EdLoop

EdLoop EAPCET

PHYSICS · EAPCET (EAMCET)

Dual Nature of Matter & Radiation

Previous Year Questions with answers

161 questions · **139** papers · **2010–2026** · newest paper first

Step-by-step solutions for every question: free in the EdLoop EAPCET app (Google Play) · pyq.edloop.in

What is in this PDF: every Dual Nature of Matter & Radiation question we hold from past AP and TS EAPCET (called EAMCET until 2020 in Andhra Pradesh and 2023 in Telangana) papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

Step-by-step solutions for every question are free in the EdLoop EAPCET app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

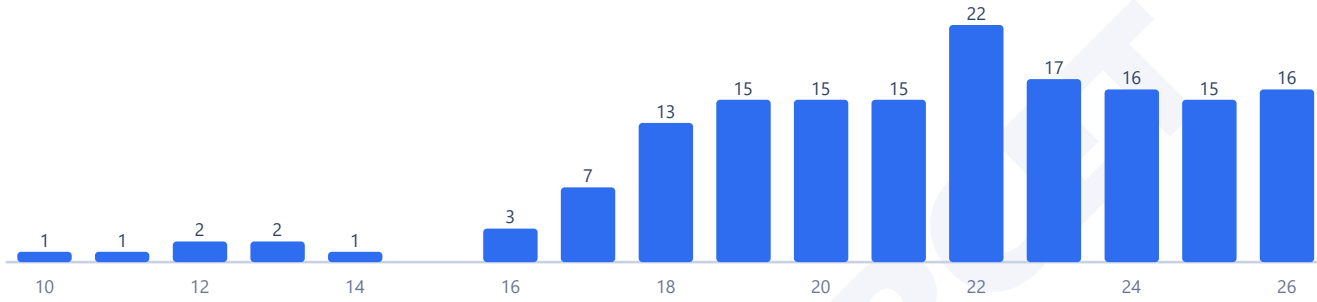
EdLoop EA

Chapter at a glance

2.8%	161	74 of 77	161 / 0
of Physics questions, 2022–2026	questions, 2010–2026	papers asked it, 2022–2026	MCQ / numerical, 2010–2026

Trend. Steady: 1 questions per paper in 2024–2026 against 1.3 in 2022–2023.

Questions per year



Counts are the questions we hold: 161 in 139 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2010–2026)

Photoelectric Effect	108
Matter Waves	53

How often it comes up

Modern physics commences with Dual Nature of Matter & Radiation in Class 12. Across the AP and TS EAPCET papers held in our archive between 2022 and 2026, the chapter contributed 86 questions across 77 papers. That gives an average frequency of 1.1 questions per paper, making up 2.8% of all physics questions in that recent window. Examining all 149 papers in our collection from 2010 to 2026, Dual Nature of Matter & Radiation contributed 161 questions, sustaining an average of 1.1 questions per paper and a 2.7% subject share. Over the earlier segment from 2010 to 2021, our records capture 75 questions across 72 papers (2.6% share). In the last three exam years from 2024 to 2026, the topic supplied 47 questions across 46 papers, holding a 2.6% share. Viewed against early papers, the subject share in the last three years is about the same, and when measured against the recent five-year window it is also about the same.

State-wise breakdowns show consistent testing across regional exams. AP EAPCET papers between 2022 and 2026 contributed 51 questions across 48 papers in our set, with 47 papers featuring at least one question (1.1 per paper, 2.7% share). TS EAPCET contributed 35 questions across 29 papers in our set, with 27 papers containing questions (1.2 per paper, 3.0% share). Dual Nature of Matter & Radiation has appeared every year since 2022, though across all 77 recent papers in our collection, three papers omitted it, meaning it did not feature in all 77 sittings. By question volume from 2022 to 2026, it stands 19th among the 28 physics chapters. Its most active sitting in our archive occurred in 2022, supplying 22 questions across 16 papers.

Most-asked topics

Questions concentrate across two syllabus areas:

- **Photoelectric Effect**: This major topic brought 57 questions between 2022 and 2026, contributing to 108 questions across all years in our archive. It tests Einstein's photoelectric equation h ν = Φ_zero + K_max, stopping potential V_zero, work function, threshold frequency and wavelength, saturation current, and photon energy flux.

- **Matter Waves**: Recent examinations produced 29 questions, out of 53 questions in the complete record. Key concepts cover the de Broglie wavelength λ = h / p, matter waves for electrons, protons, and alpha particles accelerated through potential differences, thermal neutrons, and the Davisson-Germer experiment.

What the questions look like

Einstein's photoelectric equation is the source of many numerical problems. A classic question illuminates a photosensitive metal with radiation of wavelength λ, recording a stopping potential V_one, and then replaces it with wavelength two λ, yielding stopping potential V_two. Students must set up two simultaneous linear equations to extract the threshold wavelength or work function. Other questions test graphical characteristics, such as the linear slope of stopping potential against incident frequency, which always equals Planck's constant divided by elementary charge, h / e.

Matter wave problems heavily test comparative ratios between elementary particles. A common question asks for the ratio of de Broglie wavelengths of a proton and an alpha particle accelerated from rest through identical electric potential differences. Students must evaluate λ = h / √(two m q V), noting that an alpha particle has four times the mass and twice the charge of a proton, giving an eight-fold mass-charge product.

How to practise it

Start by mastering Einstein's photoelectric law. Express energy balance as K_max = e V_zero = h ν - Φ_zero = h c (1/λ - 1/λ_zero). Remember the key physical dependencies: maximum kinetic energy and stopping potential depend strictly on incident radiation frequency, not on light beam intensity. Conversely, photocurrent and saturation current scale linearly with light intensity at constant frequency.

Next, master de Broglie matter wave formulas. For any particle of momentum p and kinetic energy K, wavelength is λ = h / p = h / √(two m K). When accelerated from rest through electric potential difference V, kinetic energy is K = q V, yielding λ = h / √(two m q V). For a gas molecule or thermal neutron at absolute temperature T, average kinetic energy is (three / two) k_B T, so thermal de Broglie wavelength is λ = h / √(three m k_B T).

Finally, memorize the particle ratios for proton, deuteron, and alpha particle. For a proton of mass m and charge e, mass-charge product is m e. For a deuteron of mass two m and charge e, the product is two m e. For an alpha particle of mass four m and charge two e, the product is eight m e. Because λ is inversely proportional to √(m q), accelerating all three through identical voltages produces wavelengths in the ratio √eight : √four : 1.

