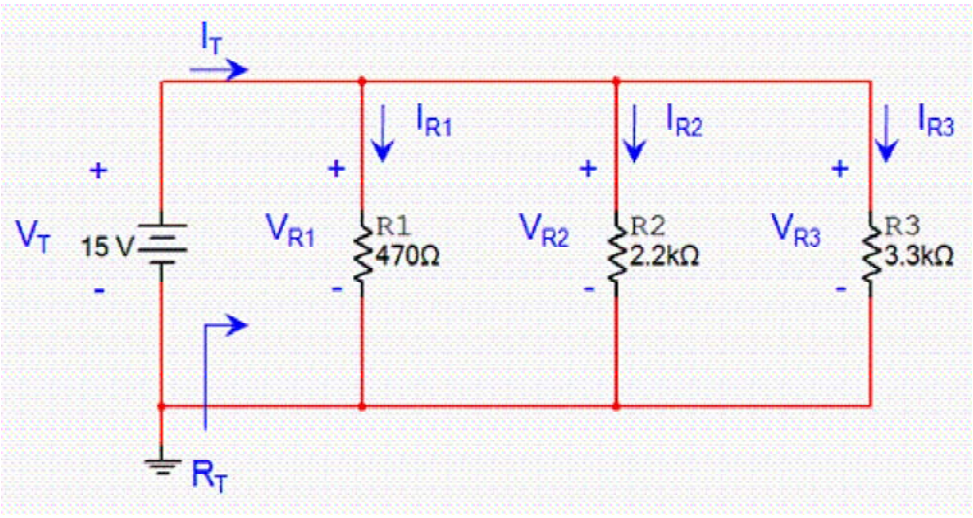
Name: _____ **Class:** _____ **Date:** _____ **ID: A**

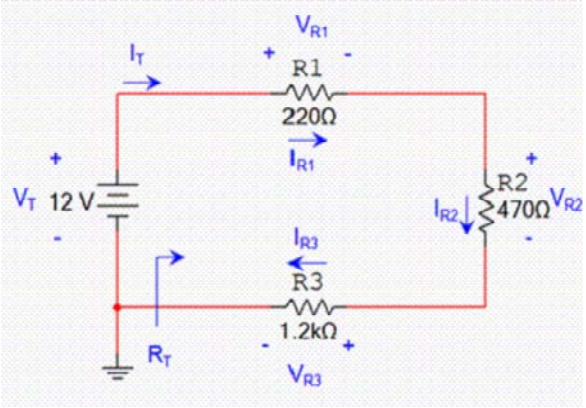
POE Practice Test - Electricity, Power, & Energy

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

1. Which of the following forms of energy is NOT a fossil fuel?
   a. Uranium
   b. Natural Gas
   c. Oil
   d. Coal
2. Select the INEXHAUSTABLE energy source.
   a. Coal
   b. Biomass
   c. Uranium
   d. Wind
3. Select the RENEWABLE energy source
   a. Coal
   b. Natural Gas
   c. Uranium
   d. Biomass
4. A motor running a winch system can lift a 3 N load 6 meters in 60 seconds while running at an average of 9 volts and drawing 500 mA. What is the efficiency of this system to the nearest tenth of a percent?
   a. 0.15%
   b. 6.67%
   c. 30%
   d. 85%
5. A light bulb with 15 ohms of resistance is hooked up to a 1.5 volt battery. The current running through the light bulb will be _____.
   a. 0.10 amps.
   b. 0.67 amps.
   c. 10.0 amps.
   d. 22.5 amps.
6. 

   Calculate I_T
   a. 0.12 A
   b. 0.86 A
   c. 0.043 A
   d. 1.5 A
   e. none of these

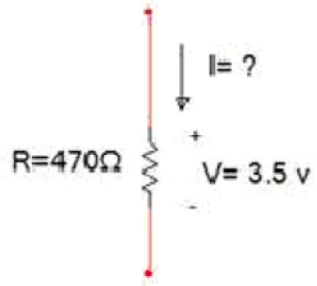
Name: _____ **ID: A**

7. 

At which resistor will the voltage drop be greatest?

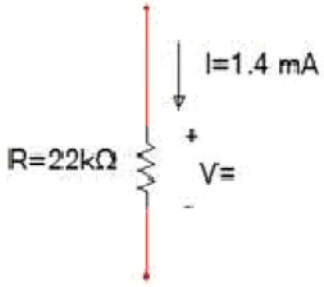
a. R1
b. R2
c. R3
d. All resistors experience the same voltage.
e. Not enough information to know.

