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Continuing Education Course #201
Electrical Engineering Fundamentals
for Non-Electrical Engineers

1. A Farad is the SI unit for Inductance. (True or False)
- a. True
- b. False

2. Hertz can also be expressed as cycles per second. (True or False)
- a. True
- b. False

3. What does the following symbol represent?

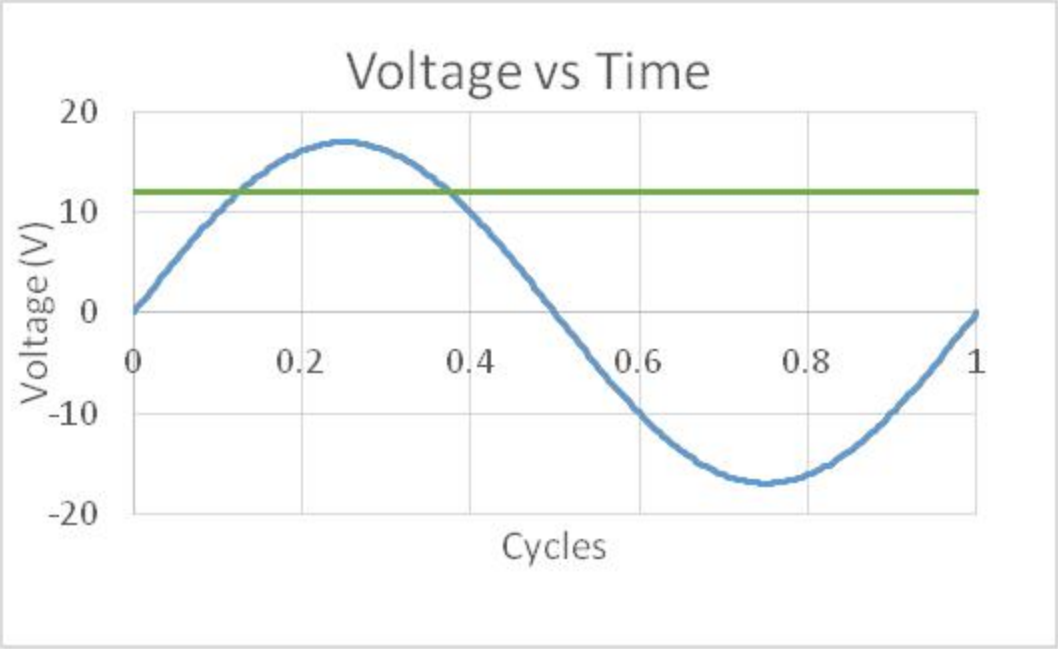
- a. AC Source
- b. Capacitor
- c. DC Source
- d. Inductor

4. In an ideal DC source, describe the voltage over time.
- a. The voltage is represented by a sine wave. The positive and negative terminals change polarity at some frequency, f.
- b. The voltage is constant over time. The positive and negative terminals change polarity at some frequency, f.
- c. The voltage is represented by a sine wave. The positive and negative terminals always remain the same polarity.
- d. The voltage is constant over time. The positive and negative terminals always remain the same polarity.

5. There are two conventions for current flow, conventional current flow and electron flow. (True or False)
- a. True
- b. False

6. Which of the following is the name of this equation, $V=I*R$?
- a. Faraday's Law
- b. Lenz's Law
- c. Kirchoff's Law
- d. Ohm's Law

