

A-Level Physics

Name: _____ Score: _____

1. The e.m.f. is the energy given to each unit of charge by the _____.

2. 5.0 A flows into a junction and splits into two branches; one carries 2.0 A. What does the other carry?
_____ A
3. A 12 V supply is across $R_1 = 2.0 \text{ k}\Omega$ and $R_2 = 4.0 \text{ k}\Omega$ in series. What is the output across R_2 ?
_____ V
4. A cell of e.m.f. 12 V and internal resistance $0.50 \text{ }\Omega$ drives a current of 2.0 A. What is the terminal p.d.?
_____ V
5. A $3.0 \text{ }\Omega$ and a $6.0 \text{ }\Omega$ resistor are in series. What is the total resistance?
_____ Ω
6. In a potential divider, the p.d. across each resistor is proportional to its resistance.
☐ True ☐ False
7. A cell of e.m.f. 6.0 V and internal resistance $0.50 \text{ }\Omega$ is short-circuited. What current flows?
_____ A
8. A parallel combination is always smaller than the smallest resistor in it.
☐ True ☐ False
9. Replacing one resistor in a divider with an LDR makes the output voltage depend on:
☐ nothing
☐ the light level
☐ the temperature
☐ the time of day only
10. An ideal ammeter has:
☐ infinite resistance, connected in parallel
☐ zero resistance, connected in parallel
☐ zero resistance, connected in series
☐ infinite resistance, connected in series

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1. **source**

The source (battery, cell, generator) supplies energy to the charge; a component takes it back out (the p.d.).

2. **3 A**

Current in = current out: $5.0 = 2.0 + I$, so $I = 3.0$ A.

3. **8 V**

$$V_{\text{out}} = V_{\text{in}} \frac{R_2}{R_1 + R_2} = 12 \times \frac{4.0}{2.0 + 4.0} = 8.0 \text{ V.}$$

4. **11 V**

$$V = \varepsilon - Ir = 12 - 2.0 \times 0.50 = 11 \text{ V.}$$

5. **9 Ω**

$$R = R_1 + R_2 = 3.0 + 6.0 = 9.0 \text{ } \Omega.$$

6. **True**

The same current flows through both, so $V = IR$ means the bigger resistor takes the bigger share.

7. **12 A**

$$\text{With } R_{\text{ext}} \rightarrow 0, I = \frac{\varepsilon}{r} = \frac{6.0}{0.50} = 12 \text{ A.}$$

8. **True**

Yes – adding a parallel path gives the current another route, lowering the overall resistance.

9. **the light level**

An LDR's resistance changes with light, so its share of the voltage – the output – tracks the brightness.

10. **zero resistance, connected in series**

An ammeter goes in series and should add no resistance, so an ideal one has zero resistance.