EdLoop EAPCET

Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

The kinetic energy of released electron in photo electric effect depends on

(A) Intensity of incidenting photons
(B) Frequency of incidenting photons
(C) Area of photocell
(D) Time

Answer: (B) Frequency of incidenting photons · The council's preliminary key

Q2 AP EAPCET 2026 · 18 May · Shift 2 MCQ

Sodium and Copper have work functions 2.3 eV and 4.5 eV respectively. Then the ratio of their threshold wavelengths is nearly

(A) 1:2
(B) 4:1
(C) 2:1
(D) 1:4

Answer: (C) 2:1 · The council's preliminary key

Q3 AP EAPCET 2026 · 15 May · Shift 1 MCQ

Two identical photo cathodes receive light of frequencies f_1 and f_2. If the velocity of photo electrons (of mass m) coming out are respectively V_1 & V_2, then

(A) $V_1^2 - V_2^2 = \frac{2h}{m}(f_1 - f_2)$
(B) $V_1 + V_2 = \left[\frac{2h}{m}(f_1 + f_2)\right]^{\frac{1}{2}}$
(C) $V_1^2 + V_2^2 = \frac{2h}{m}(f_1 + f_2)$
(D) $V_1 - V_2 = \left[\frac{2h}{m}(f_1 - f_2)\right]^{\frac{1}{2}}$

Answer: (A) $V_1^2 - V_2^2 = \frac{2h}{m}(f_1 - f_2)$ · The council's preliminary key

Q4 AP EAPCET 2026 · 15 May · Shift 2 MCQ

If the potential difference used to accelerate electrons at rest is increased from 150 V to 600 V, then the percentage decrease in the de-Broglie wavelength associated with the electron is

EdLoop EAPCET

(A) 25
(B) 75
(C) 50
(D) 40

Answer: (C) 50 · The council's preliminary key

Q5 AP EAPCET 2026 · 14 May · Shift 1 MCQ

Light of wavelength $1000\ \text{Å}$ incidents on a metal surface of work function 6 eV. The maximum kinetic energy of photoelectrons is

(A) 12.4 eV
(B) 6.4 eV
(C) 19.2 eV
(D) 0 eV

Answer: (B) 6.4 eV · The council's preliminary key

Q6 AP EAPCET 2026 · 14 May · Shift 2 MCQ

When photons of energy 4.2 eV incident on a photosensitive material of work function 2.2 eV, photoelectrons are emitted with a maximum linear momentum of P. If photons of energy 6.2 eV incident on the same photosensitive material, the maximum linear momentum of the emitted photoelectrons is

(A) 4P
(B) $\text{P}\sqrt{2}$
(C) 2P
(D) $\text{P}\sqrt{3}$

Answer: (B) $\text{P}\sqrt{2}$ · The council's preliminary key

Q7 AP EAPCET 2026 · 13 May · Shift 1 MCQ

Work function of a metallic surface is 5.01 eV. When a light of wavelength 2000Å falls on the metallic surface, it emits photo electrons. The potential difference required to stop the fastest photo electron is? (in Volt)

(A) 1.2
(B) 1.6
(C) 2.4
(D) 2.8

Answer: (A) 1.2 · The council's preliminary key

EdLoop EAPCET

Q8 AP EAPCET 2026 · 13 May · Shift 2 MCQ

When a metal surface is illuminated with lights of wavelengths λ and 2λ separately, the stopping potentials are V and $\frac{V}{3}$ respectively. Then the threshold wavelength of that metal surface is

(A) $\frac{4\lambda}{3}$
(B) 4λ
(C) 6λ
(D) $\frac{8\lambda}{3}$

Answer: (B) 4λ · The council's preliminary key

Q9 AP EAPCET 2026 · 12 May · Shift 1 MCQ

A proton and an α-particle are accelerated through the same potential difference. The ratio of their de Broglie wavelengths will be

(A) $1:1$
(B) $1:2$
(C) $2:1$
(D) $2\sqrt{2}:1$

Answer: (D) $2\sqrt{2}:1$ · The council's preliminary key

Q10 AP EAPCET 2026 · 12 May · Shift 2 MCQ

When two electrons A and B are accelerated through potential difference V_A and V_B respectively, their deBrogli wave lengths are in the ratio of 2:3, then the ratio of potential differences $\frac{V_A}{V_B}$ is

(A) 3:2
(B) 2:3
(C) 4:9
(D) 9:4

Answer: (D) 9:4 · The council's preliminary key

Q11 TS EAPCET 2026 · 11 May · Shift 1 MCQ

When monochromatic photons incident on a photosensitive material of work function 1.8 eV, photoelectrons are emitted with a maximum kinetic energy of 2.2 eV. If the frequency of the incident photons is doubled, then the maximum kinetic energy of the emitted photoelectrons is

(A) 7.2 eV
(B) 6.2 eV
(C) 4.4 eV
(D) 3.6 eV

Answer: (B) 6.2 eV · The council's preliminary key

Q12 TS EAPCET 2026 · 11 May · Shift 1 MCQ

When an electron and a positron at rest annihilate each other, the momentum of each of the photons emitted is

(Rest mass of electron $= 9 \times 10^{-31}$ kg)

(A) $36 \times 10^{-23}\ \mathrm{kg\,ms^{-1}}$
(B) $9 \times 10^{-23}\ \mathrm{kg\,ms^{-1}}$
(C) $27 \times 10^{-23}\ \mathrm{kg\,ms^{-1}}$
(D) $18 \times 10^{-23}\ \mathrm{kg\,ms^{-1}}$

Answer: (C) $27 \times 10^{-23}\ \mathrm{kg\,ms^{-1}}$ · The council's preliminary key

Q13 TS EAPCET 2026 · 11 May · Shift 2 MCQ

If an electron initially at rest is subjected to a uniform electric field of $4125\ \mathrm{NC^{-1}}$, then the de Broglie wavelength associated with the electron at time $t = 2 \times 10^{-9}$ s is
(Planck's constant $= 6.6 \times 10^{-34}$ Js)

(A) 12 Å
(B) 2 Å
(C) 10 Å
(D) 5 Å

Answer: (D) 5 Å · The council's preliminary key

Q14 TS EAPCET 2026 · 10 May · Shift 1 MCQ

The process of electron emission that takes place in a spark plug is

(A) Field emission
(B) Photoelectric emission
(C) Thermionic emission
(D) Secondary emission

Answer: (A) Field emission · The council's preliminary key

Q15 TS EAPCET 2026 · 9 May · Shift 1 MCQ

If the wavelength of an electromagnetic radiation is 4288 Å, then the de Broglie wavelength associated with its photon is

(A) 4288 Å
(B) 1072 Å
(C) 2144 Å
(D) 8576 Å

Answer: (A) 4288 Å · The council's preliminary key

Q16 TS EAPCET 2026 · 9 May · Shift 2 MCQ

When photons of wavelength 4000 Å are incident on a photosensitive material of cut-off wavelength 4800 Å, the stopping potential is V. If the same photons incident on another photosensitive material of cut off wavelength 6000 Å, then the stopping potential is

(A) 1.5V
(B) 0.5V
(C) 4V
(D) 2V

Answer: (D) 2V · The council's preliminary key

Q17 AP EAPCET 2025 · 27 May · Shift 1 MCQ

The de Broglie wavelength associated with an electron accelerated through a potential difference of $\frac{200}{3}$ V is nearly

(A) $25\ \text{Å}$
(B) $2.5\ \text{Å}$
(C) $15\ \text{Å}$
(D) $1.5\ \text{Å}$

Answer: (D) $1.5\ \text{Å}$ · The council's preliminary key

Q18 AP EAPCET 2025 · 26 May · Shift 1 MCQ

When photons of energy 8×10^{-19} J incident on a photosensitive material, the de Broglie wavelength of the photoelectrons emitted with maximum kinetic energy is 10 Å. The work function of the photosensitive material is nearly

