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 $R_1 = 2.0$ kΩ and $R_2 = 4.0$ kΩ in series. What is the output across R_2?

   _____ V

4. A cell of e.m.f. 12 V and internal resistance 0.50 Ω drives a current of 2.0 A. What is the terminal p.d.?

   _____ V

5. A 3.0 Ω and a 6.0 Ω 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 Ω 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**

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

4. **11 V**

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

5. **9 Ω**

   $R = R_1 + R_2 = 3.0 + 6.0 = 9.0$ Ω.

6. **True**

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

7. **12 A**

   With $R_{\text{ext}} \to 0$, $I = \dfrac{\varepsilon}{r} = \dfrac{6.0}{0.50} = 12$ 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.