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NEET DUAL NATURE OF RADIATION AND MATTER — PYQS

Max. Marks: 328 **Questions:** 82

Section A (MCQ) — 82 questions

Q.1 Match **List-I** with **List-II** : [NEET (UG) 2026]

List-I		List-II	
A.	E = hν	I.	de Broglie wavelength
B.	Diffraction and Interference	II.	Particle nature of light
C.	λ = h/p	III.	Wave nature of light
D.	Compton effect	IV.	Energy of photon

(1) A-IV, B-III, C-II, D-I
(2) A-IV, B-III, C-I, D-II
(3) A-I, B-IV, C-III, D-II
(4) A-IV, B-I, C-II, D-III

Solution

Q.2 For a metal of work function 6.6 eV, which of the following wavelengths of incident radiation does not give rise to the photoelectric effect?
(Take Planck's constant as 6.6×10^{-34} J s)
[NEET (UG) 2026]

(1) 200 nm (2) 100 nm (3) 50 nm (4) 150 nm

Scan or tap for the full solution

Q.3 A photon and an electron, each of 20 eV energy, move in free space. The ratio of linear momentum of electron p_e to that of photon p_{Ph}, $\frac{p_e}{p_{Ph}}$ is:

[Take speed of light = 3×10^8 m s^{-1}, charge of electron = -1.6×10^{-19} C and mass of electron = 9×10^{-31} kg] [RE-NEET (UG) 2026]

(1) 275 (2) $\frac{2}{450}$ (3) $\frac{1}{250}$ (4) 225

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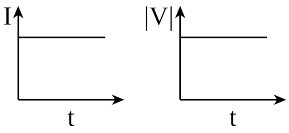
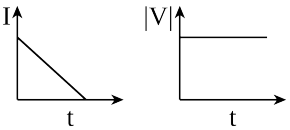
Q.4 A beam of light falls on a metal surface such that photo-electrons are generated. If power of the light source starts to decrease linearly with time t, then variation of the photocurrent I and magnitude of the stopping potential |V| with time is best represented by: [RE-NEET (UG) 2026]

(1)


(2)


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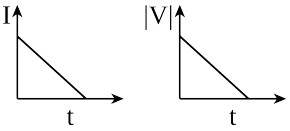

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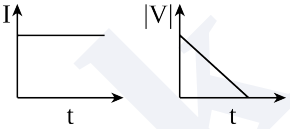

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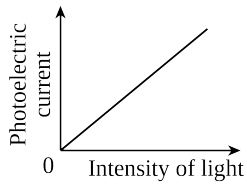
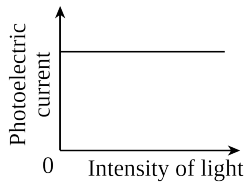
Q.5 A ray of light with wavelength λ is incident on three different photoelectric cells namely 1, 2 and 3. The threshold wavelength of these photoelectric cells are λ_1, λ_2, and λ_3, respectively and the magnitude of stopping potentials of these cells are V_1, V_2 and V_3, respectively. The relation between λ and threshold wavelengths are $\lambda_1 < \lambda$, $\lambda_2 > \lambda$ and $\lambda_3 \gg \lambda$. The correct option is: [RE-NEET (UG) 2026]

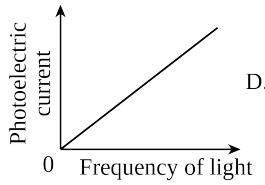
(1) $V_1 < V_2$, $V_3 = 0$ (2) $V_1 = 0$, $V_2 < V_3$
(3) $V_1 = 0$, $V_2 > V_3$ (4) $V_1 > V_2$, $V_3 = 0$

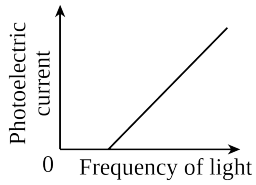
Scan or tap for the full solution

Q.6 Which of the following options represent the variation of photoelectric current with property of light shown on the x-axis? [NEET (UG) 2025]

A.


B.


C.


D.


