CP Physics Unit 10   Copy: _____
PreTest

<u>Directions:</u>   Use the formulas below to help answer questions on the test. DO NOT WRITE ON THIS TEST

Formulas: $V = IR$ $P = VI$ $P = I^2 R$ $E = P t$ $E = I^2 R t$ $R = \rho L/A$

   1 e⁻ = 9.11 x 10⁻³¹ kg   1 p⁺ = 1.67 x 10⁻²⁷ kg
   1 e⁻ = -1.6 x 10⁻¹⁹ C   1 p⁺ = 1.6 x 10⁻¹⁹ C

Units: <u>Volts(V)</u> = Joules / Coulombs (J/C)   <u>Power(P)</u> = Watts (Joules/sec)
        Energy(E) = Joules (Nm)   <u>Amps (I)</u> = Coulombs / second (C/s)
        Energy(E)= KWH   Ohms(R) = Volts/Amps (Js/C²)

    <u>Series Circuits:</u>   <u>Parallel:</u>
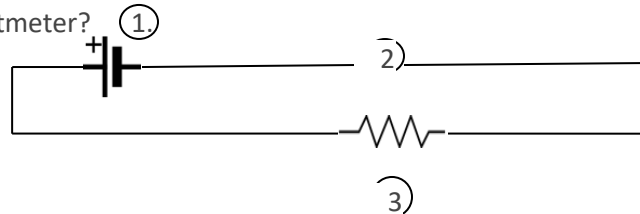
    $V_T = V_1 + V_2 + V_3 +$ .... $V_T = V_1 = V_2 = V_3 =$ ....
    $I_T = I_1 = I_2 = I_3 =$ .... $I_T = I_1 + I_2 + I_3 +$ ....
    $R_T = R_1 + R_2 + R_3 +$ .... $1/R_T = 1/R_1 + 1/R_2 + 1/R_3 +$ ....

1. The most dangerous thing about electricity is:
   a. the voltage and amperes together
   b. the amperes alone
   c. the volts alone
   d. you can't see it moving

2. Which meter in the circuit below is a voltmeter?

   a.   1   b. 2   c. 3

3. Three 6 Ω resistors are connected in parallel. Their total resistance is:
   a. 6 Ω   b. 2 Ω   c. 18 Ω   d. 216 Ω

4. Which change in a circuit would increase the current flow?
   a. decrease voltage   b. decrease ohms   c. longer wires

5. Decreasing the resistance of a wire by a factor of 2 causes the heat (energy) produced in the resistor
   to change by a factor of:
   a. 4   b. 2   c. 1.41   d. ¼

6. A 4 A current flows through a 20 Ω resistor. The voltage drop across this resistor is:
   a. 0.2 V   b. 5 V   c. 24 V   d. 80 V

7. Which letter is on the positive side of the device shown below?

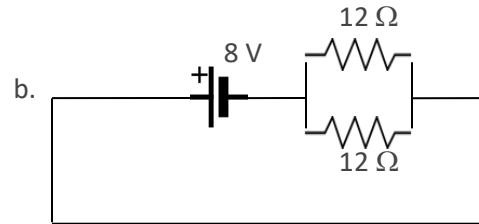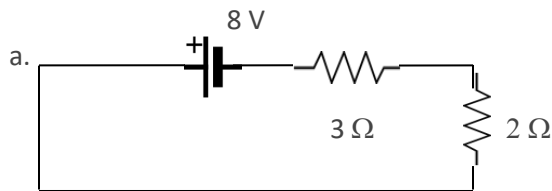   A| |B
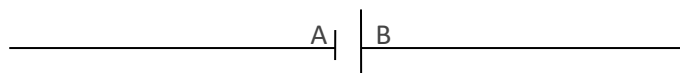
8. In order to deep power losses due to heat production to a minimum when transmitting electricity over long distances, the _____ is kept very high while the _____ is kept very low.

