SNC1D
UNIT 3: CHARACTERISTICS OF ELECTRICITY
CHAPTER 10: STATIC CHARGES & ENERGY

10.3: CHARGES AT WORK

Read the reference pages indicated for each topic.
For each topic:

- Provide **sketches** as illustrated in the textbook
- Use **point form notes** to explain/describe each topic.
- Use applicable **key terms and concepts** covered in the study of static electricity in all explanations.

1. Lightning	Pages 418 – 421
2. Lightning Rod.	Pages 420 - 421
3. Electrostatic Precipitator	Pages 421 – 422
4. Electrostatic Spray Painting	Page 423
5. The Van de Graaff Generator	Page 424
6. Photocopiers	Page 425
7. Radiation Dosimeters	Page 427

Lightning

1. What is lightning?

_____

_____

2. Place the following descriptions in the correct order (1 to 4) to explain how lightning forms.

_____ **A.** Negative charges on the bottom of the cloud move toward the positive charges in the ground.

_____ **B.** Convection currents cause charge separation within the storm cloud.

_____ **C.** Positive ions jump from the ground and a lightning flash is created.

_____ **D.** Negative charges on the bottom of the cloud induce a positive charge on the ground below the cloud.

3. Describe the ***parts*** of a lightning rod.

_____

_____

_____

4. What are the ***two functions*** of a lightning rod?

_____

_____

_____

5. Explain how a lightning rod attached to the roof of a building attracts lightning to strike it.

_____

_____

_____

REVIEW 10.3

1. Why is the path of lightning not a straight line?

_____

_____

_____

2. Complete the table.

Parts of a Lightning Rod	Function
Metal sphere or point	
Copper wire or cable	
Metal plate or metal cable in the ground	

3. An electrostatic air purifier is a type of electrostatic precipitator (see page 422) for use in homes and offices. It removes particles such as dust and pollen from the air.

Put the electrostatic air purifier steps in order:

_____ **A.** Particles are neutralized and collected in the hoppers.

_____ **B.** Charged particles induce a negative charge on the collection plates.

_____ **C.** Particles receive a positive charge from ionizing wires.

_____ **D.** Particles are attracted to the collection plates.

_____ **E.** Air enters the purifier.

4. Sandy's company makes sandpaper. They use electrostatics to attach an abrasive material (aluminum oxide) to a polyester backing. Using electrostatics makes sure the sandpaper is coated with aluminum oxide and reduces waste.

Draw a diagram or describe how Sandy makes sandpaper. [Label all parts and any charges.]

5. A Van de Graaff generator is a machine used to generate _____.

It is used for _____ and _____.

6. Indicate the charge of each photocopier part.

Photocopier Part	Positive	Neutral	Negative
Selenium-coated drum before copying starts			
Areas of the drum where light reflects			
Areas of the drum where light does not reflect			
Toner and toner brush			
Paper in input tray			
Paper receiving toner			

The toner spreads from the drum to the paper because the charge on the paper is _____ (greater than / less than) the charge on the drum.

7. Complete the statement using the correct words from the list.

conductors	**ionized**	**high-energy radiation**	**water**
insulators	**neutralized**	**radiation dosimeters**	**energy**

Air and other gases are normally good _____. A gas becomes a good conductor when _____ by absorbing _____ from another source, such as _____.

8. The diagram shows parts of a pen-style radiation dosimeter.
A particle of radiation is about to strike one of the gas molecules.
Label the diagram using the word list. Include all charges.

electrode
gas molecules
movable fibre
particle of radiation