(1) A and D (2) B and D
(3) A only (4) A and C

Scan or tap for the full solution

Q.7 A photon and an electron (mass m) have the same energy E. The ratio ($\lambda_{photon}/\lambda_{electron}$) of their de Broglie wavelengths is: (c is the speed of light)

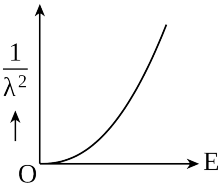
[NEET (UG) 2025]

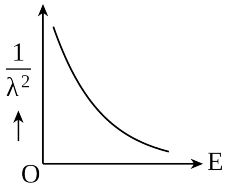
(1) $c\sqrt{\frac{2m}{E}}$ (2) $\frac{1}{c}\sqrt{E/2m}$

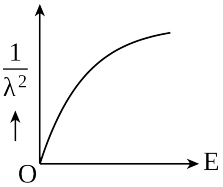
(3) $\sqrt{E/2m}$ (4) $c\sqrt{2mE}$

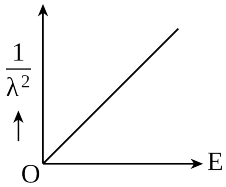
Scan or tap for the full solution

Q.8 The graph which shows the variation of $\left(\frac{1}{\lambda^2}\right)$ and its kinetic energy, E is (where λ is de Broglie wavelength of a free particle): [NEET (UG) 2024]

(1) 

(2) 

(3) 

(4) 

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Q.9 If c is the velocity of light in free space, the correct statements about photon among the following are:

A. The energy of a photon is E = hν.

B. The velocity of a photon is c.

C. The momentum of a photon, $p = \frac{h\nu}{c}$.

D. In a photon-electron collision, both total energy and total momentum are conserved.

E. Photon possesses positive charge.

Choose the correct answer from the options given below: [NEET (UG) 2024]

(1) A and B only (2) A, B, C and D only

(3) A, C and D only (4) A, B, D and E only

Scan or tap for the full solution

Q.10 An electron and an alpha particle are accelerated by the same potential difference. Let λ_e and λ_α denote the de-Broglie wavelengths of the electron and the alpha particle, respectively, then:

[RE-NEET (UG) 2024]

(1) $\lambda_e > \lambda_\alpha$ (2) $\lambda_e = 4\lambda_\alpha$

(3) $\lambda_e = \lambda_\alpha$ (4) $\lambda_e < \lambda_\alpha$

Scan or tap for the full solution

Q.11 If φ is the work function of photosensitive material in eV and light of wavelength of numerical value $\lambda = \frac{hc}{e}$ metre, is incident on it with energy above its threshold value at an instant then the maximum kinetic energy of the photo-electron ejected by it at that instant (Take h-Planck's constant, c-velocity of light in free space) is (in SI units):

[RE-NEET (UG) 2024]

(1) e + 2φ (2) 2e − φ (3) e − eφ (4) e + φ

Scan or tap for the full solution

Q.12 The work functions of Caesium (Cs), potassium (K) and sodium (Na) are 2.14 eV, 2.30 eV and 2.75 eV respectively. If incident electromagnetic radiation has an incident energy of 2.20 eV, which of these photosensitive surfaces may emit photoelectrons?

[NEET (UG) 2023]

(1) Both Na and K (2) K only

(3) Na only (4) Cs only

Scan or tap for the full solution

Q.13 The minimum wavelength of X-rays produced by an electron accelerated through a potential difference of V volts is proportional to :

[NEET (UG) 2023]

(1) $\frac{1}{V}$ (2) $\frac{1}{\sqrt{V}}$ (3) V^2 (4) $\sqrt{V}$

Scan or tap for the full solution

Q.14 When two monochromatic lights of frequency, ν and $\frac{\nu}{2}$ are incident on a photoelectric metal, their stopping potential becomes $\frac{V_s}{2}$ and V_s respectively. The threshold frequency for this metal is

[NEET (UG) 2022]

(1) 2ν (2) 3ν (3) $\frac{2}{3}\nu$ (4) $\frac{3}{2}\nu$

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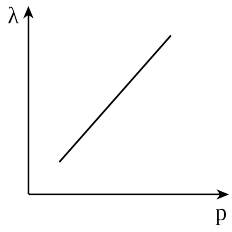
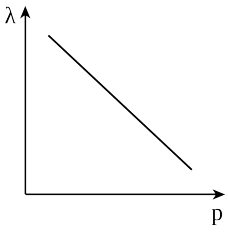
Q.15 The graph which shows the variation of the de Broglie wavelength (λ) of a particle and its associated momentum (p) is [NEET (UG) 2022]

(1) 

(2) 

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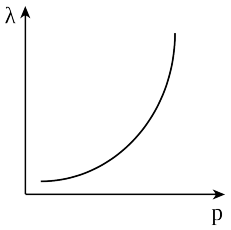

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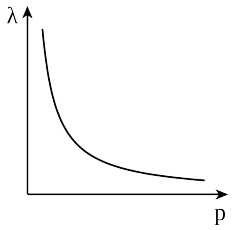