8. Use Olm's law to calculate the unknown quantity



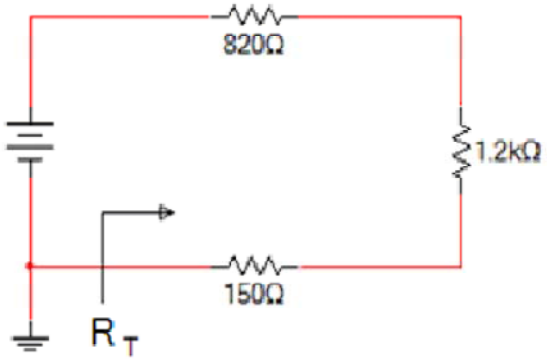
a. 1645 A
b. 134 A
c. 7 mA
d. 700 mA
e. none of the above.

9. Use Ohm's Law to calculate the unknown quantity.

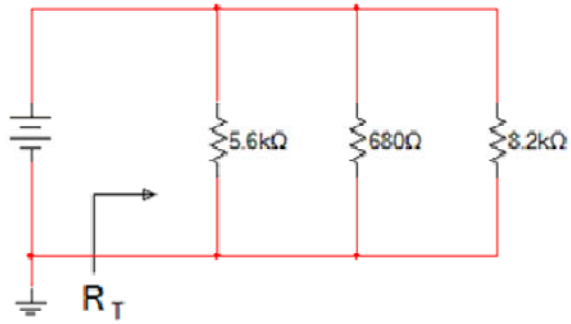


a. 30.8 V
b. 0.308 mV
c. 30.8 mV
d. 30.8 kV
e. none of the above

10. Calculate total resistance R_T



a. 114.7 ohms
b. 971.2 ohms
c. 150 ohms
d. 2170 ohms
e. none of the above

11. 

a. 694 ohms
b. 5600 ohms
c. 565 ohms
d. 14,500 ohms
e. none of the above.

12. Two lamps are wired in parallel. If another lamp is added in parallel.
    a. The voltage will drop.
    b. The total current stay the same.
    c. The total resistance will increase.
    d. The total resistance will decrease.

13. When measuring _____, the multimeter is placed within the circuit.
    a. volts
    b. amps
    c. watts
    d. resistance

14. Electromotive force is another term for _____.
    a. current
    b. RPMs
    c. resistance
    d. voltage

15. The images in Figures 7 and 8 show the voltmeter configurations that two different POE students used to take a voltage reading within a simple circuit. Only one of the two students was able to measure the voltage value in the simple circuit. Use the information given in the figures to answer the following questions.
    a. Which of the two setups (Figure 7 or Figure 8) shows the correct way to measure voltage?
    b. If the amount of current in the circuit is equal to 0.625A, what is the voltage value of the power supply?

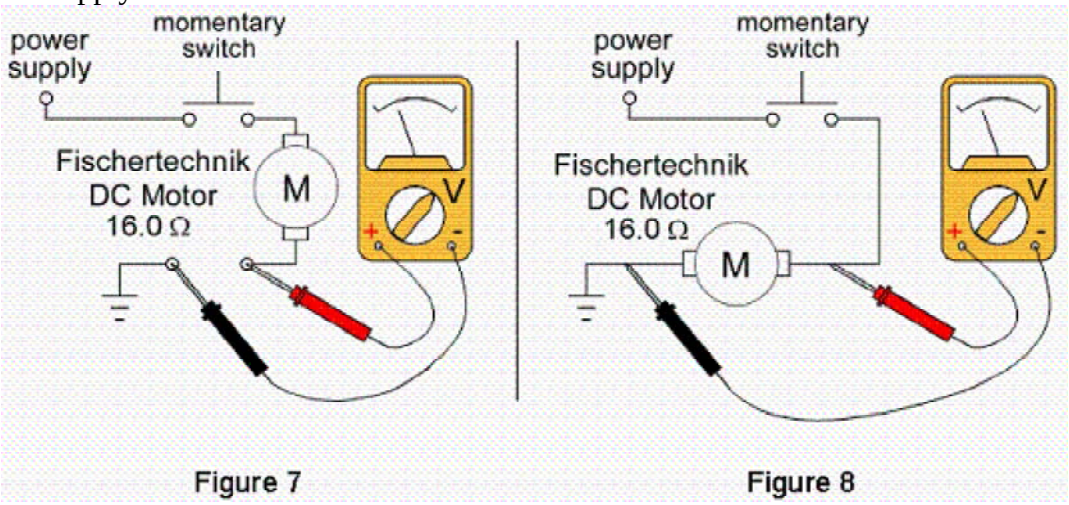


Figure 7 Figure 8

    a. Figure 8, 25.6 Volts
    b. Figure 8, 10 Volts
    c. Figure 7, 25.6 Volts
    d. Figure 7, 10 Volts