7. The horizontal green line in this figure represents which of the following?

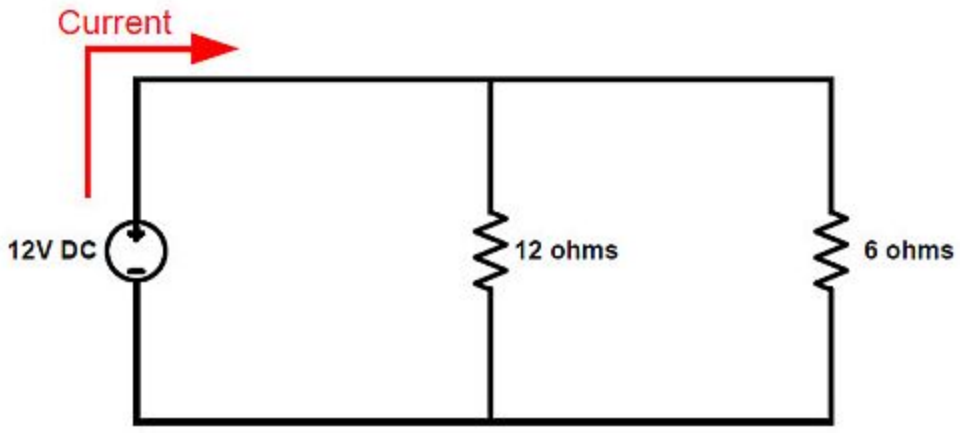


- ○ a. Peak voltage
- ○ b. Peak to peak voltage
- ○ c. RMS voltage
- ○ d. Transient voltage

8. What is the **peak** voltage that you would expect to see from hot to neutral in a household outlet?

- ○ a. Approximately 110-120V
- ○ b. Approximately 130-140V
- ○ c. Approximately 155-175V
- ○ d. Approximately 330-350V

