Exercise walk-through

Electric Circuits ▪ 11.2

eXercise

You must be able to

- identify the components of a circuit: **source of emf 电动势源**, resistors, wires, switches
- distinguish an **open**, a **closed**, and a **short circuit 短路**
- describe an **ideal battery** as a source of constant potential difference
- state how **ammeters** and **voltmeters** are connected

Method — Components

A source of emf, resistors, connecting wires, and switches — each with a standard schematic symbol.

Method — Circuit states

- **Open** — broken loop, no current.
- **Closed** — complete loop, current flows.
- **Short** — a very low-resistance path that lets a large current bypass a component.

Method — Meters

An **ammeter** goes **in series** (to read the current through a branch); a **voltmeter** goes **in parallel** (to read the potential difference across a component).

Practice 2.1 ▪ 1 mark

State how an ammeter is connected in a circuit.

Solution 2.1

Worked steps

in series B1.

Practice 2.2 ▪ 1 mark

State how a voltmeter is connected.

Solution 2.2

Worked steps

in parallel with the component B1.

Practice 2.3 ▪ 2 marks

State the difference between an open and a closed circuit.

Solution 2.3

Method: Circuit states

Worked steps

a closed circuit is a complete loop that carries current; an open circuit is broken, so no current flows B1 B1.

Exam-style 3.1 ▪ 1 mark

An ammeter is connected in

A series

B parallel

C either way

D neither way

Solution 3.1

A series ✓

B parallel

C either way

D neither way

Worked steps

A.

Exam-style 3.2 ▪ 1 mark

A short circuit is a path of

A very high resistance

B very low resistance

C no current at all

D infinite voltage

Solution 3.2

Method: Circuit states

A very high resistance

B very low resistance ✓

C no current at all

D infinite voltage

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

A circuit has a battery, a resistor, an ammeter, and a voltmeter across the resistor.
(a) State how the ammeter is connected.
(b) State how the voltmeter is connected.
(c) Explain why a voltmeter should have a very high resistance.

Solution 3.3

Worked steps

(a) in series B1. (b) in parallel with the resistor B1. (c) so it draws almost no current and does not disturb the circuit it measures B1.