(A) 3.5 eV
(B) 2.5 eV
(C) 2.0 eV
(D) 1.5 eV

Answer: (A) 3.5 eV · The council's preliminary key

EdLoop EAPCET

Q19 AP EAPCET 2025 · 26 May · Shift 2 MCQ

The ratio of de Broglie wavelengths associated with thermal neutrons at temperatures $127\ ^\circ\mathrm{C}$ and $352\ ^\circ\mathrm{C}$ is

(A) $5:3$
(B) $3:2$
(C) $3:4$
(D) $5:4$

Answer: (D) $5:4$ · The council's preliminary key

Q20 AP EAPCET 2025 · 24 May · Shift 1 MCQ

A laser produces a beam of light of frequency 5×10^{14} Hz with an output power of 33 mW. The average number of photons emitted by the laser per second is (Planck's constant = 6.6×10^{-34} J s)

(A) 40×10^{16}
(B) 10×10^{16}
(C) 30×10^{16}
(D) 20×10^{16}

Answer: (B) 10×10^{16} · The council's preliminary key

Q21 AP EAPCET 2025 · 23 May · Shift 1 MCQ

If a proton and an alpha particle are accelerated through the same potential difference, then the ratio of their de Broglie wavelengths is

(A) $1:2$
(B) $1:4$
(C) $2\sqrt{2}:1$
(D) $1:8$

Answer: (C) $2\sqrt{2}:1$ · The council's preliminary key

Q22 AP EAPCET 2025 · 23 May · Shift 2 MCQ

If the de Broglie wavelength of an electron is 2 nm, then its kinetic energy is nearly

(Planck's constant = 6.6×10^{-34} J s and mass of electron = 9×10^{-31} kg)

(A) 0.48 eV
(B) 0.68 eV
(C) 0.38 eV
(D) 0.25 eV

Answer: (C) 0.38 eV · The council's preliminary key

Q23 AP EAPCET 2025 · 22 May · Shift 1 MCQ

An alpha particle moves along a circular path of radius 0.5 mm in a magnetic field of 2×10^{-2} T. The de Broglie wavelength associated with the alpha particle is nearly
(Planck's constant $= 6.63 \times 10^{-34}$ J s)

(A) 3.1 Å
(B) 1.1 Å
(C) 0.1 Å
(D) 2.1 Å

Answer: (D) 2.1 Å · The council's preliminary key

Q24 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If the threshold wavelength of light for photoelectric emission to take place from a metal surface is 6250 Å, then the work function of the metal is

(Planck's constant = 6.6×10^{-34} Js)

(A) 3.98 eV
(B) 1.98 eV
(C) 2.98 eV
(D) 4.98 eV

Answer: (B) 1.98 eV · The council's preliminary key

Q25 AP EAPCET 2025 · 21 May · Shift 1 MCQ

If the linear momentum of a proton is changed by p_0, then the de Broglie wavelength associated with the proton changes by 0.25%. Then the initial linear momentum of the proton is

(A) $100p_0$
(B) $\frac{p_0}{400}$
(C) $400p_0$
(D) $\frac{p_0}{100}$

Answer: (C) $400p_0$ · The council's preliminary key

Q26 AP EAPCET 2025 · 21 May · Shift 1 MCQ

If an electron in the excited state falls to ground state, a photon of energy 5 eV is emitted, then the wavelength of the photon is nearly

EdLoop EAPCET

(A) 748 nm
(B) 598 nm
(C) 398 nm
(D) 248 nm

Answer: (D) 248 nm · The council's preliminary key

Q27 TS EAPCET 2025 · 4 May · Shift 1 MCQ

The work done to accelerate an electron from rest so that it can have a de Broglie wavelength of 6600 Å is nearly

(Planck's constant $= 6.6 \times 10^{-34}$ Js and mass of electron $= 9 \times 10^{-31}$ kg)

(A) 5.56×10^{-25} eV
(B) 1.88 eV
(C) 5.56×10^{-25} J
(D) 1.88 J

Answer: (C) 5.56×10^{-25} J · The council's preliminary key

Q28 TS EAPCET 2025 · 4 May · Shift 2 MCQ

In a photoelectric experiment, the slope of the graph drawn between stopping potential along y-axis and frequency of incident radiation along x-axis is

(Planck's constant $= 6.6 \times 10^{-34}$ Js)

(A) $2.42 \times 10^{15}\ \mathrm{Js\,C^{-1}}$
(B) $10.56 \times 10^{-15}\ \mathrm{Js\,C^{-1}}$
(C) $4.125 \times 10^{-15}\ \mathrm{Js\,C^{-1}}$
(D) $6.25 \times 10^{-20}\ \mathrm{Js\,C^{-1}}$

Answer: (C) $4.125 \times 10^{-15}\ \mathrm{Js\,C^{-1}}$ · The council's preliminary key

Q29 TS EAPCET 2025 · 3 May · Shift 2 MCQ

When photons incident on a photosensitive material of work function 1.5 eV, the maximum velocity of the emitted photoelectrons is $8 \times 10^5\ \mathrm{ms^{-1}}$. The stopping potential of the photoelectrons is

(Mass of the electron $= 9 \times 10^{-31}$ kg and charge of the electron $= 1.6 \times 10^{-19}$ C)

(A) 1.8 V
(B) 1.5 V
(C) 2.1 V
(D) 2.4 V

Answer: (A) 1.8 V · The council's preliminary key

Q30 TS EAPCET 2025 · 2 May · Shift 1 MCQ

Photons of energy $4.5\ \text{eV}$ are incident on a photosensitive material of work function $3\ \text{eV}$. The de Broglie wavelength associated with the photoelectrons emitted with maximum kinetic energy is nearly

(A) $10\ \text{Å}$
(B) $5\ \text{Å}$
(C) $20\ \text{Å}$
(D) $15\ \text{Å}$

Answer: (A) $10\ \text{Å}$ · The council's preliminary key

Q31 TS EAPCET 2025 · 2 May · Shift 2 MCQ

When a photosensitive material is illuminated by photons of energy 3.1 eV, the stopping potential of the photoelectrons is 1.7 V. When the same photosensitive material is illuminated by photons of energy 2.5 eV, the stopping potential of the photoelectrons is

(A) 1.8 V
(B) 1.4 V
(C) 1.1 V
(D) 1.3 V

Answer: (C) 1.1 V · The council's preliminary key

Q32 AP EAPCET 2024 · 23 May · Shift 1 MCQ

A photon incident on a metal of work function 2 eV produced photo electron of maximum kinetic energy of 2 eV. The wavelength associated with the photon is

(A) 6200 Å
(B) 3100 Å
(C) 9300 Å
(D) 2000 Å

Answer: (B) 3100 Å · The council's preliminary key

Q33 AP EAPCET 2024 · 22 May · Shift 1 MCQ

The surface of a metal is first illuminated with a light of wavelength 300 nm and later illuminated by another light of wavelength 500 nm. It is observed that the ratio of maximum velocities of photo electrons in two cases is 3. The work function of metal value is close to