9. The following figure represents a parallel circuit. (True or False)

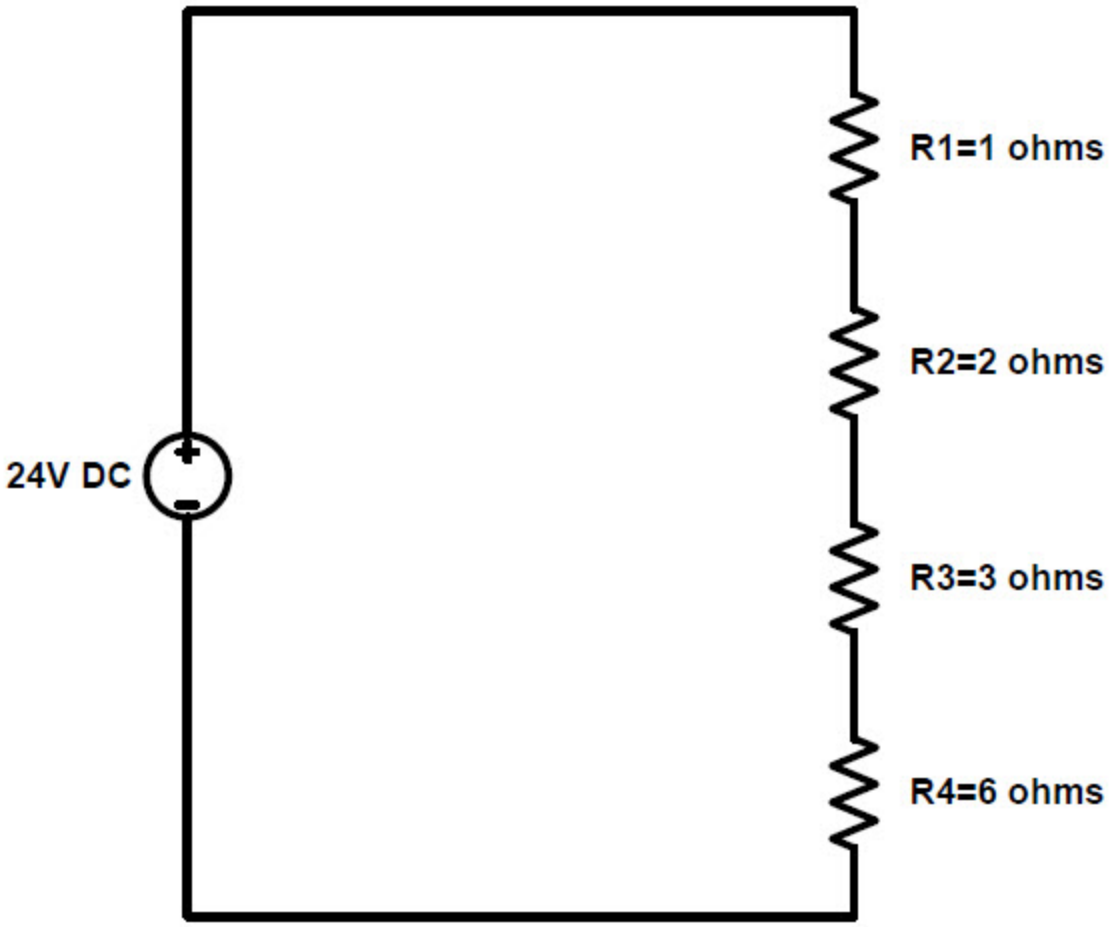


- ○ a. True
- ○ b. False

10. In a parallel circuit, more current will flow through the branch that has a higher resistance. (True or False)

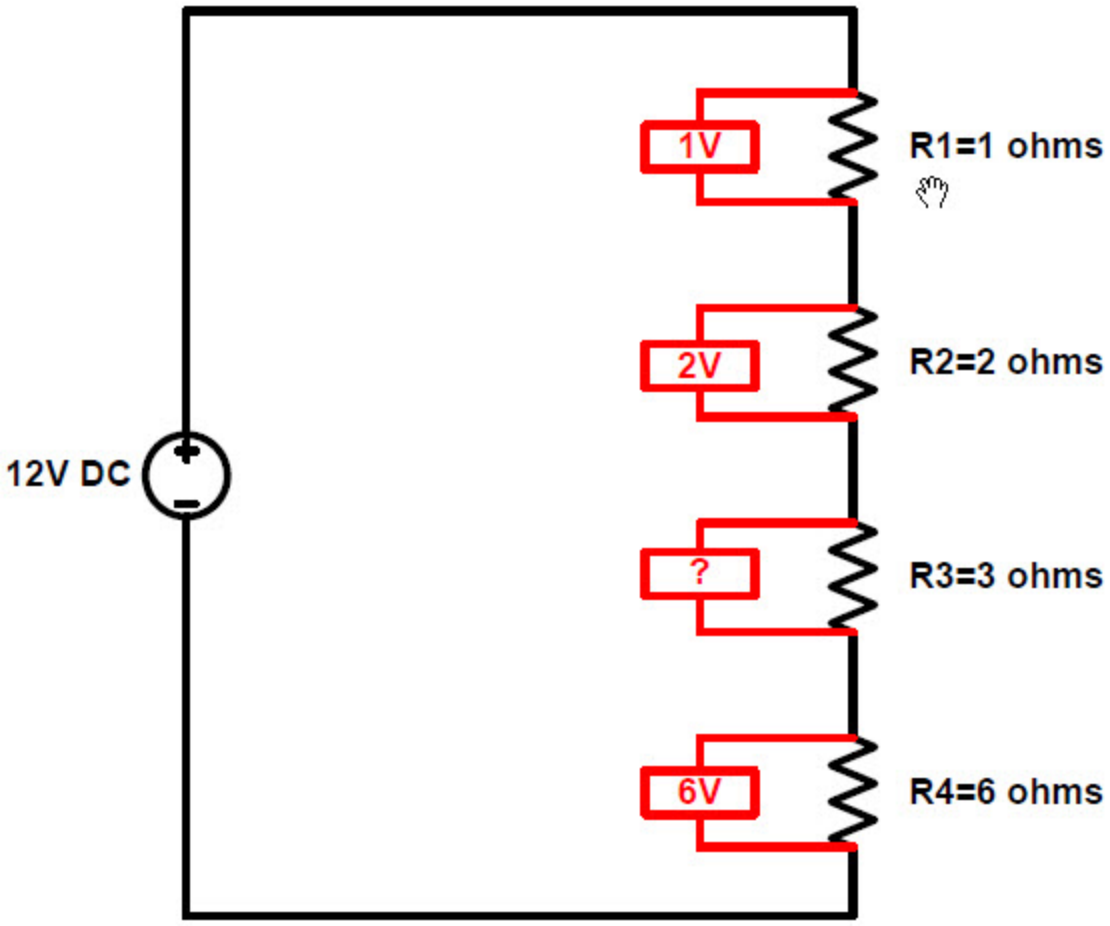
- ○ a. True
- ○ b. False