   a. ohms, voltage   b. voltage, amps   c. amps, temperature

9. Which circuit would draw the least current?
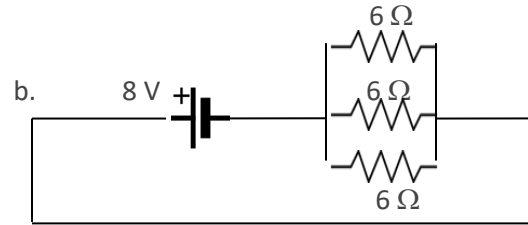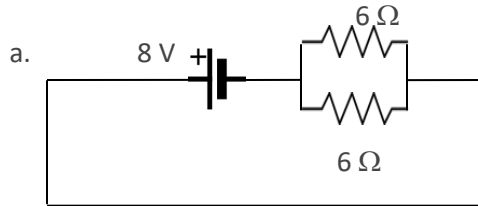
10. Which circuit would draw the least current?

11. A 1 Ω resistor, a 1000 Ω resistor, and a 2000 Ω resistor are connected in series. The total resistance is:

   a. > 3000 Ω   b. > 2000 Ω   c. > 1000 Ω   d. < 1 Ω

12. The unit for a volt is:
   a. C/s   b. J/s   c. N/ C   d. J/ C

13. The unit for an Ampere is:
   a. C/S   b. J/s   c. N/C   d. J/C

14. Why might a carbon-zinc battery explode if someone tries to recharge it?
   a. Zinc oxidizes to produce an explosive reaction
   b. An internal resistance is too high, creating heat
   c. Safety feature made by battery companies, so you need to buy more
   d. no one really knows, it is a secret

15. The following are all reasons why your home is connected in parallel instead of series, EXCEPT:
   a. Connecting in parallel doesn't increase the total resistance
   b. Connecting parallel allows you to hook up as many appliances to a circuit as you want
   c. Allows outlets to work independently
   d. Keeps a constant voltage drop across all outlets

16. Voltage drops are the same as the power source in a _____ circuit.
   a. crooked   b. short   c. series   d. parallel

17. The voltage drops across 3 resistors in series are:
    a. Always different when resistors vary in value
    b. Equal to the value of the resistor
    c. Always equal
    d. Equal only when the resistors are different in value

18. The reason you are told not to plug in too many appliances into an outlet is:
    a. the resistance become too high
    b. the resistance becomes too low
    c. the voltage gets out of hand
    d. the amperes become too low

19. The sum of the current flowing through each resistor is equal to the original current in what type of circuit?
    a. crooked   b. short   c. series   d. parallel

20. The symbol that represents a battery in a circuit diagram is:

    a.   b.   c.   d.
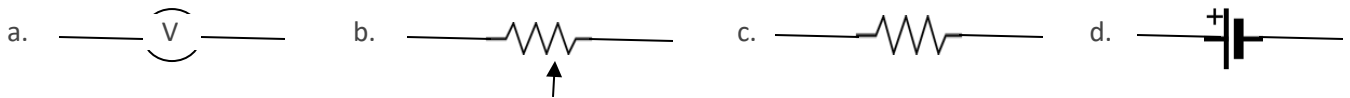
21. Which one of the following represents energy?
    a. Coulombs   b. Watts   c. KWH   d. Amperes

22. The function of a fuse is to regulate:
    a. Amperes   b. Ohms   c. Volts   d. KWH

23. The main reason the Cadmium-Nickel battery is rechargeable is:
    a. It costs more than other batteries
    b. They have a special receptacle on the battery for recharging
    c. The atoms are small enough to accept the charging
    d. The atoms are large enough to accept the charging

24. A light bulb is 80 % efficient. This means.. (Choose two answers)
    a. 80% of the energy used is lost to heat
    b. 80% of the energy used is converted to light
    c. 20% of the energy used is lost to heat
    d. 20% of the energy is never used

25. The unit on an appliance that helps you directly determine the cost of operation is:
    a. joules   b. volts   c. amps   d. watts

26. Resistivity refers to:
    a. the type of material
    b. the length of a wire
    c. the cross sectional area of a wire
    d. all of these
    e. none of these

27. The product of volts times amperes equals:
    a. joules per coulomb
    b. amperes per joule
    c. resistance
    d. watts

28. Increasing the current in a resistor by a factor of 3 causes the heat (energy) produce by the resistor
    to change by a factor of:
    a. 9   b. 3   c. 1/3   d. 1/9

29. A battery supplies 30 V to a motor. Every 4 C of charge that passes through the motor delivers
    _____ J to the motor.
    a. 4   b. 7.5   c. 30   d. 120

30. The symbol use to represent a variable resistor (rheostat) is:

    a.   b.   c.   d.

