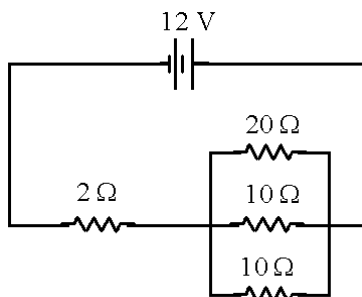


Circuits Practice Worksheet 18.1

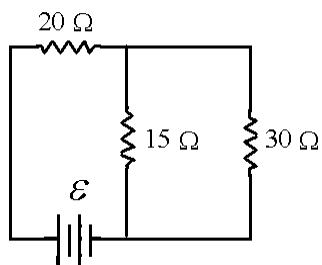
Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. How much power is being dissipated by one of the 10- Ω resistors?



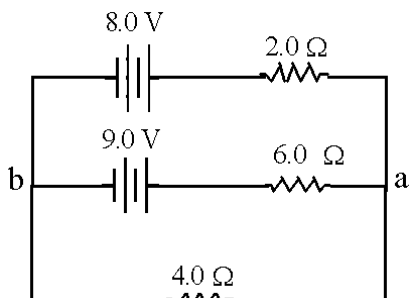
- a. 24 W
 b. 9.6 W
 c. 16 W
 d. 6.4 W
 e. 8.2 W
- _____ 2. If $\epsilon = 24$ V, at what rate is thermal energy generated in the 20- Ω resistor?



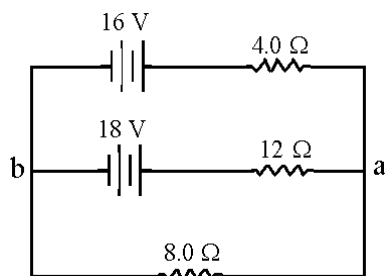
- a. 13 W
 b. 3.2 W
 c. 23 W
 d. 39 W
 e. 0.51 W
- _____ 3. If $R_1 < R_2 < R_3$, and if these resistors are connected in parallel in a circuit, which one has the highest current?
- a. R_1
 b. R_2
 c. R_3
 d. All have the same current.
 e. The answer depends on the internal resistance of the battery.

- _____ 4. Resistors of values $8.0\ \Omega$, $12.0\ \Omega$, and $24.0\ \Omega$ are connected in parallel across a fresh battery. Which resistor dissipates the greatest power?
- the $8.0\text{-}\Omega$ resistor
 - the $12.0\text{-}\Omega$ resistor
 - the $24.0\text{-}\Omega$ resistor
 - All dissipate the same power when in series.
 - The answer depends on the internal resistance of the battery.

- _____ 5. What is the current through the $2\text{-}\Omega$ resistor?

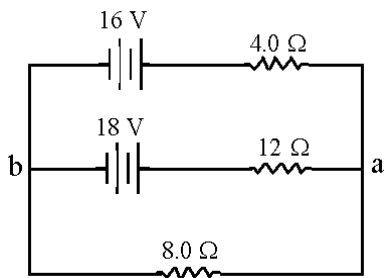


- 1.0 A
 - 0.50 A
 - 1.5 A
 - 2.0 A
 - 2.5 A
- _____ 6. What is the current through the $8\text{-}\Omega$ resistor?



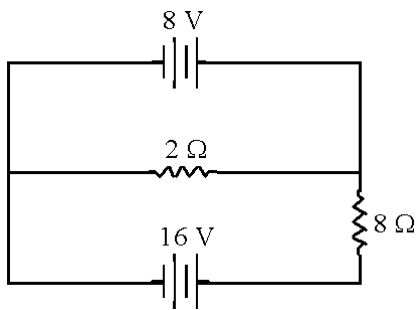
- 1.0 A
- 0.50 A
- 1.5 A
- 2.0 A
- 2.5 A

_____ 7. What is the potential difference between points a and b?



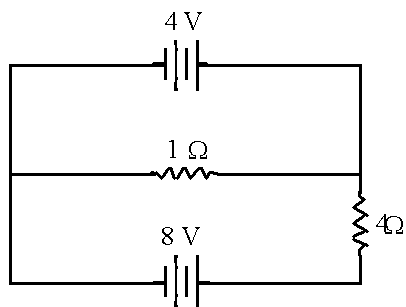
- a. 6 V
- b. 8 V
- c. 12 V
- d. 24 V
- e. 27 V