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Q.16 The light rays having photons of energy 4.2 eV are falling on a metal surface having a work function of 2.2 eV. The stopping potential of the surface is

[NEET (UG) 2022 (Phase 2)]

(1) 6.4 V (2) 2 eV (3) 2 V (4) 1.1 V

Scan or tap for the full solution

Q.17 The threshold frequency of a photoelectric metal is ν_0. If light of frequency $4\nu_0$ is incident on this metal, then the maximum kinetic energy of emitted electrons will be : [NEET (UG) 2022 (Phase 2)]

(1) $4h\nu_0$ (2) $h\nu_0$ (3) $2h\nu_0$ (4) $3h\nu_0$

Scan or tap for the full solution

Q.18 The number of photons per second on an average emitted by the source of monochromatic light of wavelength 600 nm, when it delivers the power of 3.3×10^{-3} watt will be : ($h = 6.6 \times 10^{-34}$ J s)

[NEET (UG) 2021]

(1) 10^{15} (2) 10^{18} (3) 10^{17} (4) 10^{16}

Scan or tap for the full solution

Q.19 An electromagnetic wave of wavelength 'λ' is incident on a photosensitive surface of negligible work function. If 'm' mass is of photoelectron emitted from the surface has de-Broglie wavelength λ_d, then : [NEET (UG) 2021]

(1) $\lambda = \left(\frac{2h}{mc}\right)\lambda_d^2$ (2) $\lambda = \left(\frac{2m}{hc}\right)\lambda_d^2$

(3) $\lambda_d = \left(\frac{2mc}{h}\right)\lambda^2$ (4) $\lambda = \left(\frac{2mc}{h}\right)\lambda_d^2$

Scan or tap for the full solution

Q.20 Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled?

[NEET (UG) 2020]

(1) four times (2) one-fourth

(3) zero (4) doubled

Scan or tap for the full solution

Q.21 The energy required to break one bond in DNA is 10^{-20} J. This value in eV is nearly :

[NEET (UG) 2020]

(1) 0.6 (2) 0.06 (3) 0.006 (4) 6

Scan or tap for the full solution

Q.22 An electron is accelerated from rest through a potential difference of V volt. If the de-Broglie wavelength of the electron is 1.227×10^{-2} nm, the potential difference is : [NEET (UG) 2020]

(1) 10^2 V (2) 10^3 V (3) 10^4 V (4) 10 V

Scan or tap for the full solution

Q.23 An electron is accelerated through a potential difference of 10,000 V. Its de Broglie wavelength is (nearly) : ($m_e = 9 \times 10^{-31}$ kg) [NEET (UG) 2019]

(1) 12.2×10^{-12} m (2) 12.2×10^{-13} m

(3) 12.2×10^{-14} m (4) 12.2 nm

Scan or tap for the full solution

Q.24 An electron of mass m with an initial velocity $\vec{v} = v_0\hat{i}$ ($v_0 > 0$) enters an electric field $\vec{E} = -E_0\hat{i}$ (E_0 = constant > 0) at t = 0. If λ_0 is its de-Broglie wavelength initially, then its de-Broglie wavelength at time t is [NEET 2018]

(1) $\frac{\lambda_0}{\left(1 + \frac{eE_0}{mv_0}t\right)}$ (2) $\lambda_0\left(1 + \frac{eE_0}{mv_0}t\right)$

(3) $\lambda_0 t$ (4) λ_0

Scan or tap for the full solution

Q.25 When the light of frequency $2\nu_0$ (where ν_0 is threshold frequency), is incident on a metal plate, the maximum velocity of electrons emitted is v_1. When the frequency of the incident radiation is increased to $5\nu_0$, the maximum velocity of electrons emitted from the same plate is v_2. The ratio of v_1 to v_2 is [NEET 2018]

(1) 1:2 (2) 1:4 (3) 4:1 (4) 2:1

Scan or tap for the full solution

Q.26 The de-Broglie wavelength of a neutron in thermal equilibrium with heavy water at a temperature T (kelvin) and mass m, is [NEET 2017]

(1) $\frac{h}{\sqrt{3mkT}}$ (2) $\frac{2h}{\sqrt{3mkT}}$

(3) $\frac{2h}{\sqrt{mkT}}$ (4) $\frac{h}{\sqrt{mkT}}$

Scan or tap for the full solution

Q.27 The photoelectric threshold wavelength of silver is 3250×10^{-10} m. The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength 2536×10^{-10} m is
[Given $h = 4.14 \times 10^{-15}$ eV s and $c = 3 \times 10^{8}$ m s^{-1}]
[NEET 2017]

