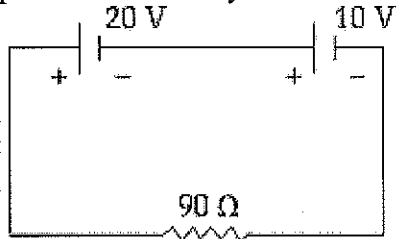


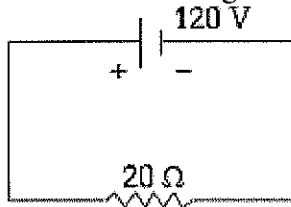
Name: _____ Date: _____
 Chapter 26 B Practice Test-Kirchoff's Rules and RC Circuits
 AP Physics C

1. In this circuit, two batteries, one with a potential difference of 10 V and the other with a potential difference of 20 V, are connected in series across a resistance of $90\ \Omega$. The power delivered by the 10-V battery is approximately



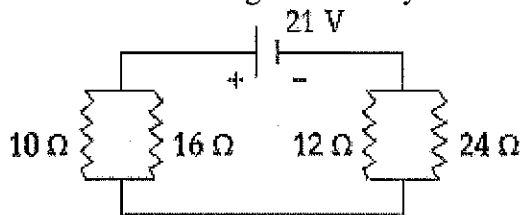
- A) 5.4 W B) 15 W C) 10 W D) 3.3 W E) 6.7 W

2. The current through the battery in the figure is approximately



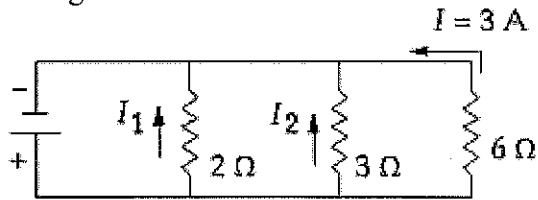
- A) 10 A B) 13 A C) 0.67 A D) 6.0 A E) None of these is correct.

3. The current I through the battery in this circuit is

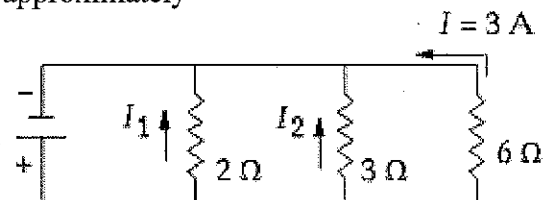


- A) 13 mA B) 3.0 A C) 15 mA D) 0.67 A E) None of these is correct.

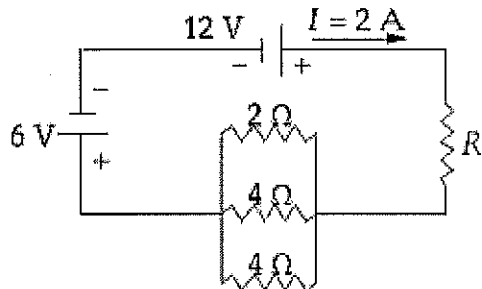
4. You connect resistors of $2\ \Omega$, $3\ \Omega$, and $6\ \Omega$ in parallel across a battery. The current through the $6\text{-}\Omega$ resistor is 3 A . What are the currents in the other two resistors?



- A) $I_1 = 9\text{ A}$; $I_2 = 6\text{ A}$
 B) $I_1 = 6\text{ A}$; $I_2 = 9\text{ A}$
 C) $I_1 = 1\text{ A}$; $I_2 = 1.5\text{ A}$
 D) The answer cannot be obtained without knowing the emf of the battery.
 E) None of these is correct.
5. You connect resistors of $2\ \Omega$, $3\ \Omega$, and $6\ \Omega$ in parallel across a battery. The current through the $6\text{-}\Omega$ resistor is 3 A . The power dissipated in the $3\text{-}\Omega$ resistor is approximately

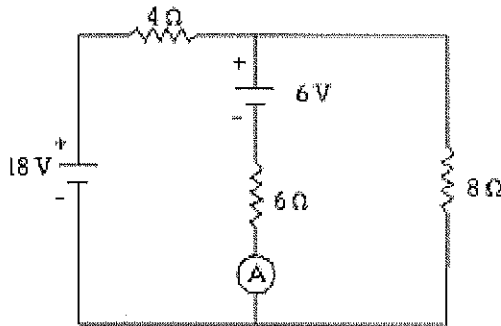


- A) 0.24 kW B) 0.11 kW C) 0.36 kW D) 0.54 kW E) 0.86 kW
6. The resistance of the unknown resistor (R) is



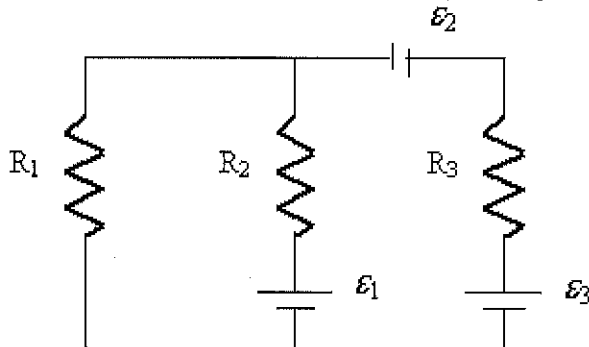
- A) $0.6\ \Omega$ B) $2\ \Omega$ C) $3\ \Omega$ D) $5\ \Omega$ E) $8\ \Omega$

