09. photoelectric effect :-

When radiation such as γ-rays, x-rays, UV and even visible light fall on metals, electrons are emitted. This, phenomenon of emission of electrons is known as photoelectric effect

Laws of photoelectric effct:-

(1) For a given photosensitive material, there is a minimum frequency called threshold frequency, below which emission of photo electrons stops completely, however great intensity may be.

(2) For a given photo sensitive material the photo electric current is directly proportional to intensity of incident radiation provided the frequency is greater than threshold frequency.

(3) There is no time lag b/w incidence of radiation and emission of photo electrons

Failure of classical theory

1. Existance of threshold frequency

Since energy of wave is dependent on square of its amplitude the classical wave theory predicts that if sufficiently

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intense light is used, the electrons would absorb energy to escape There should not be any threshold frequency

2. Almost immediate emission of photoelectrons

3. Independence of kinetic energy of photo electron on intensity and dependence on frequency

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