(1) $\approx 0.6 \times 10^{6}$ m s^{-1} (2) $\approx 61 \times 10^{3}$ m s^{-1}
(3) $\approx 0.3 \times 10^{6}$ m s^{-1} (4) $\approx 6 \times 10^{5}$ m s^{-1}

Scan or tap for the full solution

Q.28 An electron of mass m and a photon have same energy E. The ratio of de-Broglie wavelengths associated with them is [NEET 2016 (Phase 1)]

(1) $c(2mE)^{\frac{1}{2}}$ (2) $\frac{1}{c}\left(\frac{2m}{E}\right)^{\frac{1}{2}}$
(3) $\frac{1}{c}\left(\frac{E}{2m}\right)^{\frac{1}{2}}$ (4) $\left(\frac{E}{2m}\right)^{\frac{1}{2}}$

Scan or tap for the full solution

Q.29 When a metallic surface is illuminated with radiation of wavelength λ, the stopping potential is V. If the same surface is illuminated with radiation of wavelength 2λ, the stopping potential is $\frac{V}{4}$. The threshold wavelength for the metallic surface is
[NEET 2016 (Phase 1)]

(1) $\frac{5}{2}\lambda$ (2) 3λ (3) 4λ (4) 5λ

Scan or tap for the full solution

Q.30 Photons with energy 5 eV are incident on a cathode C in a photoelectric cell. The maximum energy of emitted photoelectrons is 2 eV. When photons of energy 6 eV are incident on C, no photoelectrons will reach the anode A, if the stopping potential of A relative to C is [NEET 2016 (Phase 2)]

(1) +3 V (2) +4 V (3) −1 V (4) −3 V

Scan or tap for the full solution

Q.31 A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and λ/2. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function of the surface of the material is
(h = Planck's constant, c = speed of light)
[AIPMT 2015]

(1) $\frac{2hc}{\lambda}$ (2) $\frac{hc}{3\lambda}$ (3) $\frac{hc}{2\lambda}$ (4) $\frac{hc}{\lambda}$

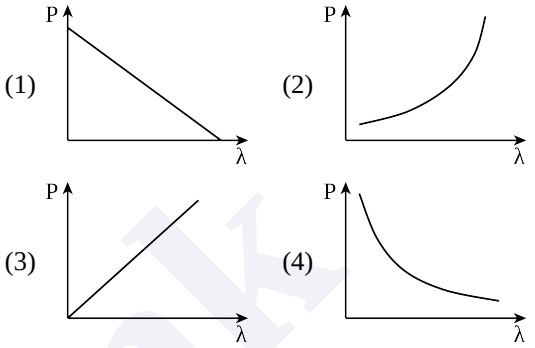
Scan or tap for the full solution

Q.32 Light of wavelength 500 nm is incident on a metal with work function 2.28 eV. The de Broglie wavelength of the emitted electron is [AIPMT 2015]

(1) $\geq 2.8 \times 10^{-9}$ m (2) $\leq 2.8 \times 10^{-12}$ m
(3) $< 2.8 \times 10^{-10}$ m (4) $< 2.8 \times 10^{-9}$ m

Scan or tap for the full solution

Q.33 Which of the following figures represent the variation of particle momentum and the associated de-Broglie wavelength? [AIPMT 2015 (Cancelled)]



Scan or tap for the full solution

Q.34 A certain metallic surface is illuminated with monochromatic light of wavelength, λ. The stopping potential for photo-electric current for this light is $3V_0$. If the same surface is illuminated with light of wavelength 2λ, the stopping potential is V_0. The threshold wavelength for this surface for photo-electric effect is [AIPMT 2015 (Cancelled)]

(1) $\frac{\lambda}{4}$ (2) $\frac{\lambda}{6}$ (3) 6λ (4) 4λ

Scan or tap for the full solution

Q.35 When the energy of the incident radiation is increased by 20%, the kinetic energy of the photoelectrons emitted from a metal surface increased from 0.5 eV to 0.8 eV. The work function of the metal is [AIPMT 2014]

(1) 0.65 eV (2) 1.0 eV
(3) 1.3 eV (4) 1.5 eV

Solution

Q.36 If the kinetic energy of the particle is increased to 16 times its previous value, the percentage change in the de Broglie wavelength of the particle is
[AIPMT 2014]

(1) 25 (2) 75 (3) 60 (4) 50

Scan or tap for the full solution

Q.37 A parallel beam of fast moving electrons is incident normally on a narrow slit. A fluorescent screen is placed at a large distance from the slit. If the speed of the electrons is increased, which of the following statements is correct ? [NEET 2013]

(1) The angular width of the central maximum will decrease.
(2) The angular width of the central maximum will be unaffected.
(3) Diffraction pattern is not observed on the screen in the case of electrons.
(4) The angular width of the central maximum of the diffraction pattern will increase.

