Home assignment-2

1) **Construction of Davisson and Germer experiment:-**

Davisson and Germer designed and built a vaccum apparatus for the purpose of measuring the energies of electrons scattered from a metal surface. Electrons from a heated filament were accelerated by a voltage and allowed to strike the surface of nickel metal.

The electron beam was directed at the nickel target, which could be rotated to observe angular dependence of the scattered electrons. Their electron detector was mounted on an ~~are~~ arc so that it could be rotated to observe electrons at different angles.

- Dual nature of matter was proposed by de Broglie in 1923, it was experimentally verified by Davisson and Germer by diffraction experiment. Wave character of matter has significance only for microscopic particles.

2) **Photoelectric effect:-**

Photoelectric effect phenomenon in which electrically charged ~~particially~~ particles are released from or within a material when it absorbs electromagnetic radiation. The effect is often defined as the ejection of electrons from a metal plate when light falls on it

work function:

The work function is defined as the minimum amount of thermodynamic work required to remove an electron from a solid to a point in the vaccum

immediately outside the solid surface. The symbol for work function is Φ

Threshold frequency:

The threshold frequency is defined as the minimum frequency of incident radiation below which the photo electric emission is not possible completely. irrespective of the intensity of incident radiation.

cut-off wave length:

The cut off wave length is the minimum wavelength in which a particular fiber still acts as a single mode fiber. Above the cutoff wavelength, the fiber will only allow the LP01 mode to propagate through the fiber.

3) potential energy between two plates = 0eV

Stopping potential(V_0) = 3V

Maximum kinetic energy = K_{max}

$$V_0 = \frac{\omega}{q}$$

$$V_0 = \frac{K_{max}}{e}$$

$$K_{max} = eV_0$$

$$K_{max} = e(3V)$$

$$K_{max} = 3eV.$$

4) De Broglie's justification of Bohr's Assumption:-

De Broglie realized that if you use the wavelength associated with the electron, and assume that an integral number of wavelengths must fit in the circumference of an orbit, you get same quantized angular momenta that Bohr did.

De Broglie Hypothesis:-

De Broglie Hypothesis of matter waves. In 1924, louis de-Broglie suggested that similar to light dual nature "every moving matter has a associated wave" The wave associated with the moving particle is known as matter wave.