

Chapter 1 Basic Electricity and Magnetism

MULTIPLE CHOICE

1. ____ is the simplest atom.

- | | |
|-------------|-----------|
| a. Oxygen | c. Carbon |
| b. Hydrogen | d. Helium |

ANS: B PTS: 1

2. ____ is an atomic particle that has a negative charge

- | | |
|------------|------------------------|
| a. Proton | c. Sub-Atomic Particle |
| b. Neutron | d. Electron |

ANS: D PTS: 1

3. ____ is an atomic particle that has no charge

- | | |
|------------|------------------------|
| a. Proton | c. Sub-Atomic Particle |
| b. Neutron | d. Electron |

ANS: B PTS: 1

4. ____ is an atomic particle that has a positive charge

- | | |
|------------|------------------------|
| a. Proton | c. Sub-Atomic Particle |
| b. Neutron | d. Electron |

ANS: A PTS: 1

TRUE/FALSE

1. Copper, Silver and Gold are considered to be a good conductor of electricity because are precious metals.

ANS: F

Because each metal has one electron in its outer orbit

PTS: 1

2. When an atom has several electrons in its outer orbit it is considered to be an insulator

ANS: T PTS: 1

3. Energy – is the substance of which a physical object is composed.

ANS: F

Matter – is the substance of which a physical object is composed.

PTS: 1

4. Electron flow in an electric circuit is known as current flow.

ANS: T PTS: 1

5. An electric circuit is the complete path of an electric current, along with any necessary elements, such as power source and a load.

ANS: T PTS: 1

6. The voltage in a series circuit is the same for each device.

ANS: F

The voltage in a series circuit is completely used by all the loads in the circuits.

The voltage of a series circuit changes through each load.

This change is called voltage drop.

PTS: 1

7. Like the series circuit the parallel circuit has only one path for the voltage to follow.

ANS: F

The Parallel circuit has more than one path for the electrons to flow.

PTS: 1

8. The current draw in a parallel circuit is determined for each part of the circuit, depending on the resistance of that portion of the circuit.

ANS: T PTS: 1

9. The total current draw of the entire parallel circuit can not be determined.

ANS: F

The total current draw of the entire parallel circuit is the sum of the currents in the individual sections of the parallel circuit.

PTS: 1

COMPLETION

1. A _____ is the smallest particle of a substance that has the properties of that substance.

ANS: molecule

PTS: 1

2. An atom is basically made up of three parts. _____, _____, and _____.

ANS: Proton, Neutron, Electrons

PTS: 1

3. The nucleus is made up of _____ and _____.

ANS: protons, neutrons

PTS: 1

4. When the circuit is complete so that the current can flow, it is termed _____.

ANS: closed

PTS: 1

5. When the path of the current flow is interrupted, the circuit is termed _____.

ANS: open

PTS: 1

6. The _____ circuit allows only one path of current flow through the circuit.

ANS: series

PTS: 1

SHORT ANSWER

1. What is the law of electric charges state?

ANS:

The Law of Electric Charges states that like charges repel and unlike charges attract.

PTS: 1

2. Write the formula for finding the resistance in a series circuit.

ANS:

The total resistance in a series circuit is the sum of all the resistances in the circuit

$$R_t = R_1 + R_2 + R_3 + R_4 + R \dots$$

PTS: 1

3. Write the formula for two resistors in parallel.

ANS:

$$R_t = (R_1 * R_2) / (R_1 + R_2)$$

PTS: 1

PROBLEM

1. Complete the following:

Resistance = _____

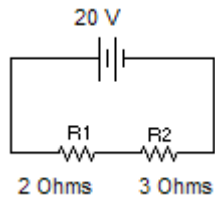
Voltage = 120Volts

Current = 20Amps

ANS:

Resistance = 6ohms

PTS: 1



2.

Find the following:

$R_t =$ _____ ohms

$I_t =$ _____ amps

$I_{r1} =$ _____ amps

$I_{r2} =$ _____ amps

$V_{r1} =$ _____ volts

$V_{r2} =$ _____ volts

$P_t =$ _____ watts

$P_{r1} =$ _____ watts

$P_{r2} =$ _____ watts

ANS:

$R_t = 5$ ohms

$I_t = 4$ amps

$I_{r1} = 4$ amps

$I_{r2} = 4$ amps

$V_{r1} = 8$ volts

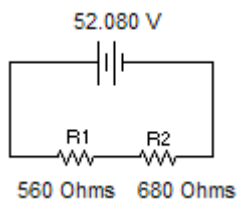
$V_{r2} = 12$ volts

$P_t = 80$ watts

$P_{r1} = 32$ watts

$P_{r2} = 48$ watts

PTS: 1



3.