31. If a 240 V lamp is connected to a 120 V circuit, which of the following would most likely to happen?
    a. the lamp would glow brightly
    b. the lamp wouldn't have enough energy to work
    c. the4 fuse that controls that part of the circuit would burn out
    d. the lamp would burn out

32. When connecting a voltmeter and an ammeter in an electric circuit you should:
    a. connect the voltmeter in parallel and the ammeter in series
    b. connect the voltmeter in series and the ammeter in parallel
    c. connect both instruments in series
    d. connect both instruments in parallel

33. Which of the following is true about the resistance of a connecting wire in a circuit?
    a. the larger the cross-sectional area of a wire, the less the resistance
    b. the shorter the wire, the greater the resistance
    c. the longer the wire, the less the resistance
    d. the smaller the cross-sectional area of a wire, the less the resistance

34. How much charge is transferred by a 5.0 Amp DC current in 8.0 minutes?
    a. 2400 C   b. 96 C   c. 40 C   d.   5 C

35. The larger the resistivity the better conductor the material is:
    a. True   b. False

36. A 12 V battery is used to operate a circuit with two lamps in parallel. If one lamp burn out:
    a. both lamps will continue t light
    b. the battery will lose its charge rapidly
    c. the other lamp will not light
    d. the other lamp will continue to light

37. If a 100 Ω resistor and a 25 Ω resistor are connect in series and then in parallel, which connection
    would give the greater combined resistance?
    a.   Both connections would have the same resistance
    b.   The problem is not practically workable
    c.   The series connection would have the greater resistance
    d.   The parallel connection would have the greater resistance

38. An electric iron rated at 1000 W is operated for 45 min. If the cost per KWH is $0.07. What did it
    cost to run the electric Iron?
    a. 3150 cents   b. $3.15   c. 10.71 cents   d. 5.25 cents

39. When resistors of 20 Ω , 30 Ω and 40 Ω are connected in series to a battery the voltage drop is
    greatest across which resistor?
    a. 20 Ω   b. 30 Ω   c. 40 Ω   d. equal for all three

40. A 240 V circuit is protected by a 15 Amp fuse. The maximum power that this circuit can supply
    without blowing the fuse:
    a.   16 Watts   b. 3600 Watts   c. 225 Watts   d. 360 Watts

Use the below diagram for questions 41,42, and 43.
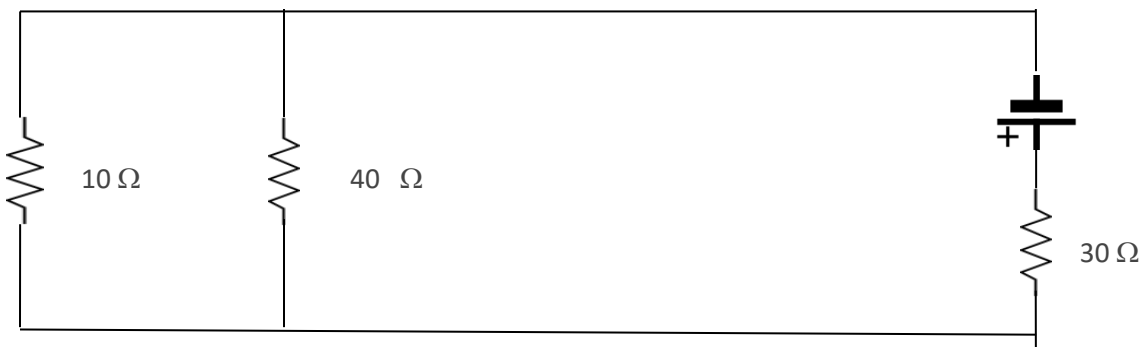
41. If the current in the 10 Ω resistor is 1.0 Amp, the current in the 40 Ω resistor is:
    a. 0.25 A   b. 0.50 A   c. 1.0 A   d. 4.0 A   e. impossible to determine without volts

