1. Determination of Work Function and Planck's Constant Using Photoelectric Effect

1. **What is the photoelectric effect?**

The photoelectric effect is the emission of electrons from a metal surface when it is exposed to light of sufficient frequency.

2. **What is Planck's constant?**

Planck's constant () is a fundamental constant representing the energy of a photon divided by its frequency ().

3. **What is the stopping potential?**

The stopping potential is the minimum voltage required to stop photoelectrons from reaching the anode.

4. **Why are different color filters used in the experiment?**

To provide light of different frequencies for measuring the stopping potential and determining and work function.

5. **What is the work function of a material?**

The work function () is the minimum energy required to eject an electron from the surface of a metal.

6. **Why is a vacuum photo tube used?**

To prevent collisions between emitted electrons and air molecules, ensuring accurate measurements.

7. **How is the slope of the graph related to Planck's constant?**

The slope of the graph between stopping potential and frequency is , allowing determination of .

8. **Why does light intensity not affect stopping potential?**

Stopping potential depends only on the frequency of light, not its intensity.

9. **What is the standard value of Planck's constant?**

.

10. **What happens if the frequency of light is below the threshold frequency?**

No photoelectrons are emitted regardless of light intensity.

2. Determination of Hall Coefficient and Carrier Concentration

1. **What is the Hall effect?**

It is the production of a voltage across a conductor when it is placed in a magnetic field perpendicular to the current.

2. **What is the Hall coefficient?**

The Hall coefficient () is a measure of the voltage generated per unit current per unit magnetic field.

3. **How is carrier concentration related to the Hall coefficient?**

Carrier concentration () is inversely proportional to the Hall coefficient: .

4. **What is the significance of Hall voltage?**

It indicates the type of charge carriers (positive for holes, negative for electrons) and their concentration.

5. **Why is the Hall probe calibrated before the experiment?**

To ensure accurate measurements of the magnetic field and Hall voltage.

6. **What are the applications of the Hall effect?**

It is used in magnetic field sensors, position sensors, and determining material properties.

7. **What factors affect the Hall voltage?**

The magnetic field, current, thickness of the material, and type of charge carriers.

8. **Why is the Hall probe kept perpendicular to the magnetic field?**

To maximize the Hall voltage and obtain accurate readings.

9. **What is carrier mobility?**

It is the ability of charge carriers to move through a material under the influence of an electric field.

10. **How does temperature affect the Hall coefficient?**

Temperature can influence the mobility and concentration of charge carriers, thus affecting .