Scan or tap for the full solution

Q.38 The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by [NEET 2013]

(1) $\lambda_p \propto \sqrt{\lambda_e}$ (2) $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$
(3) $\lambda_p \propto \lambda_e^2$ (4) $\lambda_p \propto \lambda_e$

Scan or tap for the full solution

Q.39 For photoelectric emission from certain metal the cutoff frequency is ν. If radiation of frequency 2ν impinges on the metal plate, the maximum possible velocity of the emitted electron will be (m is the electron mass) [NEET 2013]

(1) $\sqrt{\frac{2h\nu}{m}}$ (2) $2\sqrt{\frac{h\nu}{m}}$
(3) $\sqrt{\frac{h\nu}{(2m)}}$ (4) $\sqrt{\frac{h\nu}{m}}$

Scan or tap for the full solution

Q.40 A source of light is placed at a distance of 50 cm from a photo cell and the stopping potential is found to be V_0. If the distance between the light source and photo cell is made 25 cm, the new stopping potential will be : [NEET 2013 (Karnataka)]

(1) $V_0/2$ (2) V_0 (3) $4V_0$ (4) $2V_0$

Scan or tap for the full solution

Q.41 The de-broglie wavelength of neutrons in thermal equilibrium at temperature T is [NEET 2013 (Karnataka)]

(1) $\frac{3.08}{\sqrt{T}}$ Å (2) $\frac{0.308}{\sqrt{T}}$ Å
(3) $\frac{0.0308}{\sqrt{T}}$ Å (4) $\frac{30.8}{\sqrt{T}}$ Å

Scan or tap for the full solution

Q.42 If the momentum of an electron is changed by P, then the de Broglie wavelength associated with it changes by 0.5%. The initial momentum of electron will be [AIPMT 2012 (Mains)]

(1) 200 P (2) 400 P (3) $\frac{P}{200}$ (4) 100 P

Scan or tap for the full solution

Q.43 Two radiations of photons energies 1 eV and 2.5 eV, successively illuminate a photosensitive metallic surface of work function 0.5 eV. The ratio of the maximum speeds of the emitted electrons is [AIPMT 2012 (Mains)]

(1) 1 : 4 (2) 1 : 2 (3) 1 : 1 (4) 1 : 5

Scan or tap for the full solution

Q.44 A 200 W sodium street lamp emits yellow light of wavelength 0.6 μm. Assuming it to be 25% efficient in converting electrical energy to light, the number of photons of yellow light it emits per second is [AIPMT 2012 (Prelims)]

(1) 1.5×10^{20} (2) 6×10^{18}
(3) 62×10^{20} (4) 3×10^{19}

Scan or tap for the full solution

Q.45 Monochromatic radiation emitted when electron in hydrogen atom jumps from first excited to the ground state irradiates a photosensitive material. The stopping potential is measured to be 3.57 V. The threshold frequency of the material is [AIPMT 2012 (Prelims)]

(1) 4×10^{15} Hz (2) 5×10^{15} Hz
(3) 1.6×10^{15} Hz (4) 2.5×10^{15} Hz

Scan or tap for the full solution

Q.46 An α-particle moves in a circular path of radius 0.83 cm in the presence of a magnetic field of 0.25 Wb/m^2. The de Broglie wavelength associated with the particle will be [AIPMT 2012 (Prelims)]

(1) 1 Å (2) 0.1 Å (3) 10 Å (4) 0.01 Å

Scan or tap for the full solution

Q.47 The threshold frequency for a photosensitive metal is 3.3×10^{14} Hz. If light of frequency 8.2×10^{14} Hz is incident on this metal, the cut-off voltage for the photoelectron emission is nearly [AIPMT 2011 (Mains)]

(1) 1 V (2) 2 V (3) 3 V (4) 5 V

Scan or tap for the full solution

Q.48 Photoelectric emission occurs only when the incident light has more than a certain minimum [AIPMT 2011 (Prelims)]

(1) power (2) wavelength
(3) intensity (4) frequency

Scan or tap for the full solution

Q.49 Light of two different frequencies whose photons have energies 1 eV and 2.5 eV respectively illuminate a metallic surface whose work function is 0.5 eV successively. Ratio of maximum speeds of emitted electrons will be [AIPMT 2011 (Prelims)]
(1) 1 : 4 (2) 1 : 2 (3) 1 : 1 (4) 1 : 5

