

11.2 Electric Circuits

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS series 串联 • parallel 并联 • source of emf 电动势源 • short circuit 短路
• resistance 电阻

Objective

Build the skills to answer exam questions on **electric circuits**.

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

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Components

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

■ 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.

■ 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).

2 Practice

2.1 State how an ammeter is connected in a circuit. [1]

2.2 State how a voltmeter is connected. [1]

2.3 State the difference between an open and a closed circuit. [2]

3 Exam-style questions

3.1 An ammeter is connected in [1]

- **A** series
- **B** parallel
- **C** either way
- **D** neither way

3.2 A short circuit is a path of [1]

- **A** very high resistance
- **B** very low resistance
- **C** no current at all
- **D** infinite voltage

3.3 A circuit has a battery, a resistor, an ammeter, and a voltmeter across the resistor.

(a) State how the ammeter is connected. [1]

(b) State how the voltmeter is connected. [1]

(c) Explain why a voltmeter should have a very high resistance. [1]

Solutions

2.1 in series.

2.2 in parallel with the component.

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

3.1 A.

3.2 B.

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