11. In the following series circuit, the same current will flow through every resistor. (True or False)



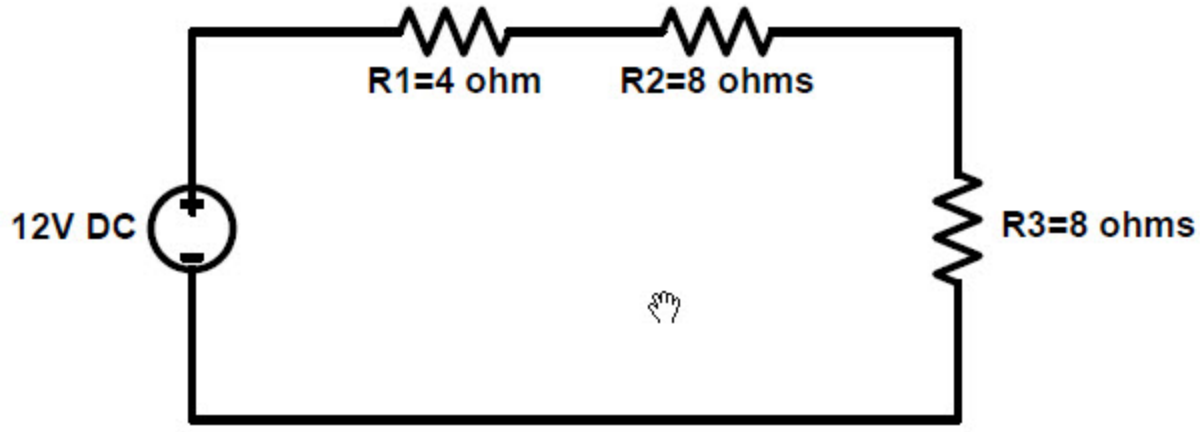
- a. True
- b. False

12. In the following series circuit, the missing voltage value is:



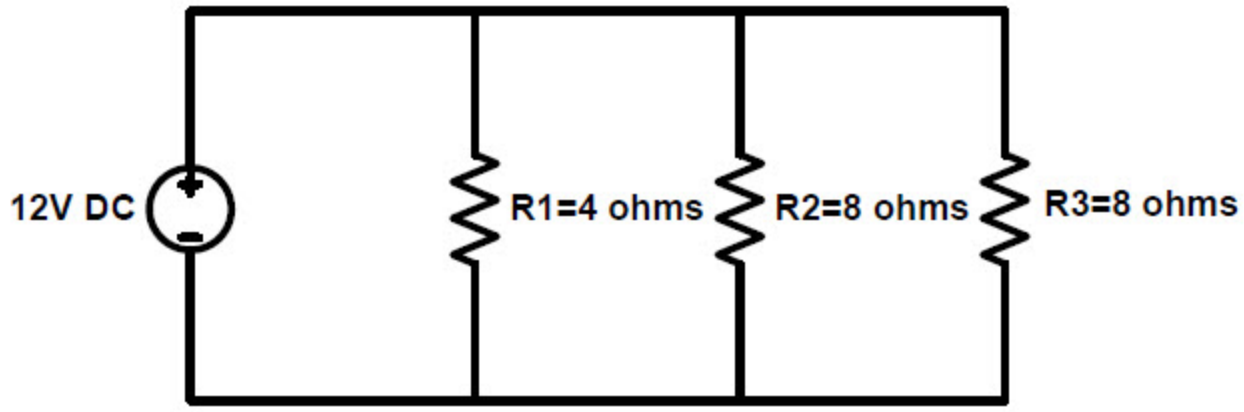
- a. 1V
- b. 2V
- c. 3V
- d. Not enough information to determine the voltage.

