1. 6 C of charge flows past a point in 3 s. What is the current, in amperes?

   _____ A

2. For current to flow in a circuit, the loop must be:

   ☐ made only of copper

   ☐ very long

   ☐ complete (closed)

   ☐ open

3. A resistor carries 0.5 A from a 6 V supply. What is its resistance, in Ω?

   _____ Ω

4. A bulb carries 0.5 A at 12 V. What power does it dissipate, in watts?

   _____ W

5. Two 6 Ω resistors are in **series**. What is the total resistance, in Ω?

   _____ Ω

6. A 9 V battery drives current through $R_1 = 2\ \Omega$ and $R_2 = 1\ \Omega$ in series. Using the loop rule, what is the current, in A?

   _____ A

7. Kirchhoff's junction rule is a statement of the conservation of:

   ☐ charge

   ☐ energy

   ☐ momentum

   ☐ voltage

8. As a capacitor charges through a resistor, its charge rises:

   ☐ exponentially toward a final value

   ☐ not at all

   ☐ instantly to full

   ☐ linearly (a straight line)

9. Electric current is defined as:

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   ☐ charge times time

   ☐ voltage per unit charge

   ☐ resistance times charge

10. The energy a battery supplies per unit charge is called its _____.

    _____

1. **2 A**

   $I = Q/t = 6/3 = 2$ A.

2. **complete (closed)**

   A complete, closed loop is needed; any break stops the current.

3. **12 Ω**

   $R = V/I = 6/0.5 = 12\ \Omega$.

4. **6 W**

   $P = IV = 0.5 \times 12 = 6$ W.

5. **12 Ω**

   Series resistances add: $6 + 6 = 12\ \Omega$.

6. **3 A**

   $9 - 2I - I = 0 \Rightarrow 9 = 3I \Rightarrow I = 3$ A.

7. **charge**

   In steady state no net charge accumulates at a junction, so conservation of charge requires total current in to equal total current out.

8. **exponentially toward a final value**

   Charge rises exponentially toward $Q = CV$, fast at first then slowing.

9. **charge per unit time**

   $I = Q/t$ – charge flowing per second.

10. **EMF**

    The electromotive force (EMF) is the battery's energy per unit charge.

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