

Chapter :- **Dual nature of radiation and matter**

Assignment 2

Class 12

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|  **Class : XIIth Subject : PHYSICS** **Date : DPP No. : 2** |

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| **Topic :- Dual nature of radiation and matter**  |

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| 1. | The uncertainty in the position of a particle is equal to the de-Broglie wavelength. The uncertainty in its momentum will be |
|  | a) | $$h/λ$$ | b) | $$2h/3λ$$ | c) | $$λ/h$$ | d) | $$3λ/2h$$ |
| 2. | The work functions for sodium and copper are $2eV$ and $4eV.$ Which of them is suitable for a photocell with $4000 Å$ light |
|  | a) | Copper | b) | Sodium | c) | Both | d) | Neither of them |
| 3. | The curve between current $\left(i\right) $and potential difference$ (V)$ for a photo cell will be |
|  | a) | *i**V* | b) | *i**V* | c) | *V**i* | d) | *V**i* |
| 4. | What will be the number of photons emitted per second by a 10 W sodium vapour lamp assuming that 90% of the consumed energy is converted into light? Wavelength of sodium light is 590 nm, $h=6.63×10^{-34}$J-s. |
|  | a) | $$0.267×10^{18}$$ | b) | $$0.267×10^{19}$$ | c) | $$0.267×10^{20}$$ | d) | $$0.267×10^{17}$$ |
| 5. | For the Bohr’s second orbit of circumference $2πr$, the de-Broglie wavelength of revolving electron will be  |
|  | a) | $$2πr$$ | b) | $$πr$$ | c) | $$\frac{1}{2πr}$$ | d) | $$\frac{1}{4πr}$$ |
| 6. | The work function of a metal is |
|  | a) | The energy for the electron to enter into the metal |
|  | b) | The energy for producing $X$-ray |
|  | c) | The energy is required for an electron to come out from metal surface |
|  | d) | None of these |
| 7. | If the uncertainty in the position of proton is $6×10^{8}$m, then the minimum uncertainty in its speed will be |
|  | a) | $$1 cms^{-1}$$ | b) | $$1 ms^{-1}$$ | c) | $$1 mms^{-1}$$ | d) | $$100 ms^{-1}$$ |
| 8. | The work function for metals $A, B$ and $C$ are respectively $1.92 eV, 2.0 eV$ and $5 eV.$ According to Einstein’s equation, the metals which will emit photo electrons for a radiation of wavelength $4100 Å$ is/are |
|  | a) | None of these | b) | $A$ only | c) | $A$ and $B$ only | d) | All the three metals |
| 9. | Among the following four spectral regions, the photons has the highest energy in |
|  | a) | Infrared | b) | Violet | c) | Red | d) | Blue |
| 10. | Kinetic energy of emitted cathode rays is dependent on |
|  | a) | Only voltage | b) | Only work function |
|  | c) | Both (a) and (b) | d) | It does not depend upon any physical quantity |
| 11. | An electron is accelerated under a potential difference of 182 V. The maximum velocity of electron will be (Charge of an electron is $1.6×10^{-19}$ C and its mass is $9.1×10^{-31} $kg) |
|  | a) | $5.65×10^{6}$ m/s | b) | $4×10^{6}$ m/s | c) | $8×10^{6}$ m/s | d) | $16×10^{6}$ m/s |
| 12. | If the voltage of $X$-rays tube is doubled, the intensity of $X$-rays will become |
|  | a) | Half | b) | Unchanged | c) | Double | d) | Four times |
| 13. | Bragg’s law for $X$-rays is |
|  | a) | $$d\sin(θ=2nλ)$$ | b) | $$2d\sin(θ=nλ)$$ | c) | $$n\sin(θ=2λd)$$ | d) | None of these |
| 14. | An electron of charge $'e'$ coulomb passes through a potential difference of $V volts.$ Its energy in $'joules'$ will be |
|  | a) | $$V/e$$ | b) | $$eV$$ | c) | $$e/V$$ | d) | $$V$$ |
| 15. | When cathode-rays strike a metal target of high melting point with a very high velocity, then which of the following are produced |
|  | a) | $α$-rays | b) | $X$-rays | c) | Ultraviolet rays | d) | $γ$-waves |
| 16. | A photon of energy $8 eV$ is incident on a metal surface of threshold frequency $1.6×10^{15}Hz,$ then the maximum kinetic energy of photoelectrons emitted is $(h=6.6×10^{-34}Js)$ |
|  | a) | $$4.8 eV$$ | b) | $$2.4 eV$$ | c) | $$1.4 eV$$ | d) | $$0.8 eV$$ |
| 17. | The kinetic energy of an electron is $5 eV.$ Calculate the de-Broglie wavelength associated with it $(h=6.6×10^{-34}Js, m\_{e}=9.1×10^{-31}kg)$ |
|  | a) | $$5.47 Å$$ | b) | $$10.9 Å$$ | c) | $$2.7 Å$$ | d) | None of these |
| 18. | Order of $q/m$ ratio of proton, $α$-particle and electron is |
|  | a) | $$e>p>α$$ | b) | $$p>α>e$$ | c) | $$e>α>p$$ | d) | None of these |
| 19. | In the following diagrams if $V\_{2}>V\_{1}$ then*V*2Potential difference*V**i*(Photoelectric current)*V*1*λ*2*λ*1 |
|  | a) | $$λ\_{1}=\sqrt{λ\_{2}}$$ | b) | $$λ\_{1}<λ\_{2}$$ | c) | $$λ\_{1}=λ\_{2}$$ | d) | $$λ\_{1}>λ\_{2}$$ |
| 20. | Ultraviolet radiations of 6.2 eV falls on an aluminium surface. KE of fastest electron emitted is (work function = 4.2 eV) |
|  | a) | $$3.2×10^{-21}J$$ | b) | $$3.2×10^{-19}J$$ | c) | $$7×10^{-25} J$$ | d) | $$9×10^{-32} J$$ |