_____ 8. What is the current flowing through the 2-Ω resistor?



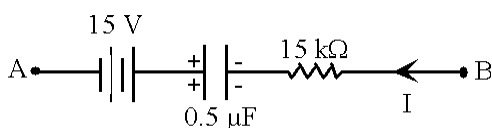
- a. 2 A
- b. 3 A
- c. 4 A
- d. 6 A
- e. 7 A

____ 9. What is the current flowing through the 4-Ω resistor?



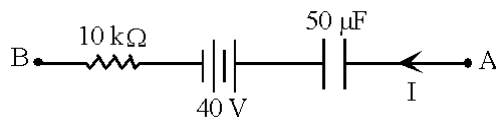
- a. 1 A
- b. 2 A
- c. 3 A
- d. 6 A
- e. 9 A

____ 10. In the circuit segment shown if $I = 7 \text{ mA}$ and $Q = 50 \mu\text{C}$, what is the potential difference, $V_A - V_B$?



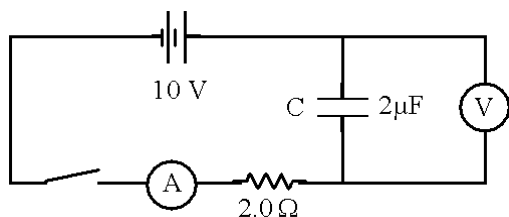
- a. -40 V
- b. +40 V
- c. +20 V
- d. -20 V
- e. -15 V

____ 11. If $I = 2.0 \text{ mA}$ and the potential difference, $V_A - V_B = +30 \text{ V}$ in the circuit segment shown, determine the charge and polarity of the capacitor.

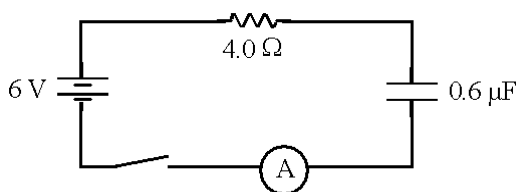


- a. 1.5 mC, left plate is positive
- b. 1.5 mC, right plate is positive
- c. 0.50 mC, left plate is positive
- d. 0.50 mC, right plate is positive
- e. 1.0 mC, left plate is positive

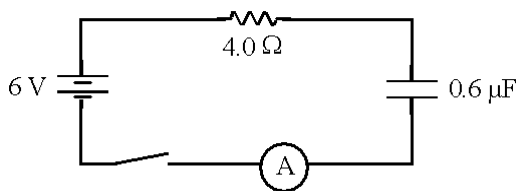
- _____ 12. A 10-V-emf battery is connected in series with the following: a $2\text{-}\mu\text{F}$ capacitor, a $2\text{-}\Omega$ resistor, an ammeter, and a switch, initially open; a voltmeter is connected in parallel across the capacitor. At the instant the switch is closed, what are the current and capacitor voltage readings, respectively?



- a. zero A, 10 V
 b. zero A, zero V
 c. 5 A, zero V
 d. 5 A, 10 V
 e. 20 A, 10 V
- _____ 13. A circuit contains a 6.0-V battery, a $4.0\text{-}\Omega$ resistor, a $0.60\text{-}\mu\text{F}$ capacitor, an ammeter, and a switch all in series. What will be the current reading immediately after the switch is closed?

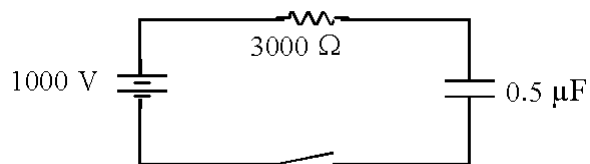


- a. zero
 b. 0.75 A
 c. 1.5 A
 d. 10 A
 e. 24 A
- _____ 14. A circuit contains a 6.0-V battery, a $4.0\text{-}\Omega$ resistor, a $0.60\text{-}\mu\text{F}$ capacitor, an ammeter, and a switch in series. What will be the charge on the capacitor 10 min after the switch is closed?