(A) 6.48 eV
(B) 1.23 eV
(C) 4.17 eV
(D) 2.28 eV

Answer: (D) 2.28 eV · The council's preliminary key

Q34 AP EAPCET 2024 · 22 May · Shift 2 MCQ

Light of wavelength $4000\ \text{Å}$ is incident on a sodium surface for which the threshold wavelength of photo electrons is $5420\ \text{Å}$. The work function of sodium is

(A) 4.58 eV
(B) 2.29 eV
(C) 1.14 eV
(D) 0.57 eV

Answer: (B) 2.29 eV · The council's preliminary key

Q35 AP EAPCET 2024 · 21 May · Shift 1 MCQ

A blue lamp emits light of mean wavelength 4500Å. The lamp is rated at $150\ W$ and 8% efficiency. Then the number of photons are emitted by the lamp per second

(A) 27.17×10^{18}
(B) 17.17×10^{18}
(C) 27.17×10^{15}
(D) 54×10^{16}

Answer: (A) 27.17×10^{18} · The council's preliminary key

Q36 AP EAPCET 2024 · 21 May · Shift 2 MCQ

The maximum wavelength of light which causes photoelectric emission from a photosensitive metal surface is λ_0. Two light beams of wavelengths $\frac{\lambda_0}{3}$ and $\frac{\lambda_0}{9}$ incident on the metal surface. The ratio of the maximum velocities of the emitted photoelectrons is

(A) $3:4$
(B) $1:3$
(C) $1:2$
(D) $2:3$

Answer: (C) $1:2$ · The council's preliminary key

Q37 AP EAPCET 2024 · 21 May · Shift 2 MCQ

A transmitter of power 10 kW emits radio waves of wavelength 500 m. The number of photons emitted per second by the transmitter is of the order of

(A) 10^{37}
(B) 10^{31}
(C) 10^{25}
(D) 10^{43}

Answer: (B) 10^{31} · The council's preliminary key

Q38 AP EAPCET 2024 · 20 May · Shift 1 MCQ

An electron of mass 'm' with initial velocity $\vec{v} = v_0\hat{i}$ $(v_0 > 0)$ enters in an electric field $\vec{E} = -E_0\hat{i}$ [E_0 is constant > 0] at $t = 0$. If λ is its de-Broglie wavelength initially, then the de-Broglie wave length after time 't' is

(A) $\dfrac{\lambda}{1 + \dfrac{eE_0t}{mv_0}}$
(B) $\dfrac{\lambda}{\left(1 - \dfrac{eE_0t}{mv_0}\right)^2}$
(C) $\left(1 + \dfrac{eE_0t}{mv_0}\right)\lambda$
(D) $\left(1 + \dfrac{eE_0t}{mv_0}\right)^2\lambda$

Answer: (A) $\dfrac{\lambda}{1 + \dfrac{eE_0t}{mv_0}}$ · The council's preliminary key

Q39 AP EAPCET 2024 · 20 May · Shift 2 MCQ

If the kinetic energy of a particle in motion is decreased by 36%, the increase in de Broglie wavelength of the particle is

(A) 18%
(B) 25%
(C) 20%
(D) 32%

Answer: (B) 25% · The council's preliminary key

Q40 AP EAPCET 2024 · 19 May · Shift 2 MCQ

The longest wavelength of light that can initiate photo electric effect in the metal of work function 9 eV is

EdLoop EAPCET

(A) $1.37 \times 10^{-7} m$
(B) $1.5 \times 10^{-7} m$
(C) $3.7 \times 10^{-7} m$
(D) $4 \times 10^{-7} m$

Answer: (A) $1.37 \times 10^{-7} m$ · The council's preliminary key

Q41 AP EAPCET 2024 · 18 May · Shift 1 MCQ

Energy required to remove an electron from aluminium surface is 4.2 eV. If light of wavelength 2000 Å falls on the surface, the velocity of the fastest electron ejected from the surface will be

(A) $8.4 \times 10^{5}\ \mathrm{ms}^{-1}$
(B) $7.4 \times 10^{5}\ \mathrm{ms}^{-1}$
(C) $6.4 \times 10^{5}\ \mathrm{ms}^{-1}$
(D) $8.4 \times 10^{6}\ \mathrm{ms}^{-1}$

Answer: (A) $8.4 \times 10^{5}\ \mathrm{ms}^{-1}$ · The council's preliminary key

Q42 TS EAPCET 2024 · 11 May · Shift 1 MCQ

The work functions of two photosensitive metal surfaces A and B are in the ratio $2:3$. If x and y are the slopes of the graphs drawn between the stopping potential and frequency of incident light for the surfaces A and B respectively, then $x:y=$

(A) $1:1$
(B) $2:3$
(C) $4:9$
(D) $2:5$

Answer: (A) $1:1$ · The council's preliminary key

Q43 TS EAPCET 2024 · 10 May · Shift 1 MCQ

The de Broglie wavelength of a proton is twice the de Broglie wavelength of an alpha particle. The ratio of the kinetic energies of the proton and the alpha particle is

(A) $1:1$
(B) $1:4$
(C) $1:2$
(D) $1:8$

Answer: (A) $1:1$ · The council's preliminary key

Q44 TS EAPCET 2024 · 10 May · Shift 2 MCQ

Wave picture of light has failed to explain

(A) photoelectric effect
(B) interference of light
(C) diffraction of light
(D) polarization of light

Answer: (A) photoelectric effect · The council's preliminary key

Q45 TS EAPCET 2024 · 10 May · Shift 2 MCQ

The work function of a photosensitive metal surface is 1.1 eV. Two light beams of energies 1.5 eV and 2 eV incident on the metal surface. The ratio of the maximum velocities of the emitted photoelectrons is

(A) $3:4$
(B) $1:1$
(C) $2:3$
(D) $4:9$

Answer: (C) $2:3$ · The council's preliminary key

Q46 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If Planck's constant is 6.63×10^{-34} Js, then the slope of a graph drawn between cut off voltage and frequency of incident light in a photoelectric experiment is

(A) 4.14×10^{-15} Vs
(B) 19.776×10^{-15} Vs
(C) 2.198×10^{-15} Vs
(D) 1.337×10^{-15} Vs

Answer: (A) 4.14×10^{-15} **Vs** · The council's preliminary key

Q47 TS EAPCET 2024 · 9 May · Shift 2 MCQ

If the de Broglie wavelength of a neutron at a temperature of $77\ ^\circ\mathrm{C}$ is λ, then the de Broglie wavelength of the neutron at a temperature of $1127\ ^\circ\mathrm{C}$ is

(A) $\frac{\lambda}{2}$
(B) $\frac{\lambda}{3}$
(C) $\frac{\lambda}{4}$
(D) $\frac{\lambda}{9}$

Answer: (A) $\frac{\lambda}{2}$ · The council's preliminary key

Q48 AP EAPCET 2023 · 19 May · Shift 1 MCQ

The de Broglie wavelength of a charged particle accelerated through a potential difference V is λ. If the potential difference is increased by 21%, the de Broglie wavelength of the charged particle is

(A) $\frac{5\lambda}{9}$
(B) $\frac{7\lambda}{9}$
(C) $\frac{9\lambda}{11}$
(D) $\frac{10\lambda}{11}$