Scan or tap for the full solution

Q.50 Electrons used in an electron microscope are accelerated by a voltage of 25 kV. If the voltage is increased to 100 kV, then the de Broglie wavelength associated with the electrons would [AIPMT 2011 (Prelims)]
(1) increase by 2 times (2) decrease by 2 times
(3) decrease by 4 times (4) increase by 4 times

Scan or tap for the full solution

Q.51 In photoelectric emission process from a metal of work function 1.8 eV, the kinetic energy of most energetic electrons is 0.5 eV. The corresponding stopping potential is [AIPMT 2011 (Prelims)]
(1) 1.8 V (2) 1.3 V (3) 0.5 V (4) 2.3 V

Scan or tap for the full solution

Q.52 In the Davisson and Germer experiment, the velocity of electrons emitted from the electron gun can be increased by [AIPMT 2011 (Prelims)]
(1) increasing the potential difference between the anode and filament
(2) increasing the filament current
(3) decreasing the filament current
(4) decreasing the potential difference between the anode and filament

Scan or tap for the full solution

Q.53 A radioactive nucleus of mass M emits a photon of frequency ν and the nucleus recoils. The recoil energy will be [AIPMT 2011 (Prelims)]
(1) $Mc^2 - h\nu$ (2) $h^2\nu^2/2Mc^2$
(3) zero (4) $h\nu$

Scan or tap for the full solution

Q.54 When monochromatic radiation of intensity I falls on a metal surface, the number of photoelectrons and their maximum kinetic energy are N and T respectively. If the intensity of radiation is 2I, the number of emitted electrons and their maximum kinetic energy are respectively [AIPMT 2010 (Mains)]
(1) N and 2T (2) 2N and T
(3) 2N and 2T (4) N and T

Scan or tap for the full solution

Q.55 The electron in the hydrogen atom jumps from excited state (n = 3) to its ground state (n = 1) and the photons thus emitted irradiate a photosensitive material. If the work function of the material is 5.1 eV, the stopping potential is estimated to be (the energy of the electron in n^{th} state $E_n = -\frac{13.6}{n^2}$ eV) [AIPMT 2010 (Mains)]
(1) 5.1 V (2) 12.1 V (3) 17.2 V (4) 7 V

Scan or tap for the full solution

Q.56 A source S_1 is producing 10^{15} photons per second of wavelength 5000 Å. Another source S_2 is producing 1.02×10^{15} photons per second of wavelength 5100 Å. Then, (power of S_2)/(power of S_1) is equal to [AIPMT 2010 (Prelims)]
(1) 1.00 (2) 1.02 (3) 1.04 (4) 0.98

Scan or tap for the full solution

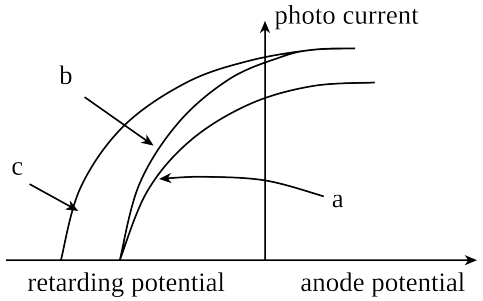
Q.57 The potential difference that must be applied to stop the fastest photoelectrons emitted by a nickel surface, having work function 5.01 eV, when ultraviolet light of 200 nm falls on it, must be [AIPMT 2010 (Prelims)]
(1) 2.4 V (2) −1.2 V (3) −2.4 V (4) 1.2 V

Scan or tap for the full solution

Q.58 The number of photo electrons emitted for light of a frequency ν (higher than the threshold frequency ν_0) is proportional to [AIPMT 2009]
(1) threshold frequency (ν_0)
(2) intensity of light
(3) frequency of light (ν)
(4) $\nu - \nu_0$

Solution

Q.59 The figure shows a plot of photo current versus anode potential for a photo sensitive surface for three different radiations. Which one of the following is a correct statement? [AIPMT 2009]



(1) Curves (a) and (b) represent incident radiations of same frequency but of different intensities.

(2) Curves (b) and (c) represent incident radiations of different frequencies and different intensities.

(3) Curves (b) and (c) represent incident radiations of same frequency having same intensity.

(4) Curves (a) and (b) represent incident radiations of different frequencies and different intensities.