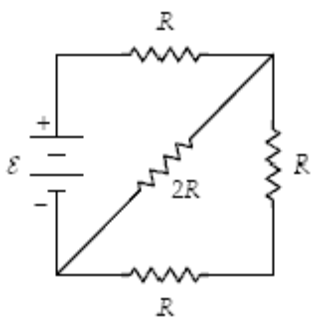


- a. zero
 b. $0.10\ \mu\text{C}$
 c. $3.6\ \mu\text{C}$
 d. $2.4\ \mu\text{C}$
 e. $1.2\ \mu\text{C}$

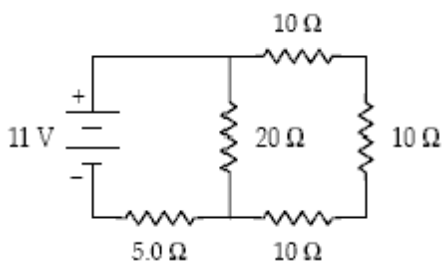
- _____ 15. A 1 000-V battery, a 3 000- Ω resistor and a 0.50- μ F capacitor are connected in series with a switch. The capacitor is initially uncharged. What is the value of the current the moment after the switch is closed?



- a. 0.39 A
 - b. 0.33 A
 - c. 0.84 A
 - d. 2 000 A
 - e. 1.0 A
- _____ 16. At what rate is thermal energy being generated in the $2R$ -resistor when $\varepsilon = 12$ V and $R = 3.0$ Ω ?

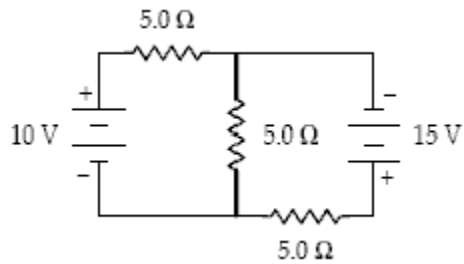


- a. 12 W
 - b. 24 W
 - c. 6.0 W
 - d. 3.0 W
 - e. 1.5 W
- _____ 17. What is the magnitude of the potential difference across the 20- Ω resistor?



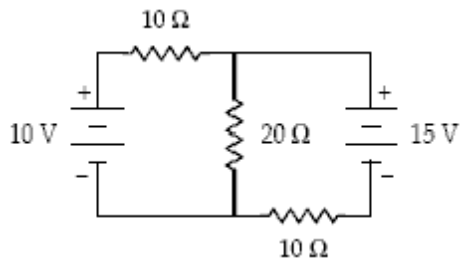
- a. 3.2 V
- b. 7.8 V
- c. 11 V
- d. 5.0 V
- e. 8.6 V

_____ 18. Determine the current in the 10-V emf.



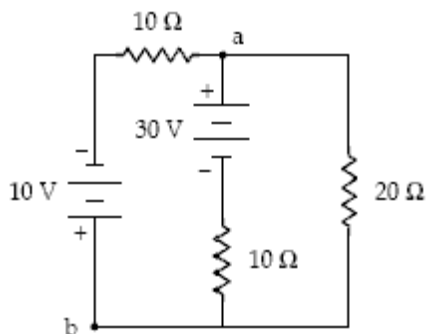
- a. 2.3 A
- b. 2.7 A
- c. 1.3 A
- d. 0.30 A
- e. 2.5 A

_____ 19. What is the magnitude of the current in the 20-Ω resistor?



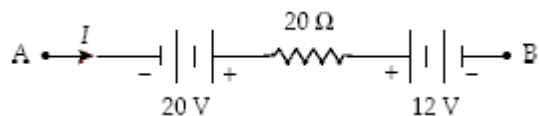
- a. 0.75 A
- b. 0.00 A
- c. 0.25 A
- d. 0.50 A
- e. 1.00 A

_____ 20. What is the potential difference $V_b - V_a$ shown in the circuit below.



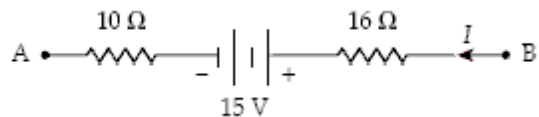
- a. -8.0 V
- b. +8.0 V
- c. -18 V
- d. +18 V
- e. -12 V

_____ 21. What is the potential difference $V_B - V_A$ when the $I = 1.5$ A in the circuit segment below?



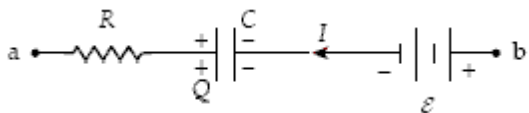
- a. +22 V
- b. -22 V
- c. -38 V
- d. +38 V
- e. +2.0 V

