

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

3.2 A short circuit is a path of [1]

- | | |
|---|---|
| A | B |
| C | D |
- 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]