Answer: (D) $\frac{10\lambda}{11}$ · The council's preliminary key

Q49 AP EAPCET 2023 · 18 May · Shift 1 MCQ

Photoelectrons are emitted with maximum velocity v when light of frequency 3 f incidents on a photosensitive material of work function 2 hf. If the frequency of the incident light is 4.25 f, the maximum velocity of the emitted photoelectrons is (h – Plank's constant)

(A) 0.5 v
(B) v
(C) 1.5 v
(D) 2 v

Answer: (C) 1.5 v · The council's preliminary key

Q50 AP EAPCET 2023 · 18 May · Shift 2 MCQ

The threshold wavelength of a photosensitive material is equal to the frequency of H_{α} line of hydrogen. If a photon whose frequency equal to the frequency of H_{β} line of hydrogen is incident on this photosensitive material, the maximum kinetic energy of the emitted photoelectrons is

(R – Rydberg's constant, h – Planck's constant and c – speed of light in vacuum)

(A) Rhc
(B) $\frac{5Rhc}{144}$
(C) $\frac{7Rhc}{144}$
(D) $\frac{Rhc}{36}$

Answer: (C) $\frac{7Rhc}{144}$ · The council's preliminary key

Q51 AP EAPCET 2023 · 17 May · Shift 1 MCQ

When light of wavelength λ incidents on a photosensitive material, photoelectrons are emitted. If the wavelength of the incident light is reduced by 50%, the maximum kinetic energy of the emitted photoelectrons becomes 3 times the initial maximum kinetic energy. The work function of the material is

(h – Planck's constant, c – Speed of light in vacuum)

EdLoop EAPCET

(A) $\frac{hc}{\lambda}$
(B) $\frac{hc}{2\lambda}$
(C) $\frac{2hc}{\lambda}$
(D) $\frac{hc}{3\lambda}$

Answer: (B) $\frac{hc}{2\lambda}$ · The council's preliminary key

Q52 AP EAPCET 2023 · 17 May · Shift 2 MCQ

In a photoelectric experiment, a graph is drawn with stopping potential along Y-axis and the frequency of the incident light along X-axis. If the graph is a straight line which makes an angle θ with Y-axis, then $\tan\theta =$

(h – planck's constant, e – charge of electron)

(A) $\frac{h}{e}$
(B) $\frac{e}{h}$
(C) $\sqrt{\frac{h}{e}}$
(D) $\sqrt{\frac{e}{h}}$

Answer: (B) $\frac{e}{h}$ · The council's preliminary key

Q53 AP EAPCET 2023 · 17 May · Shift 2 MCQ

The particle having zero mass is

(A) proton
(B) neutron
(C) photon
(D) electron

Answer: (C) photon · The council's preliminary key

Q54 AP EAPCET 2023 · 16 May · Shift 1 MCQ

The maximum kinetic energy of the emitted photoelectrons from a photosensitive material of work function ϕ, when light of frequency 'v' incidents on it is 'E'. If the frequency of the incident light is $3v$, the maximum kinetic energy of the emitted photoelectrons is

(A) $3E + 2\phi$
(B) $3E - 2\phi$
(C) $2E + 3\phi$
(D) $2E - 3\phi$

Answer: (A) $3E + 2\phi$ · The council's preliminary key

Q55 AP EAPCET 2023 · 16 May · Shift 2 MCQ

The threshold frequency of a photosensitive material is ν. When photons of frequency 2ν incident on the material, photoelectrons are emitted with a maximum linear momentum P. To get photoelectrons with maximum linear momentum 2 P, the frequency of the incident photons is

(A) 2ν
(B) 3ν
(C) 4ν
(D) 5ν

Answer: (D) 5ν · The council's preliminary key

Q56 AP EAPCET 2023 · 15 May · Shift 1 MCQ

The velocity of a particle A is 3 times the velocity of proton. If the ratio of the de Broglie wavelengths of the particle A and the proton is 3:2, the mass of the particle A is

(m_p – mass of proton)

(A) $\frac{2}{9}m_p$
(B) $\frac{2}{3}m_p$
(C) $\frac{2}{5}m_p$
(D) $\frac{2}{7}m_p$

Answer: (A) $\frac{2}{9}m_p$ · The council's preliminary key

Q57 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The de Broglie wavelength of the most energetic photoelectrons emitted from a photosensitive metal of work function ϕ, when light frequency ν incidents on it is λ. Then $\nu =$

(h – Planck's constant, m – mass of electron)

(A) $\frac{2\phi}{h} - \frac{h}{m\lambda^2}$
(B) $\frac{2\phi}{h} + \frac{h}{m\lambda^2}$
(C) $\frac{\phi}{h} + \frac{h}{2m\lambda^2}$
(D) $\frac{\phi}{h} - \frac{h}{2m\lambda^2}$

Answer: (C) $\frac{\phi}{h} + \frac{h}{2m\lambda^2}$ · The council's preliminary key

Q58 TS EAMCET 2023 · 14 May · Shift 1 MCQ

Radiations of wavelength 400 nm incidents on a photo sensitive material of work function 2.2 eV. The stopping potential is nearly

(A) 0.9 V
(B) 0.5 V
(C) 0.4 V
(D) 0.1 V

Answer: (A) 0.9 V · The council's preliminary key

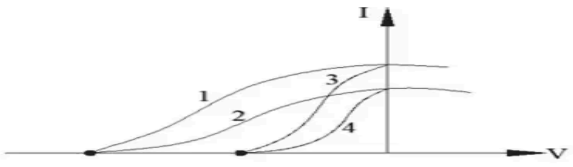
Q59 TS EAMCET 2023 · 14 May · Shift 2 MCQ

The graph given in the figure shows the variation of photo current (I) and the applied voltage (V) for two different materials and for two different intensities of the incident radiations. Then the curves which represent the same material are

(see the figure above)

The graph given in the figure shows the variation of photo current (I) and the applied voltage (V) for two different materials and for two different intensities of the incident radiations. Then the curves which represent the same material are

ఇ చ్చిన పటం రెండు వేరు వేరు కాంతి విద్యుత్ పదార్థములు మరియు రెండు వేరు వేరు తీవ్రతలు గల వికిరణములు పతనము చెందినపుడు కాంతి విద్యుత్ (I) మరియు అనువర్తించిన పొటెన్షియల్ (V) కు గీసిన గ్రాఫ్ ను సూచిస్తుంది. అయిన, ఒకే పదార్థాన్ని సూచించు వక్రాలు



Options :

1. 1 and 3
   1 మరియు 3
2. 1 and 4
   1 మరియు 4
3. 2 and 3
   2 మరియు 3
4. 3 and 4
   3 మరియు 4

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

Answer: (A) 1 and 3 · The council's preliminary key

Q60 TS EAMCET 2023 · 13 May · Shift 1 MCQ

The de Broglie wavelength of a particle moving with a speed of $0.8c$ is equal to the wavelength of a photon. If c is speed of the photon in vacuum, the ratio of the energy of the photon and the kinetic energy of the particle is

(A) $2:3$
(B) $5:2$
(C) $4:5$
(D) $3:5$

Answer: (B) $5:2$ · The council's preliminary key

Q61 TS EAMCET 2023 · 13 May · Shift 2 MCQ

Consider two black bodies A and B having equal surface areas. On the surface of A, 'n' photons of frequency 'f' are incident perpendicularly in a time 't'. On the surface of B, '2n' photons of frequency '3f' are incident perpendicularly in a time '4t'. The ratio of average intensity of radiation on surface A to that on surface B is

