-

01.4 [1 mark]

Answer: A resistor rectangle with a diagonal arrow drawn through it.

- rectangle with a diagonal arrow through it (1)
-
-

Question 2 (3 marks)

02.1 [1 mark]

Correct: LED

02.2 [2 marks]

Correct: LDR; Thermistor

Question 3 (4 marks)

03.1 [1 mark]

Answer: Light-emitting diode (LED)

- light-emitting diode / LED (1)

03.2 [1 mark]

Answer: Fuse

- fuse (1)

03.3 [1 mark]

Correct: P

03.4 [1 mark]

Answer: Two cell symbols (long and short parallel lines) drawn in series, both facing the same direction.

- two cell symbols in series, both facing the same direction (two long/short line pairs) (1)

Question 4 (4 marks)

04.1 [2 marks]

Answer: Q — it has the diode symbol with two small arrows, showing that it emits light.

- Q (1)
- (because) it has the diode symbol with two small arrows, showing it emits light (1)

Notes: The reason mark depends on Q being chosen.

04.2 [2 marks]

Answer: A cell is one long line and one short line (parallel to each other); a battery is two or more cell symbols in series.

- a cell is shown as one long line and one short line, parallel to each other (1)
 - a battery is shown as two or more cell symbols connected in series (repeated long/short lines) (1)
-

Question 5 (5 marks)

05.1 [1 mark]

Answer: Variable resistor

- variable resistor (1)

05.2 [1 mark]

Answer: To change (control) the current in the circuit.

- to change / control / vary the current (in the circuit) / to change the potential difference across the lamp (1)

05.3 [1 mark]

Correct: in series with the lamp

05.4 [2 marks]

Answer: A voltmeter measures the potential difference between two points, so it must be connected across the lamp, to the wires on each side of it.

- a voltmeter measures the potential difference across a component / between two points (1)
- so it must be connected to each side of the lamp (not in the path of the current) (1)

Question 6 (5 marks)

06.1 [1 mark]

Answer: Fuse

- fuse (1)

06.2 [2 marks]

Answer: The LED would not conduct, because current can only flow through it in one direction (it has a very high resistance in the reverse direction), so there would be no current in the series circuit and the lamp would not light either.

- the LED would not conduct / would have a very high resistance, because current can only flow through it in one direction (1)
- so there would be (almost) no current anywhere in the series circuit and the lamp would not light either (1)

06.3 [2 marks]

Answer: The circuit is broken, so there is no current anywhere in the series circuit and both the LED and the lamp go out.

- the circuit is broken / incomplete, so there is no current (anywhere in the series circuit) (1)
 - so both the LED and the lamp go out (1)
-

Question 7 (4 marks)

07.1 [4 marks]

Answer: A single series loop containing a battery (positive terminal at the top), a switch, a fuse, a resistor and an LED, with the LED drawn so that conventional current from the positive terminal flows through it in its forward direction.

- battery drawn with the correct symbol (two or more cells, each a long and a short line), with its positive terminal (long line) at the top (1)
 - switch and fuse drawn with the correct symbols, in series with the battery in a single complete loop (1)
 - resistor drawn as a rectangle, in series with the LED (1)
 - LED drawn with the correct symbol (diode symbol with two arrows pointing away), pointing in the direction of the conventional current from the positive terminal (1)
-