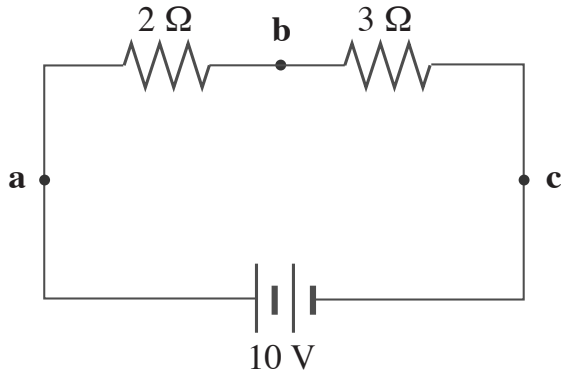# DC Circuits Practice Items

The diagram below pertains to questions 1-6.

1. In what manner does current flow through the circuit?

    A. clockwise
    B. counter-clockwise
    C. there is no current
    D. alternating current

2. What is the value of the current at point **a**?

    A. 0 A
    B. 2.0 A
    C. 5.0 A
    D. 8.3 A

3. What is the value of the current at point **b**?

    A. 0 A
    B. 2.0 A
    C. 5.0 A
    D. 8.3 A

4. What is the potential difference between points **b** and **c**?

    A. − 6 V
    B. 2 V
    C. 6 V
    D. 10 V

5. What is the potential difference between points **c** and **a**?

    A. − 10 V
    B. − 2 V
    C. 2 V
    D. 10 V

6. If the two resistors in the circuit are heating elements submerged in 0.5 liters of water, approximately how long would it take to raise the temperature 1 °C?

    A. 25 seconds
    B. 0.5 seconds
    C. almost two minutes
    D. about two hours

The diagram below pertains to questions 7 - 12.
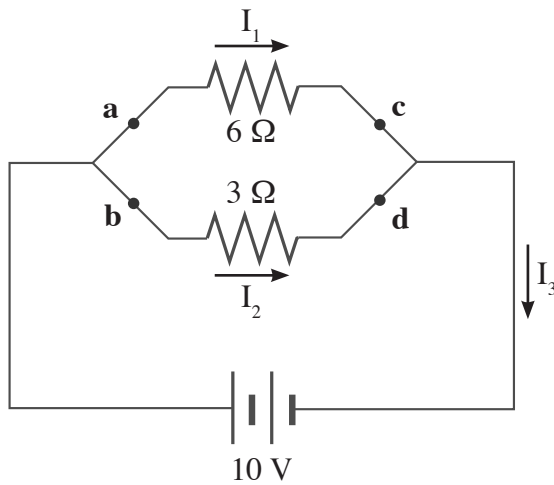
7. In the circuit pictured above, what is the potential difference between points **b** and **c**?

    A. − 10 V

    B. − 3.3 V

    C. 3.3 V

    D. 10 V

8. What is the value of I_3?

    A. 1.1 A

    B. 3.3 A

    C. 5 A

    D. 20 A

9. What is the value of I_2?

    A. 1.1 A

    B. 3.3 A

    C. 5 A

    D. 20 A

10. What is the value of the power consumption of the entire circuit?

    A. 2.0 W

    B. 10 W

    C. 20 W

    D. 50 W

11. Assuming the power supply remained unchanged in delivering 10V to the external circuit, if the wire were cut at point b, which of the following would occur?

    A. I_1 would increase

    B. I_1 would decrease

    C. I_2 would increase

    D. I_3 would decrease

12. Which of the following statements is **untrue**?

    A. I_2 is twice the value of I_1

    B. $I_1 + I_2 = I_3$

    C. The power consumption of the 6 Ω resistor is equal to the power consumption of the 3 Ω resistor.

    D. all are true

The diagram below pertains to questions 13 - 15.

The diagram below pertains to questions 16 - 17.
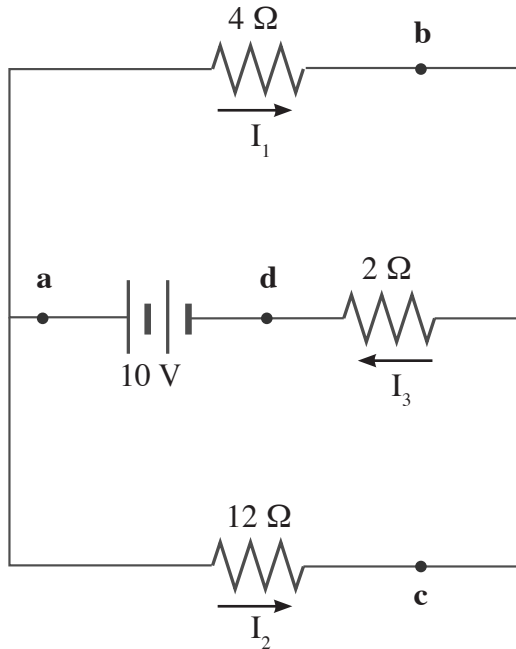
13. What is the value of I_3?