Scan or tap for the full solution

Q.60 Monochromatic light of wavelength 667 nm is produced by a helium neon laser. The power emitted is 9 mW. The number of photons arriving per sec. on the average at a target irradiated by this beam is [AIPMT 2009]

(1) 3×10^{16} (2) 9×10^{15}

(3) 3×10^{19} (4) 9×10^{17}

Scan or tap for the full solution

Q.61 The work function of a surface of a photosensitive material is 6.2 eV. The wavelength of the incident radiation for which the stopping potential is 5 V lies in the [AIPMT 2008]

(1) infrared region (2) X-ray region

(3) Ultraviolet region (4) Visible region

Scan or tap for the full solution

Q.62 A particle of mass 1 mg has the same wavelength as an electron moving with a velocity of 3×10^6 m s^{-1}. The velocity of the particle is [AIPMT 2008]

(1) 3×10^{-31} m s^{-1} (2) 2.7×10^{-21} m s^{-1}

(3) 2.7×10^{-18} m s^{-1} (4) 9×10^{-2} m s^{-1}

Scan or tap for the full solution

Q.63 Monochromatic light of frequency 6.0×10^{14} Hz is produced by a laser. The power emitted is 2×10^{-3} W. The number of photons emitted, on the average, by the source per second is [AIPMT 2007]

(1) 5×10^{16} (2) 5×10^{17}

(3) 5×10^{14} (4) 5×10^{15}

Scan or tap for the full solution

Q.64 A 5 watt source emits monochromatic light of wavelength 5000 Å. When placed 0.5 m away, it liberates photoelectrons from a photosensitive metallic surface. When the source is moved to a distance of 1.0 m, the number of photoelectrons liberated will be reduced by a factor of [AIPMT 2007]

(1) 8 (2) 16 (3) 2 (4) 4

Scan or tap for the full solution

Q.65 A photocell employs photoelectric effect to convert [AIPMT 2006]

(1) change in the frequency of light into a change in the electric current

(2) change in the frequency of light into a change in electric voltage

(3) change in the intensity of illumination into a change in photoelectric current

(4) change in the intensity of illumination into a change in the work function of the photocathode.

Scan or tap for the full solution

Q.66 When photons of energy hv fall on an aluminium plate (of work function E_0), photoelectrons of maximum kinetic energy K are ejected. If the frequency of radiation is doubled, the maximum kinetic energy of the ejected photoelectrons will be [AIPMT 2006]

(1) K + hv (2) K + E_0 (3) 2K (4) K.

Scan or tap for the full solution

Q.67 In a discharge tube ionization of enclosed gas is produced due to collisions between [AIPMT 2006]

(1) neutral gas atoms/molecules

(2) positive ions and neutral atoms/molecules

(3) negative electrons and neutral atoms/molecules

(4) photons and neutral atoms/molecules.

Scan or tap for the full solution

Q.68 The momentum of a photon of energy 1 MeV in kg m/s will be [AIPMT 2006]

(1) 5×10^{-22} (2) 0.33×10^6

(3) 7×10^{-24} (4) 10^{-22}

Scan or tap for the full solution

Q.69 The work functions 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 photoelectrons for a radiation of wavelength 4100 Å is/are [AIPMT 2005]

(1) A only (2) A and B only
(3) all the three metals (4) none

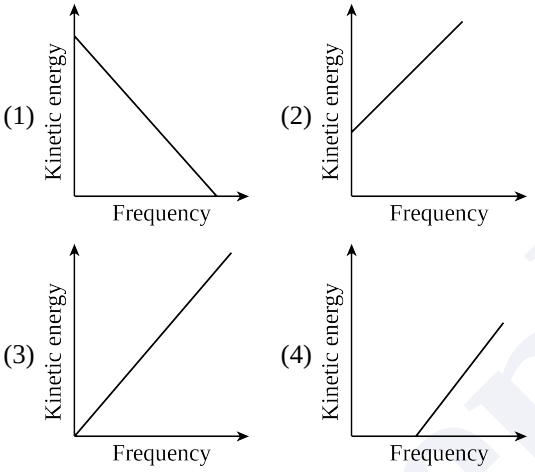
Scan or tap for the full solution

Q.70 A photosensitive metallic surface has work function, $h\nu_0$. If photons of energy $2h\nu_0$ fall on this surface, the electrons come out with a maximum velocity of 4×10^6 m/s. When the photon energy is increased to $5h\nu_0$, then maximum velocity of photoelectrons will be [AIPMT 2005]

(1) 2×10^7 m/s (2) 2×10^6 m/s
(3) 8×10^6 m/s (4) 8×10^5 m/s

Scan or tap for the full solution

Q.71 According to Einstein's photoelectric equation, the graph between the kinetic energy of photoelectrons ejected and the frequency of incident radiation is [AIPMT 2004]