_____ 22. What is the potential difference $V_B - V_A$ when $I = 0.50$ A in the circuit segment shown below?

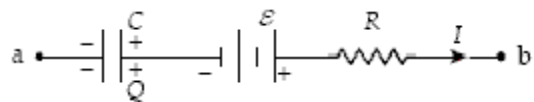


- a. +28 V
- b. +2.0 V
- c. -28 V
- d. -2.0 V
- e. +18 V

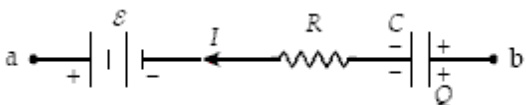
- _____ 23. If $R = 2.0 \text{ k}\Omega$, $C = 4.0 \text{ mF}$, $\varepsilon = 8.0 \text{ V}$, $Q = 20 \text{ mC}$, and $I = 3.0 \text{ mA}$, what is the potential difference $V_b - V_a$?



- a. +7.0 V
 - b. +19 V
 - c. +9.0 V
 - d. -3.0 V
 - e. -14 V
- _____ 24. If $R = 3.0 \text{ k}\Omega$, $C = 5.0 \text{ mF}$, $\varepsilon = 6.0 \text{ V}$, $Q = 15 \text{ mC}$, and $I = 4.0 \text{ mA}$, what is the potential difference $V_b - V_a$?

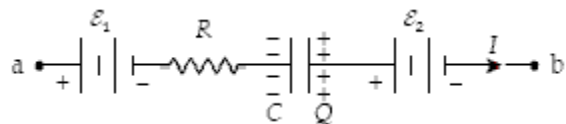


- a. -3.0 V
 - b. +9.0 V
 - c. -15 V
 - d. +21 V
 - e. -6.0 V
- _____ 25. If $R = 4.0 \text{ k}\Omega$, $C = 3.0 \text{ mF}$, $\varepsilon = 15 \text{ V}$, $Q = 12 \text{ mC}$, and $I = 2.0 \text{ mA}$, what is the potential difference $V_b - V_a$?

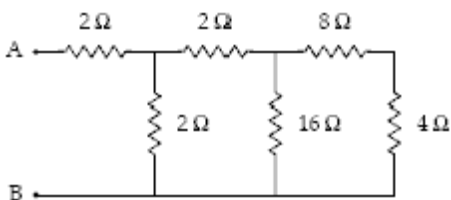


- a. +3.0 V
- b. -19 V
- c. -3.0 V
- d. +27 V
- e. +21 V

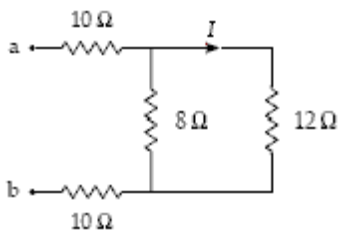
- _____ 26. If $R = 3.0 \text{ k}\Omega$, $C = 6.0 \text{ nF}$, $\epsilon_1 = 10.0 \text{ V}$, $Q = 18 \text{ nC}$, $\epsilon_2 = 6.0 \text{ V}$, and $I = 5.0 \text{ mA}$, what is the potential difference $V_b - V_a$?



- a. -13 V
 b. $+28 \text{ V}$
 c. $+13 \text{ V}$
 d. -28 V
 e. $+2.0 \text{ V}$
- _____ 27. If the current in the $4.0\text{-}\Omega$ resistor is 1.4 A , what is the magnitude of the potential difference, $V_A - V_B$?

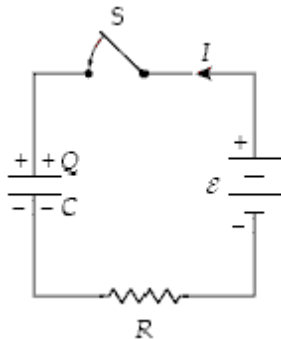


- a. 69 V
 b. 55 V
 c. 62 V
 d. 48 V
 e. 31 V
- _____ 28. If $I = 0.40 \text{ A}$ in the circuit segment shown below, what is the potential difference $V_a - V_b$?

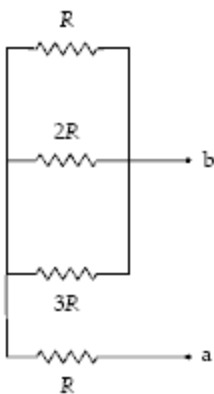


- a. 31 V
 b. 28 V
 c. 25 V
 d. 34 V
 e. 10 V

- _____ 29. At $t = 0$ the switch S is closed with the capacitor uncharged. If $C = 30 \mu\text{F}$, $\mathcal{E} = 50 \text{ V}$, and $R = 10 \text{ k}\Omega$, what is the potential difference across the capacitor when $I = 2.0 \text{ mA}$?