(A) 2:3
(B) 3:2
(C) 1:12
(D) 1:24

Answer: (A) 2:3 · The council's preliminary key

Q62 TS EAMCET 2023 · 13 May · Shift 2 MCQ

A photon released by the transition of an electron from the second excited state to the ground state of Hydrogen atom is incident on the surface of a metal of work function 3.1 eV. The de Broglie wavelength of the most energetic electron emitted from that metal surface is nearly

(A) 2.6 Å
(B) 4 Å
(C) 6 Å
(D) 7 Å

Answer: (B) 4 Å · The council's preliminary key

Q63 TS EAMCET 2023 · 12 May · Shift 1 MCQ

The de Broglie wavelength of an electron accelerated between two plates having a potential difference of 900 V is nearly

(A) 0.015 nm
(B) 0.01 nm
(C) 0.02 nm
(D) 0.04 nm

Answer: (D) 0.04 nm · The council's preliminary key

Q64 TS EAMCET 2023 · 12 May · Shift 2 MCQ

The additional energy that should be given to an electron to reduce its de-Broglie wavelength from 1 nm to 0.5 nm is

(A) four times initial energy
(B) thrice the initial energy
(C) equal to the initial energy
(D) twice the initial energy

Answer: (B) thrice the initial energy · The council's preliminary key

Q65 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

Statement I : By increasing the potential difference between cathode and anode continuously in a photoelectric experiment, the photo current always increases continuously.
Statement II : If two photons A and B of energies 2.5 eV and 3.5 eV respectively fall on a metal surface of work function 2.0 eV, then the ratio of maximum kinetic energies emitted between A and B is 3.
Statement III : The maximum energy needed by an electron to come out from a metal surface is called the work function of the metal.
Which of the following is correct?

(A) Statements I, II and III are true
(B) Statements I, II true, but statement III is false
(C) Statements II, III are true, but statement I is false
(D) Statements I, II and III are false

Answer: (D) Statements I, II and III are false · The council's preliminary key

Q66 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

Which of the following has the largest de Broglie wavelength?

(A) a bullet of mass 0.02 kg moving with speed 1 km/s
(B) a ball of mass 0.06 kg moving with speed 10 m/s
(C) a particle of mass 0.01 kg moving with speed 100 m/s
(D) a ball of mass 0.03 kg moving with speed 1 m/s

Answer: (D) a ball of mass 0.03 kg moving with speed 1 m/s · The council's preliminary key

Q67 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

When monochromatic light falls on a photo-sensitive metal, an electron is emitted with maximum velocity 1.6×10^6 m/s. Find the stopping potential.
[charge of electron = 1.6×10^{-19} C, mass of electron = 9×10^{-31}kg]

(A) 7.2 V
(B) 14.4 V
(C) 21.6 V
(D) 28.8 V

Answer: (A) 7.2 V · The council's preliminary key

Q68 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

A lamp of power 942 W radiates energy uniformly in all direction. The wavelength of radiation is 660 nm. The photon flux on a small screen 5.0 m from the lamp in units of $\frac{\text{photon}}{m^2.s}$ is
(Take Planck's constant $h = 6.6 \times 10^{-34}$ SI unit)

(A) 5×10^{20}
(B) $2\pi \times 10^{19}$
(C) $\frac{6}{\pi} \times 10^{18}$
(D) 1×10^{19}

Answer: (D) 1×10^{19} · The council's preliminary key

Q69 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

Light strikes a metal surface causing photoelectric emission. The wavelength of incident light is 248 nm. If the stopping potential for the ejected electrons is 2.8 eV, then the work function of the metal is
(Take hc = 1240 eV.nm)

(A) 5.2 eV
(B) 4.4 eV
(C) 3.8 eV
(D) 2.2 eV

Answer: (D) 2.2 eV · The council's preliminary key

Q70 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

The de-Broglie wavelength associated with an electron, accelerated through a potential difference of 121 volts is about:
[Take Plank's constant $= h = 6.6 \times 10^{-34}\ J \cdot s$, mass of electron 9×10^{-31} kg]

(A) 0.123 nm
(B) 0.112 nm
(C) 0.221 nm
(D) 0.098 nm

Answer: (B) 0.112 nm · The council's preliminary key

Q71 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

In a photo electric experiment, the wavelength of the light incident on the metal is changed from 200 nm to 400 nm. The decrease in the stopping potential is close to
[Use hc = 1240 eV-nm where h = Planck's constant and c is velocity of light]

(A) 3.1 V
(B) 8 V
(C) 4.2 V
(D) 1.2 V

Answer: (A) 3.1 V · The council's preliminary key

Q72 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

The de-Broglie wavelength of an electron with kinetic energy of 320 eV is
(Take $h = 6.0 \times 10^{-34}$ SI unit, mass of electron $= m_e = 9.0 \times 10^{-31}$ kg, Charge of an electron $= 1.6 \times 10^{-19}$ C.)

(A) 85.8 pm
(B) 110.5 pm
(C) 62.5 pm
(D) 50 pm

Answer: (C) 62.5 pm · The council's preliminary key

Q73 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

For photoelectric effect which of the following statements are true.
I) The kinetic energies of the photoelectrons do not depend on the frequency of light
II) Photoelectric effect will always occur for highly intense light
III) The maximum kinetic energy of photoelectron does not depend upon the intensity of the light
IV) The escaping electron's kinetic energy is larger for larger frequency

(A) I and II only
(B) II and III only
(C) III and IV only
(D) IV and I only

Answer: (C) III and IV only · The council's preliminary key

Q74 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

Which of the following statements is NOT true?

EdLoop EAPCET

(A) Electromagnetic radiation is made up of particles called photons
(B) Each photon moves with the speed of light
(C) Photon energy is dependent on the intensity of radiation
(D) Photons are not deflected by electric and magnetic field

Answer: (C) Photon energy is dependent on the intensity of radiation · The council's preliminary key

Q75 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

The value of Plank's constant, if the slope of the graph of stopping potential vs frequency of incident light is 4×10^{-15} Vs is
(given charge of an electron = 1.6×10^{-19}C)

(A) 6.0×10^{-34} Js
(B) 6.2×10^{-34} Js
(C) 6.4×10^{-34} Js
(D) 6.6×10^{-34} Js

Answer: (C) 6.4×10^{-34} **Js** · The council's preliminary key

Q76 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

Two light waves of wavelengths 600 nm and 200 nm incident on a metal surface. The maximum velocity of photoelectrons produced due to one wavelength is $\frac{1}{3}$ of the maximum velocity of the photoelectrons produced due to the other wavelength, then the work function of the metal is

(A) $\frac{hc}{8} \times 10^7$ J
(B) $\frac{8}{hc} \times 10^7$ J
(C) $\frac{hc}{4} \times 10^7$ J
(D) $\frac{hc}{9} \times 10^7$ J

Answer: (A) $\frac{hc}{8} \times 10^7$ J · The council's preliminary key

Q77 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

A metal has work function 2.5 eV. If a radiation of frequency 3.2×10^{15} Hz is incident on this metal surface, then the maximum kinetic energy of ejected photo electrons is
(Plank's constant, $h = 6.6 \times 10^{-34}$ J-s)