16. Study the circuit in Figure 8. Which of the following electrical properties is being measured by the multimeter?

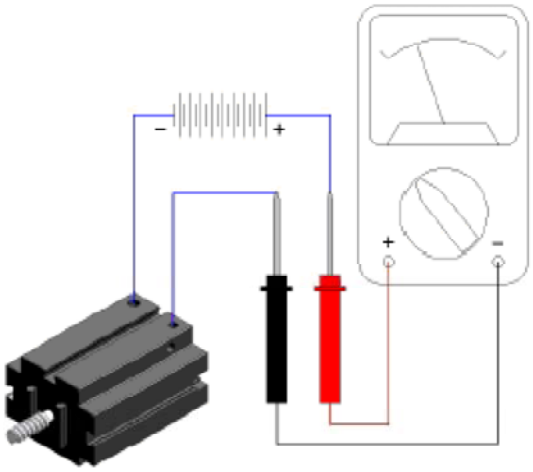
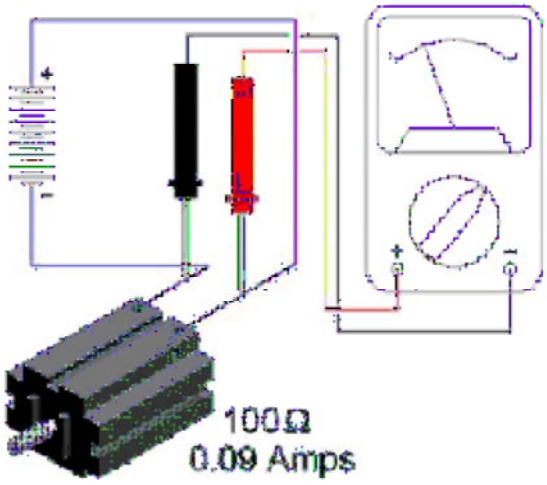


Figure 8

a. RPMs
b. Current
c. Resistance
d. Voltage

17. If the motor shown below draws 0.09 Amps and provides 100 Ohms of resistance, how many Volts should the multimeter read?



a. 90
b. 0.9
c. 900
d. 9
e. none of the above.

18. If one light bulb burns out in a string of lights, and the rest stay lit, it is reasonable to assume that the lights are wired in
a. line
b. series
c. parallel
d. not enough information to know

19. What is the power supply voltage if the ammeter displays a value of 2.0A every time the switch is pressed?

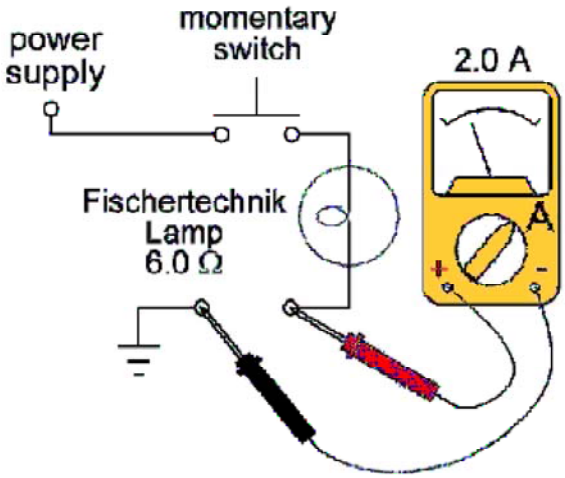


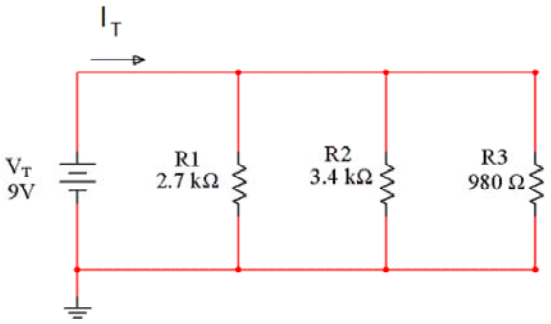
Figure 6

a. 9 volts
b. 12 volts
c. 3 volts
d. 6 volts

20. Two resistors with 15 ohms of resistance each are connected in series to a 1.5-volt battery. The current running through the system will be _____.
a. 0.50 amps
b. 0.05 amps
c. 1.0 amps
d. 0.2 amps
e. none of these

