

Bankim Sardar College

Internal Examination 2020

Sem: IV

Course: Honours

Paper: CCH9

Group-A

1. Answer all the Questions- 10x1=10
- i) As per Plank's Quantum Theory energy is emitted in-
 - a) Quanta b) its Continuous c) it's a mixture d) None of the options
 - ii) Unit of Plank's constant (h) is-
 - a) Joule/Second b) Joule.Second c) Watt.Second d) None of the options
 - iii) 'Wave number' is-
 - a) Length of a wave b) its unit of Phase c) Reciprocal of Wavelength d) All are true
 - iv) Photoelectric Effect is -
 - a) Instantaneous b) It has some time lag c) it is uncertain d) all are true
 - v) Einstein's Photoelectric equation is -
 - a) Conservation of Energy b) Conservation of momentum c) d) none of the above
 - vi) Photoelectric effect occurs for
 - a) Bound electrons b) Free electrons c) space charge electrons d) None of the above
 - vii) Compton Effect Occurs for the -
 - a) Bound Electrons b) Unbound electrons c) Free Electrons d) None of the above
 - viii) Davisson-Germer Experiment shows that-
 - a) Wave like behaviour of particles b) particles don't have wave behaviour c) a and b both are correct d) None of the above
 - ix) Work Function is-
 - a) Energy required to take an electron away from the atom b) Relation between work and distance c) a and b both are correct d) None of the above
 - x) In Compton Scattering energy of electron after collision-
 - a) Decreases b) increases c) remain the same d) all are correct

Group B

2. Answer all Questions 3x10=30
- A. Write the working formula for the experiment of verification of Stefan's law. What is draper point? What is Newton's law of Cooling? What is Stefan's Law? 3+2+2+3

B. Why the resistance of a filament increase with temperature? Why don't we use ice point and Steam point for calibration of a filament? 5+5

C. Draw the circuit diagram for experiment of Stefan's law. Draw the R_1/R_d vs temperature graph and explain. 5+5

Group C

Answer Question No. 3 and any 6 from the rest.

3. Answer all the Questions 10x2=20
- i) What is ideal black body?
 - ii) Define: emissive power and absorptive power
 - iii) What is photoelectric effect?
 - iv) State de-Broglie hypothesis.
 - v) What is phase velocity?
 - vi) What is probabilistic interpretation of wave function?
 - vii) What do you mean by normalisation of a wave function?
 - viii) What is linear superposition principle?
 - ix) Explain: Heisenberg's uncertainty Principle?
 - x) Explain: Impossibility of a particle following a trajectory
4. Derive Einstein's photoelectric equation. Explain the equation when $\nu < \nu_0$, $\nu = \nu_0$ and $\nu > \nu_0$ 3+2
5. What is Compton Effect? Explain it with proper diagram? 2+3
6. Put down differences between Photoelectric effect and the Compton Effect. 5
7. Why Compton Effect is not observed for visible light? What is unmodified radiation in the Compton Effect? 3+2
8. What group velocity and phase velocity? Establish the relation between them 2+3
9. Discuss Probabilistic view of wave function. What are the characteristics of a wave function? 2+3
10. Discuss: Normalisation of a wave function. 5
11. Discuss: Two Slit experiments with Photons and electrons 5