  A. 0.63 A
  B. 2.0 A
  C. 3.3 A
  D. 8.3 A

14. What is the value of the power consumed by the 12 Ω resistor?

  A. 6 W
  B. 3 W
  C. 72 W
  D. 25/3 W

15. Which of the following statements is **untrue**?

  A. The potential difference between points b and c is zero.
  B. I_1 is greater than I_2.
  C. The potential difference between points b and d is 10 V.
  D. All are true.
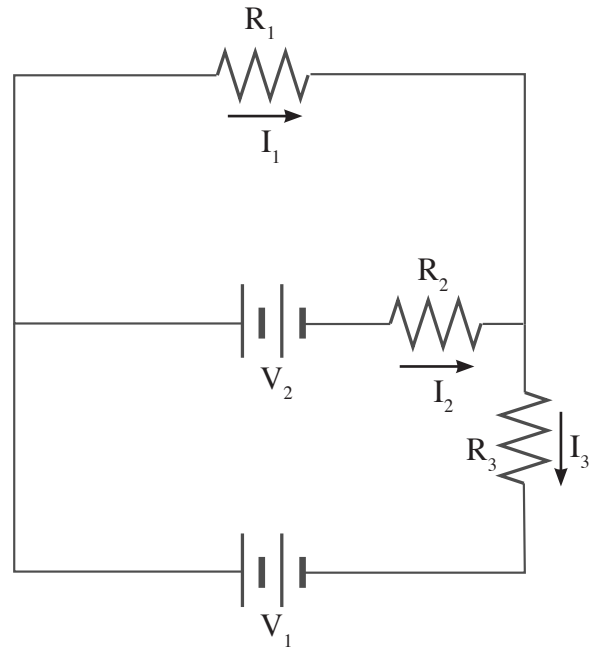
16. Which of the following expressions is incorrect?

  A. $V_1 - I_1 R_1 - I_3 R_3 = 0$
  B. $V_1 - V_2 - I_2 R_2 - I_3 R_3 = 0$
  C. $I_1 + I_2 = I_3$
  D. all are correct

17. If instead of the voltage source, V_2, a fully charged capacitor were present at that same position in the circuit, which of the following would occur?

  A. I_1 would equal I_3.
  B. The rest of the circuit would attain a net positive charge.
  C. I_1 would be greater than I_3.
  D. The voltage drop across the capacitor would be equal and opposite to V_1.

The diagram below pertains to questions 18 - 20.
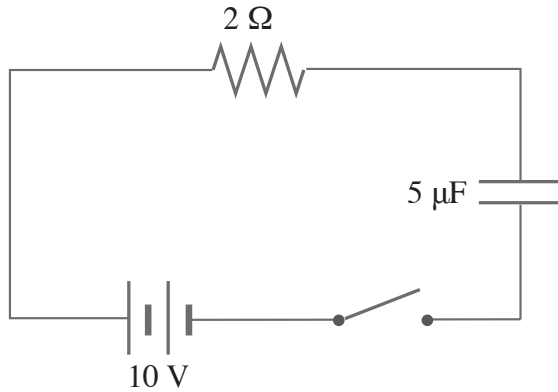
18. In the RC circuit above, what is the maximum rate of power consumption by the resistor?

    A. 5 W
    B. 25 W
    C. 50 W
    D. 100 W

19. When the capacitor has been fully charged, how much charge will it hold?

    A. 50 μC
    B. 50 mC
    C. 2.0 C
    D. 2.0×10^6 C

20. Which of the following statements predicts the behavior of the circuit?

    A. Immediately after the switch has been closed, the potential drop will be entirely across the resistor.
    B. After the capacitor has been fully charged, the potential drop will be entirely across the capacitor.
    C. Employing a dielectric within the capacitor will increase the amount of charge stored in the fully charged capacitor.
    D. all of the above