7. In this circuit, the batteries have negligible internal resistance and the ammeter has negligible resistance. The current through the ammeter is



- A) 0.30 A B) 0.69 A C) 2.1 A D) 4.2 A E) 3.6 A

8. In the above circuit, $\mathcal{E}_1 = 9$ V, $\mathcal{E}_2 = 6$ V, and $\mathcal{E}_3 = 6$ V. Also $R_1 = 25$ Ω , $R_2 = 125$ Ω , and $R_3 = 55$ Ω . Find the current flowing through R_1 .



- A) 0.60 A B) 0.072 A C) 0.68 A D) 0.044 A E) 0.16 A

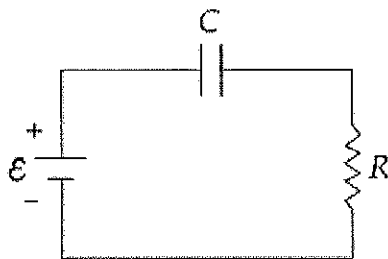
9. A battery is connected to a series combination of a switch, a resistor, and an initially uncharged capacitor. The switch is closed at $t = 0$. Which of the following statements is true?

- A) As the charge on the capacitor increases, the current increases.
- B) As the charge on the capacitor increases, the voltage drop across the resistor increases.
- C) As the charge on the capacitor increases, the current remains constant.
- D) As the charge on the capacitor increases, the voltage drop across the capacitor decreases.
- E) As the charge on the capacitor increases, the voltage drop across the resistor decreases.

10. A 20.0- μ F capacitor is charged to 200 V and is then connected across a 1000- Ω resistor. What is the initial current just after the capacitor is connected to the resistor?

- A) 100 mA B) 200 mA C) 150 mA D) 300 mA E) 50 mA

Use the following to answer question 11:



11. An uncharged capacitor and a resistor are connected in series to a battery as shown. If $\mathcal{E} = 15 \text{ V}$, $C = 20 \mu\text{F}$, and $R = 4.0 \times 10^5 \Omega$, the time constant of the circuit is approximately
A) 10 s B) 8.0 s C) 18 s D) 4.0 s E) 2.5 s
12. An uncharged capacitor and a resistor are connected in series to a battery as shown. If $\mathcal{E} = 15 \text{ V}$, $C = 20 \mu\text{F}$, and $R = 4.0 \times 10^5 \Omega$, the current as a function of time for this circuit is
A) $I(t) = 37.5 e^{0.250t} \mu\text{A}$ D) $I(t) = 37.5 e^{-0.125t} \mu\text{A}$
B) $I(t) = 150 e^{-0.250t} \mu\text{A}$ E) $I(t) = 300 e^{-0.125t} \mu\text{A}$
C) $I(t) = 37.5 e^{-0.250t} \mu\text{A}$
13. Doubling the resistance in an RC circuit
A) doubles the time constant of the circuit.
B) halves the time constant of the circuit.
C) has no effect on the time constant of the circuit.
D) has no effect on the rate at which energy is dissipated by the circuit.
E) None of these is correct.
14. Tony charges a capacitor and then discharges it through a resistor. He notices that, after two time constants, the voltage across the capacitor has decreased to _____ of its value just prior to the initiation of the discharge.
A) 0.368 B) 0.135 C) 0.0498 D) 0.0183 E) 0.00674

15. Which of the following statements is true concerning an ideal ammeter and an ideal voltmeter?
- A) both have infinite resistance
 - B) both have zero resistance
 - C) the ammeter has zero resistance, and the voltmeter has infinite resistance
 - D) the ammeter has infinite resistance, and the voltmeter has zero resistance
 - E) both have equal, finite resistances
16. You want to measure the current through and the voltage difference across a resistor. How should you connect the ammeter and voltmeter to the resistor?
- A) connect both meters in parallel
 - B) connect both meters in series
 - C) You should connect the ammeter in parallel and the voltmeter in series.
 - D) You should connect the ammeter in series and the voltmeter in parallel.
 - E) It does not matter how you connect the meters to the resistor.
17. A capacitor, initially uncharged, is connected in series to a $10\text{-k}\Omega$ resistor and a 9.0-V battery. What is the initial current in this circuit?
- | | |
|-----------------------------------|-----------------------------------|
| A) $6.0 \times 10^{-2} \text{ A}$ | D) 0.90 A |
| B) $9.0 \times 10^{-4} \text{ A}$ | E) $6.0 \times 10^{-5} \text{ A}$ |
| C) $5.4 \times 10^{-5} \text{ A}$ | |

Answer Key

1. D
2. D
3. E
4. A
5. B
6. B
7. B
8. D
9. E
10. B
11. B
12. D
13. A
14. B
15. C
16. D
17. B