13. This is a _____ circuit and the total resistance of this circuit is_____.



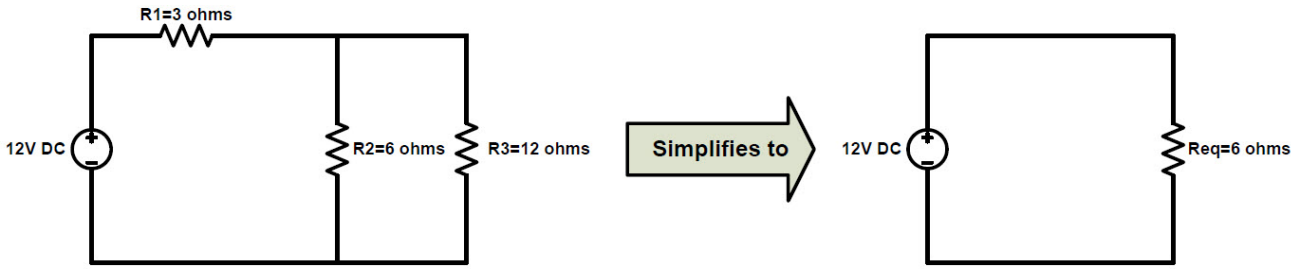
- a. Series; 2 Ω
- b. Parallel; 2 Ω
- c. Series; 20 Ω
- d. Parallel; 20 Ω

14. This is a _____ circuit and the total resistance of this circuit is_____.



- a. Series; 2 Ω
- b. Parallel; 2 Ω
- c. Series; 20 Ω
- d. Parallel; 20 Ω

15. The first circuit can be simplified by combining the resistors to form the second circuit. Hint: Calculate total resistance. (True or False)

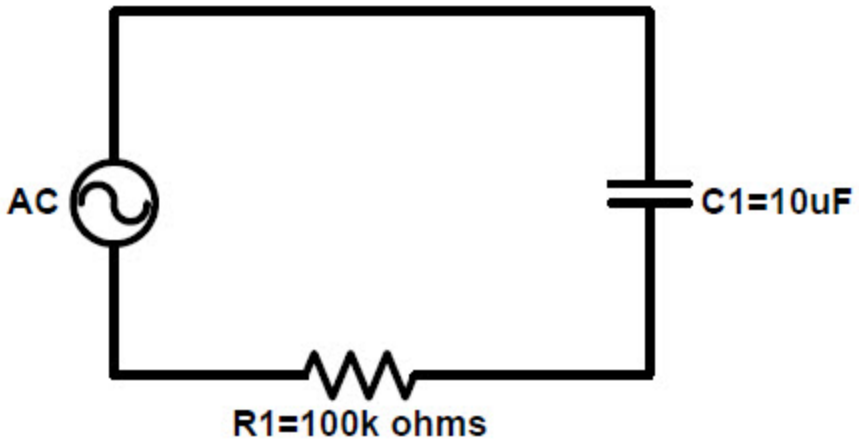


- a. True
- b. False

16. Which of the following factors **does not** affect the capacitance?

- a. Dielectric material
- b. Distance between the plates
- c. Geometry
- d. Henries

17. What is the time constant, τ, of this circuit?



- a. 0.1 nanoseconds
- b. 0.1 seconds
- c. 1 second
- d. 10 seconds

18. The time constant for an inductor is $\tau_L = \frac{L}{R}$. (True or False)

- a. True
- b. False

19. An inductor has a fully charged magnetic field and the voltage supply to the inductor is removed (i.e. switch is opened). Assume the inductor has a discharge path through a resistor. The discharging inductor will attempt to keep current flowing in the same direction. (True or False)

- a. True
- b. False

20. The imaginary number j has the following value:

- a. √1
- b. √(-1)
- c. √π
- d. √(-π)

21. Impedance is the opposition to current flow in an AC circuit. (True or False)

- a. True
- b. False

22. Which of the following terms is in the capacitive reactance (X_c) equation?

- a. Amps
- b. Frequency
- c. Henries
- d. Volts

23. Capacitive impedance is in the negative imaginary direction. (True or False)

- a. True
- b. False

24. Kirchoff's voltage law states that the algebraic sum of the voltage in any closed loop is equal to zero. (True or False)

- a. True
- b. False

25. Kirchoff's current law states that the current leaving a resistor is equal to zero.

- a. True
- b. False