



Physics

Worksheet 2 : 04/10/2020

Class - X

CHAPTER 13 : MODERN PHYSICS AND ELECTRONICS**Instructions:**

- ✓ Read the chapter in your book - quickly and thoroughly, preferably more than once.
- ✓ Learn the answers given in this worksheet.
- ✓ Contact me in case of any difficulties in understanding.

(Questions given in this worksheet are important questions for all exams)

Analytical Questions (Mark 2)**1. Radioactivity is a nuclear event - Explain.**

Ans.: In 1896, French Scientist Henery Becquerel observes that a radiation with special penetrating power emits spontaneously from the nucleus of uranium metal in a continuous manner. He also observes that the element that emits radiation, transforms totally into a new element. This is a nucleus event. This event is spontaneous and continuous phenomenon and fully controlled by the nature. Any manmade external influences such as pressure, heat, electric and magnetic field cannot stop or increase or decrease the emission of these rays.

2. Radioactivity is a spontaneous process - Explain.

Ans.: Radioactive decay is the process by which an unstable atomic nucleus loses energy by emitting radiation, such as an alpha particle, beta particle and gamma particle. When the proton number exceeds 82, the nucleus starts to become unstable. This unstable nuclei tries to become stable by emitting a kind of radiation. For example, radium becomes lead after spontaneous radioactivity. Temperature, pressure, magnetic or electric field has no impact on radioactivity. So, it can be said that radioactivity is a spontaneous process.

3. Write down three advantages of analogue signals.

Ans.: Three advantages of analogue signals are as follows -

- 1) Digital signals carry more information per second than analogue signals.
- 2) Digital signal maintain their quality over long distances better than analogue signals.
- 3) Besides many signals can be sent in every second.

4) Write down the differences between analogue and digital signal.

Ans.: Analogue signal changes continuously. For example - voltage, AC current.

On the other hand, digital signal only receives some values. That is, the signal that changes with discontinuous values is called digital signal. For example, in computer all signals are converted to binary numbers, 0 or 1.

5. If a neutron can turn into a proton emitting a beta particle, then why are not all neutrons inside a nucleus gradually converted into protons?

Ans.: We know, if we remove neutron particle from a radioactive element, it turns into proton. After emitting beta particle from a temporary radioactive element, it turns into stable nucleus. Then no other beta particle will emit from that stable nucleus. So, all neutrons do not turn into proton in a nucleus.

6. The resistance of resistor increases with an increase in temperature but why does the resistance of a semi-conductor decreases with an increase in temperature.

Ans.: Resistance increases for a resistor if temperature increases, but decreases for a semiconductor. Free electrons are present in resistor. So if temperature increases the kinetic energy also increases, so flow of electrons hinders. Therefore, resistance of a resistor increases. On the other hand, there is no free electrons in semiconductor. So, if temperature increases for a semi conductor, it frees some electrons and semiconductor acts as conductor. So, if temperature increases, then resistance of semiconductor decreases.

7. Write down the characteristics of radioactivity.

Ans.: The characteristics of radioactivity are -

- i. The elements whose atomic number is more than 82, can become radioactive.
- ii. Radioactive elements emit three energetic rays, namely - alpha, beta and gamma.
- iii. This is nuclear event- a lighter element is created by the process of disintegration of a radioactive element.
- iv. Radioactivity is spontaneous and continuous phenomenon and fully controlled by nature.
- v. Any man made external influences such as pressure, heat, electric and magnetic field cannot stop or increase or decrease the emission of these rays.