(A) 9.5 eV
(B) 2.5 eV
(C) 10.7 eV
(D) 12.6 eV

Answer: (C) 10.7 eV · The council's preliminary key

Q78 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

The average number of photons emitted per second by a laser of power 6.6×10^{-3} W producing a light of wavelength 600 nm is (Planck's constant, $h = 6.6 \times 10^{-34}$ J s)

(A) 2×10^{16}
(B) 3×10^{16}
(C) 4×10^{16}
(D) 6×10^{16}

Answer: (A) 2×10^{16} · The council's preliminary key

Q79 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

A light from Paschen series of hydrogen atom is able to eject photoelectrons from a metal. Then the work function of the metal is

(A) 3.4 eV
(B) 1.54 eV
(C) 0.85 eV
(D) 1.1 eV

Options (4) or (3) were accepted. More than one answer was accepted. · Checked by our team

Q80 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

A particle of mass 1×10^{-30} kg and electric change (sic) 1.6×10^{-19} C has de-Broglie wavelength 660 nm. Then kinetic energy of this particle is
(Plank's (sic) constant, $h = 6.6 \times 10^{-34}$ J-s)

(A) 4.2×10^{-6} eV
(B) 2.5×10^{-6} eV
(C) 1.3×10^{-6} eV
(D) 3.1×10^{-6} eV

Answer: (D) 3.1×10^{-6} **eV** · The council's preliminary key

Q81 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

A radiation of 3.8 eV falls on a metal surface to produce photo electrons. These electrons are made to enter a magnetic field of 2×10^{-4} T. If the radius of the largest circular path followed by these electrons is 30 mm, then the work function of the metal is
(Mass of electron $m_e = 9 \times 10^{-31}$ kg)

EdLoop EAPCET

(A) 0.9 eV
(B) 1.0 eV
(C) 0.6 eV
(D) 1.2 eV

Answer: (C) 0.6 eV · The council's preliminary key

Q82 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

The electric field associated with a mono chromatic light wave is given by $E = E_o \sin[(1.57 \times 10^7\ \mathrm{m}^{-1})(x - ct)]$, then the stopping potential when this light is used in a photoelectric experiment with the metal having work function 1.9 eV is
[Planck's constant, $h = 6.64 \times 10^{-34}$ Js]

(A) $0.5\ \mathrm{eV}$
(B) $3.2\ \mathrm{eV}$
(C) $1.1\ \mathrm{eV}$
(D) $0.75\ \mathrm{eV}$

Answer: (C) $1.1\ \mathrm{eV}$ · The council's preliminary key

Q83 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

The following statement is correct in the case of photoelectric effect

(A) For a given frequency of incident radiation, the stopping potential varies linearly with its intensity.
(B) For a given frequency of incident radiation, the photocurrent is independent of its intensity.
(C) For a given frequency of a incident radiation, the maximum kinetic energy of the photoelectrons is independent of its intensity.
(D) For a frequency lower than cutoff frequency, photoelectric emissions can occur if intensity of incident light is increased slightly .

Answer: (C) For a given frequency of a incident radiation, the maximum kinetic energy of the photoelectrons is independent of its intensity. · The council's preliminary key

Q84 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

A particle of mass $2 \times 10^{-27}\ \mathrm{kg}$ has de-Broglie wavelength of $3.3 \times 10^{-10}\ \mathrm{m}$. The kinetic energy of this particle is

(Plank's Constant $h = 6.6 \times 10^{-34}$ J-s)

(A) 5×10^{-20} J
(B) 8×10^{-20} J
(C) 1×10^{-21} J
(D) 6×10^{-22} J

Answer: (C) 1×10^{-21} J · The council's preliminary key

Q85 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

The metal which has the highest work function in the following is

(A) Cesium (Cs)
(B) Sodium (Na)
(C) Aluminium (Al)
(D) Platinum (Pt)

Answer: (D) Platinum (Pt) · The council's preliminary key

Q86 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

In a photoelectric experiment light of wavelength 800 nm produces photoelectrons with the smallest de Broglie wavelength of 1 nm. Light of 400 nm produces photoelectrons with smallest de Broglie wavelength of 0.5 nm. Then the work function of the metal used in the experiment is nearly

(A) 1.03 eV
(B) 0.53 eV
(C) 2.03 eV
(D) 4.02 eV

Answer: (A) 1.03 eV · The council's preliminary key

Q87 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

The maximum wavelength of light that can cause photo electric effect in a metal of work function 3.5 eV is _____

(A) $354.5\ nm$
(B) $35.45\ nm$
(C) $5.67 \times 10^{-26}\ m$
(D) 5.67 Å

Answer: (A) $354.5\ nm$ · The council's preliminary key

Q88 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

When a light of wavelength 4900 Å falls on a photosensitive metal, a negative 2 V potential is required to stop the emitted electrons. Then the work function of the material is nearly _____. Given charge on electron $= 1.602 \times 10^{-19}$ C and Planck's constant $= 6.625 \times 10^{-34}$ J.s

(A) $1.1\ \text{eV}$
(B) $2.2\ \text{eV}$
(C) $0.53\ \text{eV}$
(D) $1\ \text{eV}$

Answer: (C) $0.53\ \text{eV}$ · The council's preliminary key

Q89 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

The study of photoelectric effect is useful in understanding:

(A) Quantization of charge
(B) Quantization of energy
(C) Conservation of energy
(D) Conservation of kinetic energy

Answer: (B) Quantization of energy · The council's preliminary key

Q90 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

Photo cells convert _____

(A) light energy into mechanical energy
(B) heat energy into electrical energy
(C) light energy into electrical energy
(D) electrical energy into light energy

Answer: (C) light energy into electrical energy · The council's preliminary key

Q91 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

The voltage applied to an electron microscope to produce electrons of wavelength $0.50\ \text{Å}$ is _____

(A) $602\ V$
(B) $50\ V$
(C) $138\ V$
(D) $812\ V$

Answer: (A) $602\ V$ · The council's preliminary key

Q92 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

The graph between the maximum speed (v_{max}) of a photoelectron and frequency (v) of the incident radiation, in photoelectric effect is correctly represented by:

EdLoop EAPCET

Mandatory : No

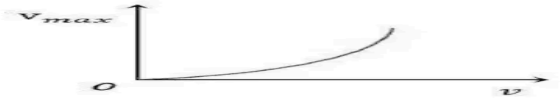
The graph between the maximum speed (v_{max}) of a photoelectron and frequency (ν) of the incident radiation, in photoelectric effect is correctly represented by:

కాంతి విద్యుత్ ప్రభావములో ఫోటోఎలక్ట్రాను గరిష్ట వేగ v_{max} మరియు పతన వికిరణము యొక్క పౌనఃపున్యము ν ల మధ్య గీసిన వక్రము _____

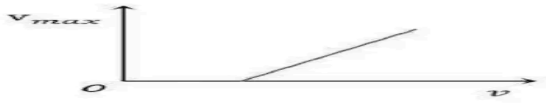
Options :

1.