Find the following:

$R_t =$ _____ ohms

$I_t =$ _____ amps

$I_{r1} =$ _____ amps

$I_{r2} =$ _____ amps

$V_{r1} =$ _____ volts

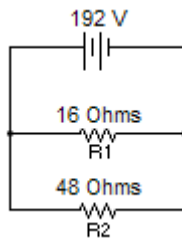
$V_{r2} =$ _____ volts

$P_t = \underline{\hspace{2cm}}$ watts
 $P_{r1} = \underline{\hspace{2cm}}$ watts
 $P_{r2} = \underline{\hspace{2cm}}$ watts

ANS:

$R_t = 1240$ ohms
 $I_t = 42$ amps
 $I_{r1} = 42$ amps
 $I_{r2} = 42$ amps
 $V_{r1} = 23.520$ volts
 $V_{r2} = 28.559$ volts
 $P_t = 2.1873$ watts
 $P_{r1} = 0.9878$ watts
 $P_{r2} = 1.1995$ watts

PTS: 1



4.

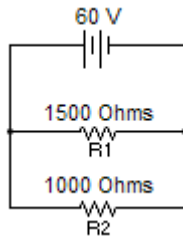
Find the following:

$R_t = \underline{\hspace{2cm}}$ ohms
 $I_t = \underline{\hspace{2cm}}$ amps
 $I_{r1} = \underline{\hspace{2cm}}$ amps
 $I_{r2} = \underline{\hspace{2cm}}$ amps
 $V_{r1} = \underline{\hspace{2cm}}$ volts
 $V_{r2} = \underline{\hspace{2cm}}$ volts
 $P_t = \underline{\hspace{2cm}}$ watts
 $P_{r1} = \underline{\hspace{2cm}}$ watts
 $P_{r2} = \underline{\hspace{2cm}}$ watts

ANS:

$R_t = 12$ ohms
 $I_t = 16$ amps
 $I_{r1} = 12$ amps
 $I_{r2} = 4$ amps
 $V_{r1} = 192$ volts
 $V_{r2} = 192$ volts
 $P_t = 3072$ watts
 $P_{r1} = 2304$ watts
 $P_{r2} = 768$ watts

PTS: 1



5.

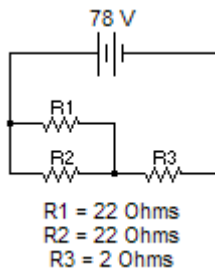
Find the following:

$R_t = \underline{\hspace{2cm}}$ ohms
 $I_t = \underline{\hspace{2cm}}$ amps
 $I_{r1} = \underline{\hspace{2cm}}$ amps
 $I_{r2} = \underline{\hspace{2cm}}$ amps
 $V_{r1} = \underline{\hspace{2cm}}$ volts
 $V_{r2} = \underline{\hspace{2cm}}$ volts
 $P_t = \underline{\hspace{2cm}}$ watts
 $P_{r1} = \underline{\hspace{2cm}}$ watts
 $P_{r2} = \underline{\hspace{2cm}}$ watts

ANS:

$R_t = 600$ ohms
 $I_t = 100$ amps
 $I_{r1} = 40$ amps
 $I_{r2} = 60$ amps
 $V_{r1} = 60$ volts
 $V_{r2} = 60$ volts
 $P_t = 6$ watts
 $P_{r1} = 2.4000$ watts
 $P_{r2} = 3.5999$ watts

PTS: 1



6.