21. In a series circuit, increasing the resistance while keeping voltage the same will cause the current to:
a. stay the same
b. increase
c. decrease
d. go to zero

22. A circuit has an applied voltage of 120 volts and a current of 250 mA. What is the resistance in the circuit?
    a. 30 kilo-ohms
    b. 2.1 ohms
    c. 480 ohms
    d. 0.48 ohms



23. The current across R1 would be _____.
    a. 0.3 A
    b. 300 A
    c. 0.003 A
    d. 3.33 A

24. The total current I_T would be _____.
    a. 9 A
    b. 0.015 mA
    c. 9 mA
    d. 15.15 mA

25. The voltage across R2 would be _____.
    a. 2.65 V
    b. 9 V
    c. 5.6 V
    d. 3 V

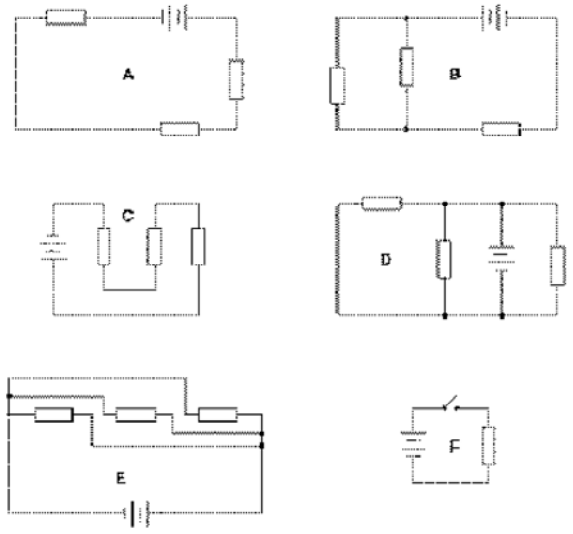
26. The total resistance in the circuit above would be _____.
    a. 986 ohms
    b. 6080 ohms
    c. 594 ohms
    d. 5940 ohms

27. Suppose you need to place a 5-kg block of ice onto the shelf of a freezer 2.0 m high. The ice will soon start melting, so you must place the ice in the freezer in 10 s. How much power will you need?
    a. 1 W
    b. 10 W
    c. 2.5 W
    d. 25 W

Name: _____ **ID: A**

Multiple Response
Identify one or more choices that best complete the statement or answer the question.

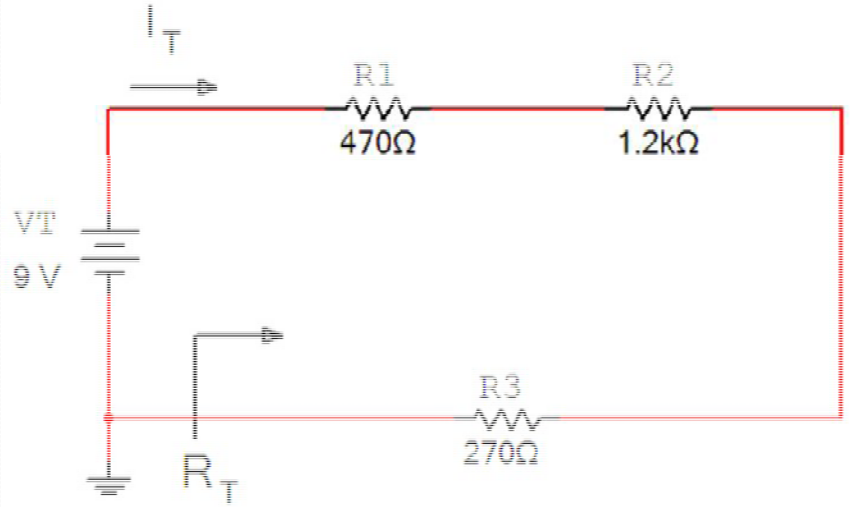
28. Identify which of these circuits is a *series* circuit (there may be more than one shown!)



a. A
b. B
c. C
d. D
e. E
f. F

Problem

29. Using the laws of circuit theory, solve for R_T, I_T, V_{R1}, V_{R2}, and V_{R3}. Be sure to put your answer in proper engineering notation and use the correct units.



30. A weightlifter lifts barbells of 200 Newtons above his head to a height of 2 metres. How much work does he do?

31. If a weightlifter lifts 2000 Newtons to a height of 2 metres in 4 seconds, how powerful is he?

32. Three students set up a mechanical winch with FischerTechniks parts and lift a 75g weight 50 cm in 10 seconds. The students use a multimeter to measure 12.0 volts in the system and the winch needs 125 mA to lift the weight. Calculate the input power of the system.