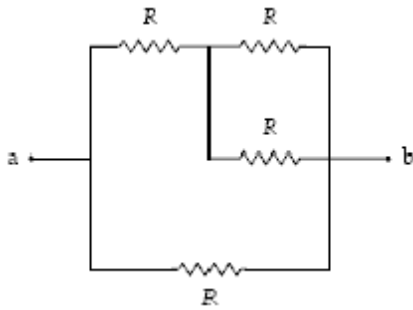


- a. 20 V
 - b. 15 V
 - c. 25 V
 - d. 30 V
 - e. 45 V
- _____ 30. What is the equivalent resistance between points a and b when $R = 13 \Omega$?



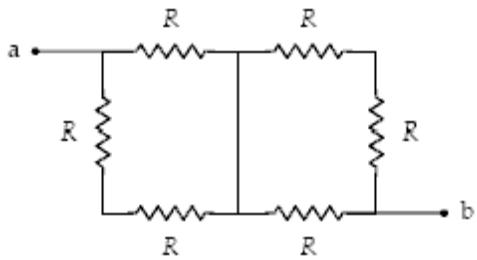
- a. 29Ω
- b. 23Ω
- c. 26Ω
- d. 20Ω
- e. 4.6Ω

____ 31. What is the equivalent resistance between points a and b when $R = 30 \Omega$?



- a. 27Ω
- b. 21Ω
- c. 24Ω
- d. 18Ω
- e. 7.5Ω

____ 32. What is the equivalent resistance between points a and b when $R = 12 \Omega$?



- a. 20Ω
- b. 16Ω
- c. 24Ω
- d. 28Ω
- e. 6.0Ω

Circuits Practice Worksheet 18.1

Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: 2
TOP: 18.1 Sources of emf | 18.2 Resistors in Series | 18.3 Resistors in Parallel
2. ANS: A PTS: 1 DIF: 3
TOP: 18.1 Sources of emf | 18.2 Resistors in Series | 18.3 Resistors in Parallel
3. ANS: A PTS: 1 DIF: 1
TOP: 18.1 Sources of emf | 18.2 Resistors in Series | 18.3 Resistors in Parallel
4. ANS: A PTS: 1 DIF: 2
TOP: 18.1 Sources of emf | 18.2 Resistors in Series | 18.3 Resistors in Parallel
5. ANS: A PTS: 1 DIF: 3
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
6. ANS: C PTS: 1 DIF: 3
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
7. ANS: C PTS: 1 DIF: 3
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
8. ANS: C PTS: 1 DIF: 2
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
9. ANS: A PTS: 1 DIF: 2
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
10. ANS: D PTS: 1 DIF: 3
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
11. ANS: A PTS: 1 DIF: 3
TOP: 18.4 Kirchhoff's Rules and Complex DC Circuits
12. ANS: C PTS: 1 DIF: 2 TOP: 18.5 RC Circuits
13. ANS: C PTS: 1 DIF: 2 TOP: 18.5 RC Circuits
14. ANS: C PTS: 1 DIF: 2 TOP: 18.5 RC Circuits
15. ANS: B PTS: 1 DIF: 2 TOP: 18.5 RC Circuits
16. ANS: C PTS: 2 DIF: Average
17. ANS: B PTS: 2 DIF: Average
18. ANS: A PTS: 3 DIF: Challenging
19. ANS: D PTS: 3 DIF: Challenging
20. ANS: A PTS: 3 DIF: Challenging
21. ANS: B PTS: 2 DIF: Average
22. ANS: A PTS: 2 DIF: Average
23. ANS: C PTS: 2 DIF: Average
24. ANS: A PTS: 2 DIF: Average
25. ANS: C PTS: 2 DIF: Average
26. ANS: D PTS: 2 DIF: Average
27. ANS: D PTS: 3 DIF: Challenging
28. ANS: C PTS: 2 DIF: Average
29. ANS: D PTS: 2 DIF: Average
30. ANS: D PTS: 2 DIF: Average

- | | | |
|------------|--------|--------------|
| 31. ANS: D | PTS: 2 | DIF: Average |
| 32. ANS: B | PTS: 2 | DIF: Average |