Scan or tap for the full solution

Q.72 A photoelectric cell is illuminated by a point source of light 1 m away. When the source is shifted to 2 m then [AIPMT 2003]

(1) each emitted electron carries one quarter of the initial energy
(2) number of electrons emitted is half the initial number
(3) each emitted electron carries half the initial energy
(4) number of electrons emitted is a quarter of the initial number

Scan or tap for the full solution

Q.73 J.J. Thomson's cathode-ray tube experiment demonstrated that [AIPMT 2003]

(1) cathode rays are streams of negatively charged ions
(2) all the mass of an atom is essentially in the nucleus
(3) the e/m of electrons is much greater than the e/m of protons
(4) the e/m ratio of the cathode-ray particles changes when a different gas is placed in the discharge tube

Scan or tap for the full solution

Q.74 The value of Planck's constant is [AIPMT 2002]

(1) 6.63×10^{-34} J/sec.
(2) 6.63×10^{-34} kg-m^2/sec^2
(3) 6.63×10^{-34} kg-m^2
(4) 6.63×10^{-34} J-sec.

Solution

Q.75 If particles are moving with same velocity, then which has maximum de Broglie wavelength? [AIPMT 2002]

(1) proton (2) α-particle
(3) neutron (4) β-particle

Scan or tap for the full solution

Q.76 When ultraviolet rays are incident on a metal plate, photoelectric effect does not occur. It occurs by incidence of [AIPMT 2002]

(1) infrared rays (2) X-rays
(3) radio waves (4) microwaves

Scan or tap for the full solution

Q.77 Which of the following is not the property of cathode rays? [AIPMT 2002]

(1) It produces heating effect
(2) It does not deflect in electric field
(3) It casts shadow
(4) It produces fluorescence.

Scan or tap for the full solution

Q.78 Which one among the following shows particle nature of light? [AIPMT 2001]

(1) photoelectric effect (2) interference
(3) refraction (4) polarization

Scan or tap for the full solution

Q.79 A photo-cell is illuminated by a source of light, which is placed at a distance d from the cell. If the distance becomes d/2, then number of electrons emitted per second, will be [AIPMT 2001]

(1) remain same (2) four times
(3) two times (4) one-fourth

Scan or tap for the full solution

Q.80 The interplanar distance in a crystal is 2.8×10^{-8} m. The value of maximum wavelength which can be diffracted is [AIPMT 2001]

(1) 2.8×10^{-8} m (2) 5.6×10^{-8} m

(3) 1.4×10^{-8} m (4) 7.6×10^{-8} m

Scan or tap for the full solution

Q.81 By photoelectric effect, Einstein proved [AIPMT 2000]

(1) $E = hv$ (2) $K.E. = \frac{1}{2} mv^2$

(3) $E = mc^2$ (4) $E = \frac{-Rhc}{n^2}$

Scan or tap for the full solution

Q.82 Who evaluated the mass of electron indirectly with help of charge [AIPMT 2000]

(1) Thomson (2) Millikan

(3) Rutherford (4) Newton

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	**2**	**1**	**4**	**2**	**2**	**3**	**1**
Ques.	8	9	10	11	12	13	14
Ans.	**4**	**2**	**1**	**3**	**4**	**1**	**4**
Ques.	15	16	17	18	19	20	21
Ans.	**4**	**3**	**4**	**4**	**4**	**3**	**2**
Ques.	22	23	24	25	26	27	28
Ans.	**3**	**1**	**1**	**1**	**1**	**1, 4**	**3**
Ques.	29	30	31	32	33	34	35
Ans.	**2**	**4**	**3**	**1**	**4**	**4**	**2**
Ques.	36	37	38	39	40	41	42
Ans.	**2**	**1**	**3**	**1**	**2**	**4**	**1**
Ques.	43	44	45	46	47	48	49
Ans.	**2**	**1**	**3**	**4**	**2**	**4**	**2**
Ques.	50	51	52	53	54	55	56
Ans.	**2**	**3**	**1**	**2**	**2**	**4**	**1**
Ques.	57	58	59	60	61	62	63
Ans.	**2**	**2**	**1**	**1**	**3**	**3**	**4**
Ques.	64	65	66	67	68	69	70
Ans.	**4**	**3**	**1**	**3**	**1**	**2**	**3**
Ques.	71	72	73	74	75	76	77
Ans.	**4**	**4**	**3**	**4**	**4**	**2**	**2**
Ques.	78	79	80	81	82		
Ans.	**1**	**2**	**2**	**1**	**1**		

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