Find the following:

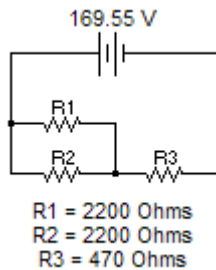
$R_t = \underline{\hspace{2cm}}$ ohms
 $I_t = \underline{\hspace{2cm}}$ amps
 $I_{r1} = \underline{\hspace{2cm}}$ amps
 $I_{r2} = \underline{\hspace{2cm}}$ amps
 $I_{r3} = \underline{\hspace{2cm}}$ amps
 $V_{r1} = \underline{\hspace{2cm}}$ volts
 $V_{r2} = \underline{\hspace{2cm}}$ volts
 $V_{r3} = \underline{\hspace{2cm}}$ volts

$P_t =$ _____ watts
 $P_{r1} =$ _____ watts
 $P_{r2} =$ _____ watts
 $P_{r3} =$ _____ watts

ANS:

$R_t =$ 13 _____ ohms
 $I_t =$ 6 _____ amps
 $I_{r1} =$ 3 _____ amps
 $I_{r2} =$ 3 _____ amps
 $I_{r3} =$ 6 _____ amps
 $V_{r1} =$ 66 _____ volts
 $V_{r2} =$ 66 _____ volts
 $V_{r3} =$ 12 _____ volts
 $P_t =$ 468 _____ watts
 $P_{r1} =$ 198 _____ watts
 $P_{r2} =$ 198 _____ watts
 $P_{r3} =$ 72 _____ watts

PTS: 1



7.

Find the following:

$R_t =$ _____ ohms
 $I_t =$ _____ amps
 $I_{r1} =$ _____ amps
 $I_{r2} =$ _____ amps
 $I_{r3} =$ _____ amps
 $V_{r1} =$ _____ volts
 $V_{r2} =$ _____ volts
 $V_{r3} =$ _____ volts
 $P_t =$ _____ watts
 $P_{r1} =$ _____ watts
 $P_{r2} =$ _____ watts
 $P_{r3} =$ _____ watts

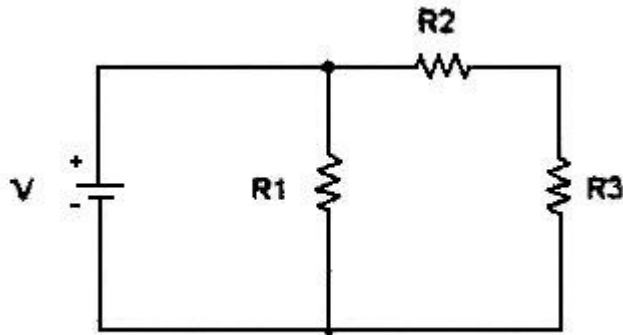
ANS:

$R_t =$ 1570 _____ ohms
 $I_t =$ 108 _____ amps
 $I_{r1} =$ 54 _____ amps
 $I_{r2} =$ 54 _____ amps
 $I_{r3} =$ 108 _____ amps
 $V_{r1} =$ 118.80 _____ volts
 $V_{r2} =$ 118.80 _____ volts

$V_{r3} = \underline{\quad 50.759 \quad}$ volts
 $P_t = \underline{\quad 18.312 \quad}$ watts
 $P_{r1} = \underline{\quad 6.4152 \quad}$ watts
 $P_{r2} = \underline{\quad 6.4152 \quad}$ watts
 $P_{r3} = \underline{\quad 5.4820 \quad}$ watts

PTS: 1

8. Calculate the following



$R_1 = 3456.000 \text{ K ohms}$
 $R_2 = 40000.000 \text{ K ohms}$
 $R_3 = 58000.000 \text{ K ohms}$

$R_{\text{total}} = \text{ K ohms}$

$V = 12.0000 \text{ Volts}$
 $V_{R1} = \text{ Volts}$
 $V_{R2} = \text{ Volts}$
 $V_{R3} = \text{ Volts}$

$I_1 = \text{ Amp}$
 $I_2 = \text{ Amp}$
 $I_3 = \text{ Amp}$
 $I_{\text{total}} = \text{ Amp}$

ANS:

$R_1 = 3456.000 \text{ K ohms}$

$R_2 = 40000.000 \text{ K ohms}$

$R_3 = 58000.000 \text{ K ohms}$

$R_{\text{total}} = 3338.275 \text{ K ohms}$

$V = 12.0000 \text{ Volts}$

$V_{R1} = 12.0000 \text{ Volts}$

$V_{R2} = 4.8980 \text{ Volts}$

$V_{R3} = 7.1020 \text{ Volts}$

$I_1 = 0.000003 \text{ Amp}$

$I_2 = 0.000000 \text{ Amp}$

$I_3 = 0.000000 \text{ Amp}$

$I_{\text{total}} = 0.000004 \text{ Amp}$

PTS: 1