

Worksheet No 3.

KEY TERMS: Other sources of DC, PHOTOELECTRIC SOURCES OF ENERGY

Question: WHAT IS PHOTOELECTRICITY?

Answer: Photoelectricity is light energy being converted into electrical energy

Task: read the text

A. This is an example of the photoconductive effect, where light reduces the resistance of a material by making the electrons inside it more mobile. When a photoconductive material is connected as part of a circuit, it functions as a resistor whose resistance depends on the light intensity. In this context, the material is called a **photoresistor**. The most common application of photoresistors is as photodetectors, i.e. devices that measure light intensity. Some photodetector applications in which photoresistors are often used include camera light meters, street lights, clock radios, and infrared detectors.

B. A solar cell is based upon the "photovoltaic effect" discovered in 1839 by Edmund Becquerel, a French physicist. In his experiments he found that certain materials would produce small amounts of electric current when exposed to sunlight. Sunlight is made up of packets of energy called **photons**. When the photons **strike** the semi-conductor layer (usually silicon) of a solar cell a portion of the photons are absorbed by the material rather than **bouncing off** of it or going through the material. When a photon is absorbed the energy of that photon is transferred to an electron in an atom of the cell causing the electron to escape from its normal position. This creates, in essence, a hole in the atom. This hole will attract another electron from a nearby atom now creating yet another whole, which in turn is again filled by an electron from another atom. This hole filling process is repeated a few **zillion times and voila**, an electric current is formed.

C. Photoemissive cells are the oldest and most **elaborate way** of turning light into electricity. They're sealed glass **vacuum tubes** inside which there's a large metal plate that serves as a negative terminal (or cathode) with a smaller, positively charged, rod-like terminal (or anode) running inside it. The negative terminal is made from a light-sensitive material. When light photons fall on it, they force electrons to leap out of it and these are promptly attracted to the positive terminal, which collects them and channels them into a circuit, producing electric power. This basic design is called a photoemissive cell or phototube. In a slightly different design called a photomultiplier, there's a whole series of plates arranged so that one incoming photon releases multiple electrons—effectively amplifying an incoming light signal so it produces a bigger electrical response.

Task: Decide whether the statement is true, false or not stated

1. Only photovoltaic effect uses sealed glass vacuum tubes.
2. Resistance of photoconductive material does not depend on light intensity.
3. Both negative and positive terminal in photoemissive cells are made of light-sensitive material.
4. Photoconductive effect is more efficient than other two effects.
5. Solar cells are much older than photoemissive cells and were invented in the 20th century.
6. Sun light contains small particles called photons and their energy causes electrons to escape from their normal position.
7. None of the mentioned effects can work when light intensity gets lower at night.

Task: Use the words below to replace the highlighted words in the text:

material that controls the level of current flowing in an electrical circuit reflect many times and again
tiny particles of light hit the surface complicated method container with no air