
Photoelectric Effect & Work Function (Questions 25, 28, 30)

- **Question 25:**

- The graph of **stopping potential (V_0) vs. $1/\lambda$** is a straight line.
- The **work function (ϕ)** is related to the x-intercept of the graph, and the metal with a higher x-intercept has a greater work function.
- The equation governing the stopping potential is:

$$eV_0 = h\nu - W$$

- A metal with a lower work function will produce electrons with higher kinetic energy for the same incident light.

- **Question 28:**

- The **photo current vs. anode potential** graph helps determine the intensity and saturation current.
- Different curves represent different intensities or frequencies of incident light.
- The correct statement depends on whether intensity or frequency changes.

- **Question 30:**

- The **stopping potential vs. frequency** graph is a straight line, with the threshold frequency (ν_0) found by extrapolating the line to where $V_0 = 0$.
- The threshold wavelength is:

$$\lambda_0 = \frac{c}{\nu_0}$$

- The value of ν_0 can be obtained from the given graph.

de Broglie Wavelength & Particle Motion (Questions 26, 27, 29)

- **Question 26:**

- The **de Broglie wavelength** of an emitted electron is given by:

$$\lambda = \frac{h}{\sqrt{2mKE}}$$

- Using the given wavelength and work function, the kinetic energy of emitted electrons can be determined.

- **Question 27:**

- The **rate of change of de Broglie wavelength** for an electron in an electric field is derived from:

$$\lambda = \frac{h}{\sqrt{2mE}}$$

- The equation changes over time due to acceleration in the electric field.

- **Question 29:**

- The **de Broglie wavelength of a neutron in thermal equilibrium** follows:

$$\lambda = \frac{h}{\sqrt{3mkT}}$$

- The options represent different constants and unit conversions.
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Photoelectric Current & Radiation (Question 28)

- The **photoelectric current vs. anode potential** graph provides information about:
 - Saturation current (maximum number of emitted electrons)
 - How different radiation frequencies or intensities affect electron emission.
 - Different curves may correspond to either the **same frequency but different intensities** or **different frequencies**.