

Reading ammeters and voltmeters in circuits

Grade 7 science (Year 8 · Class 7) · Test answers (mark scheme)

Model answers and the marking guide are given below. Award the mark for correct science even when the wording is different. Units are required for every numerical answer, and explanations must use the rules for series and parallel circuits.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS2-3

Question 1 Using meters (3 marks)

- a) An ammeter measures the electric current, in **amperes (A)**.
- b) In **series**: in the loop, so all the current passes through it.
- c) In **parallel**: across the component.

Marking: 1 mark each.

Question 2 Converting (2 marks)

- a) $480 \div 1000 = \mathbf{0.480\ A}$.
- b) $1.25 \times 1000 = \mathbf{1250\ mA}$.

Marking: 1 mark each; the unit is required.

Question 3 A series circuit (3 marks)

- a) $9.0\ V - 5.4\ V = \mathbf{3.6\ V}$.
- b) $\mathbf{0.25\ A}$.
- c) In a series circuit the current is the same everywhere, because there is only one path and the charge is not used up.

Marking: 1 mark each; part b needs the unit.

Question 4 A parallel circuit (3 marks)

- a) $1.00\ A - 0.65\ A = \mathbf{0.35\ A}$.
- b) $\mathbf{6.0\ V}$, the same as the supply.
- c) $\mathbf{0.65\ A}$, since only branch 1 now carries current.

Marking: 1 mark each; units required.

Question 5 Ammeter across a lamp (2 marks)

The lamp goes out because the ammeter gives the current an easier path and almost no current passes through the lamp. A very large current flows through the ammeter, which

may damage it or the cell.

Marking: 1 mark for the lamp going out; 1 mark for the easy path or large current.

Question 6 Current in a series loop (2 marks)

The current is the same everywhere in a series loop. The bulbs transfer energy from the charge as it passes, but the charge itself carries on round the loop and none is lost. The same current has to pass through every part, so it does not get smaller.

Marking: 1 mark for current the same everywhere; 1 mark for energy transferred but charge not used up.

Question 7 Overloading a socket (3 marks)

a) $0.30 + 0.45 + 0.60 = \mathbf{1.35\ A}$.

b) **Yes:** 1.35 A is more than the 1.0 A fuse rating.

c) **The 0.45 A appliance or the 0.60 A appliance:** removing either leaves 0.90 A or 0.75 A, below 1.0 A. Removing the 0.30 A one leaves 1.05 A, which is still too high.

Marking: 1 mark each. Accept the 0.45 A or 0.60 A appliance.

Question 8 Water analogy (2 marks)

Current is like the flow rate of water in a pipe: how much passes a point each second.

Voltage is like the pressure from the pump that pushes the water round the loop.

Marking: 1 mark for current as flow; 1 mark for voltage as push or pressure.