42. The resistor that produced the most heat (energy) is:
    a. 10 Ω   b. 40 Ω   c. the parallel combination   d. 30 Ω

43. V is equal to the sum of the voltages across:
    a. the 40 Ω and the 30 Ω resistors
    b. the 10 Ω and the 40 Ω resistors
    c. the 10 Ω , 40 Ω   and 30 Ω resistors
    d. the question cannot be answered without more information

Use the diagram below to answer questions 44 – 50
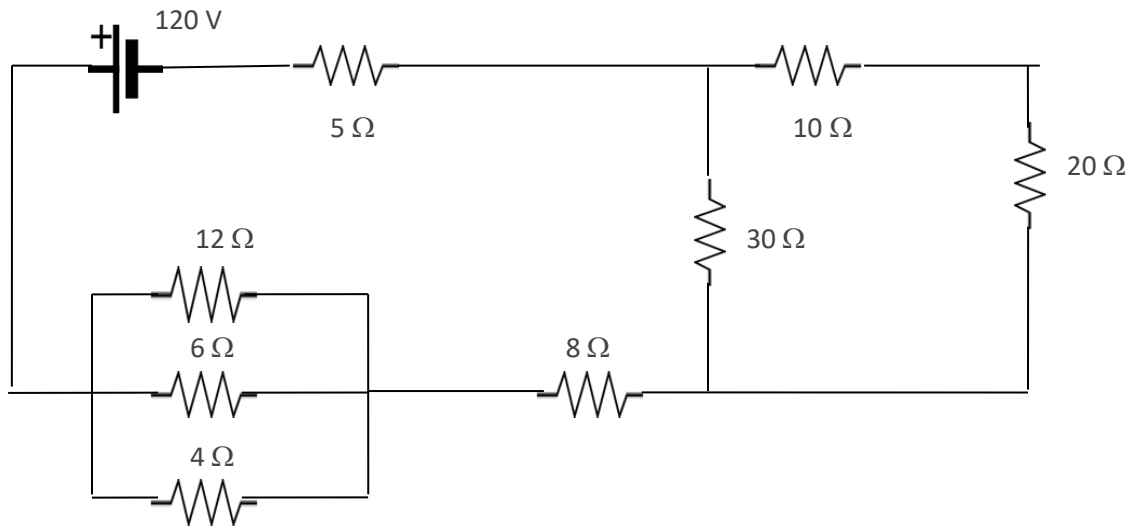
44. Calculate the total resistance in the previous circuit:
   a. 75 Ω   b. 30 Ω   c. 50 Ω d. 95 Ω

45. Calculate the Voltage Drop for the 5 Ω resistor:
   a. 120 V   b. 20 V   c. 5 V   d. 30 V

46. Calculate the Voltage Drop for the 6 Ω resistor:
   a. 120 V   b. 16 V   c. 8 V   d. 1.25 V

47. Calculate the Voltage Drop for the 20 Ω resistor:
   a. 120 V   b. 40 V   c. 20 V   d. 80 V

48. Calculate the Amperes in the 30 Ω resistor:
   a. 4 A   b. 1.5 A c. 2 A   d. 0.6 A

49. Calculate the Amperes in the 8 Ω resistor:
   a. 4 A   b. 1.5 A c. 2 A   d. 0.6 A

50. Calculate the Amperes in the 4 Ω resistor:
   a. 4 A   b. 1.5 A c. 2 A   d. 0.6 A

Bonus: Place your answer on the answer sheet, be sure to circle your answer so not to confuse it with
        other work. 3 pts.

In a faraway land there dwelt two races. The Ananias were inveterate liars, while the Diogenes were
unfailingly veracious (truthful). Once upon a time, a stranger visited the land, and on meeting a party of
three inhabitants, inquired to what race they belonged. The first murmured something that the
stranger did not catch. The second remarked, "He said he was an Anania". The third said to the second,
"You're a liar" Now the question is, of what race was this THIRD person? Why?   3 pts.