

Experiment 3

- 1) Explain any one application based on this experiment (Related to your core Branch).

Ans. 1) Planck's constant is a value which determines how much energy of a photon increases when frequency of its EM wave increases by 1 unit. It's denoted by 'h' and its value is $6.63 \times 10^{-34} \text{ Js}$.

2) Planck's constant has helped us to solve many complex problems easily and helped us in new discoveries, building laws and theorems. One of the major use of Planck's constant is in Quantum mechanics. It totally changed the view of people regarding energy of particles.

3) Being in computer science field Planck's constant has helped us to simplify the complex and tedious calculations in the programs.

4) Planck's constant has also helped us to create LEDs and display panel which has made computers user friendly and enabled the significant growth of Computer Science.

- 2) Explain other technique or experiment other than the one performed which will achieve the result and fulfill the aim of experiment.

Ans. 1) Planck's constant can also be determined by photoelectric effect. It is phenomenon of emission of electrons by certain

metals, when it is exposed to radiations of suitable frequencies.

2) A photoelectric cell is a device which converts light energy into electrical energy and works on this principle.

3) It consists of a metallic plate C and a wire loop A, connected to an external circuit with a battery and microammeter. When light of suitable wavelength falls on C, photo-electrons are emitted and attracted towards A.

Einstein's photoelectric equation is:

$$h\nu = \phi + \frac{1}{2}mv^2$$

where, h = Planck's constant, ϕ = work function.

ν = frequency of light.

4) Hence, if the work function of metal and the above parameters are determined, the value of Planck's constant can be easily obtained.