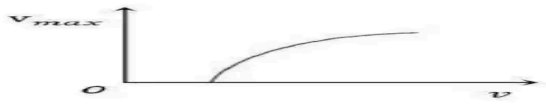
AP EAPCET 2021
AP EAPCET 2021



2.



3.



4.



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (C) · The council's preliminary key

Q93 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

If a photocell is illuminated with a radiation of 1240 Å, the stopping potential is found to be $8\ V$; then the work function of the emitter and the threshold wavelength are:

(A) $2\ eV,\ 2000$ Å
(B) $2\ eV,\ 6200$ Å
(C) $2\ eV,\ 2480$ Å
(D) $3\ eV,\ 6200$ Å

Answer: (B) $2\ eV,\ 6200$ Å · The council's preliminary key

Q94 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

Radiation of wavelength $300\ nm$ and intensity $100\ \mathrm{W.m^{-2}}$ falls on the surface of a photosensitive material. If $2\ \%$ of the incident photons produce photo electron, the number of photoelectrons emitted from an area of $2\ cm^2$ of the surface is nearly _____

(A) 15×10^{11}

(B) 6.04×10^{14}

(C) 1.5×10^{12}

(D) 60.4×10^{15}

Answer: (B) 6.04×10^{14} · The council's preliminary key

Q95 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

The de Broglie wavelength associated with a proton under the influence of an electric potential of 100 volts is _____

(A) 1.227 Å

(B) 2.86 pm

(C) 12.27 Å

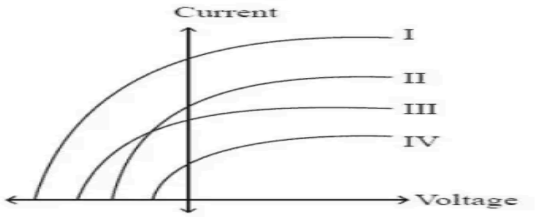
(D) 1.146×10^{-21} m

Answer: (B) 2.86 pm · The council's preliminary key

Q96 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

In a photoelectric experiment 3 different lights are incident on a metal of work function 1.5 eV. Light A is 200 nm wavelength with intensity 1.8 w/m^2, light B is 400 nm with 1 w/m^2 and light C is 600 nm with 0.5 w/m^2. The current versus voltage is measured. Which graphs correspond to which light? *(see the figure above)*

In a photoelectric experiment 3 different lights are incident on a metal of work function 1.5 eV. Light A is 200 nm wavelength with intensity 1.8 w/m^2, light B is 400 nm with 1 w/m^2 and light C is 600 nm with 0.5 w/m^2. The current versus voltage is measured. Which graphs correspond to which light?



Options :

1. Light A I, Light B III, Light C II

2. Light A I, Light B II, Light C IV

3. Light A I, Light B III, Light C IV

4. Light A III, Light B II, Light C IV

(A) Light A: I, Light B: III, Light C: II
(B) Light A: I, Light B: II, Light C: IV
(C) Light A: I, Light B: III, Light C: IV
(D) Light A: III, Light B: II, Light C: IV

Answer: (D) Light A: III, Light B: II, Light C: IV · The council's preliminary key

Q97 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

In a photoelectric effect experiment the cathode metal is exposed to light of wavelength $600\ \text{nm}$. The maximum kinetic energy of the ejected electron doubles when light of wavelength $400\ \text{nm}$ is used. The work function of the cathode metal is approximately [Use $h = 6.63 \times 10^{-34}\ \text{J.s}$, $c = 3 \times 10^{8}\ \text{m/s}$]

(A) $1.58\ \text{eV}$
(B) $1.84\ \text{eV}$
(C) $1.02\ \text{eV}$
(D) $2.64\ \text{eV}$

Answer: (C) $1.02\ \text{eV}$ · The council's preliminary key

Q98 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The de-Broglie wavelength of an electron having kinetic energy 100 eV is [Use h = 4.14×10^{-15} eVs, mass of electron = $\frac{0.5 \times 10^{6}}{c^2}$ eV, 1 pm = 10^{-12} m]

(A) 150.1 pm
(B) 124.2 pm
(C) 115.5 pm
(D) 120.8 pm

Answer: (B) 124.2 pm · The council's preliminary key

Q99 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

If the light from Balmer series of hydrogen is used to eject photoelectrons from a metal, then the maximum work function of the metal can be

(A) 1.89 eV
(B) 3.4 eV
(C) 3.8 eV
(D) 5.1 eV

Answer: (B) 3.4 eV · The council's preliminary key

Q100 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

Which of the following particle has the shortest de-Broglie wavelength?

(A) Proton
(B) Electron
(C) α – particle
(D) X – rays

Answer: (C) α **– particle** · The council's preliminary key

Q101 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

The work function of a metal is $h\nu_0$. Light of frequency ν falls on this metal. The photoelectric effect will take place only if

(A) $\nu > \nu_0$
(B) $\nu > 2\nu_0$
(C) $\nu < \nu_0$
(D) $\nu < \frac{\nu_0}{2}$

Answer: (A) $\nu > \nu_0$ · The council's preliminary key

Q102 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

Threshold frequency for photoelectric effect on sodium corresponds to a wavelength 5000Å. Its work function is

(A) 15 J
(B) 16×10^{-14} J
(C) 4×10^{-19} J
(D) 4×10^{-18} J

Answer: (C) 4×10^{-19} **J** · The council's preliminary key

Q103 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

The photoelectric threshold for a certain metal surface is 360 Å. If the metal surface is irradiated by a wavelength of 1100 Å, the kinetic energy of the emitted photoelectrons is

(A) 1.1 eV
(B) 2 eV
(C) 2.3 eV
(D) 0

Answer: (D) 0 · The council's preliminary key

Q104 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

A metal surface is illuminated by a light of given intensity and frequency to cause photoemission. If the intensity of illumination is reduced to one-fourth of its original value, then the maximum kinetic

energy of the emitted photoelectrons would become _____

(A) Unchanged
(B) Half of the original value
(C) Twice of the original value
(D) Four times of the original value

Answer: (A) Unchanged · The council's preliminary key

Q105 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

If the wavelength of a photon is 4000 Å, then its energy will be _____

(A) 4.95×10^{-19} J
(B) 5.95×10^{-19} J
(C) 3.95×10^{-19} J
(D) 6.95×10^{-19} J

Answer: (A) 4.95×10^{-19} J · The council's preliminary key

Q106 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

The maximum velocity of an electron emitted by light of wavelength λ incident on the surface of a metal of work function ϕ is _____ [h = Planck's constant, m = mass of electron and c = speed of light].

(A) $\sqrt{\frac{2(hc+\lambda\phi)}{m\lambda}}$
(B) $\frac{2(hc-\lambda\phi)}{m}$
(C) $\sqrt{\frac{2(hc-\lambda\phi)}{m\lambda}}$
(D) $\frac{2(h\lambda-\phi)}{m}$

Answer: (C) $\sqrt{\frac{2(hc-\lambda\phi)}{m\lambda}}$ · The council's preliminary key

Q107 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

The retarding potential necessary to stop the emission of photoelectrons, when a target material of work function $1.24\,\text{eV}$ is irradiated with light of wavelength $4.36 \times 10^{-7}\,\text{m}$ is

(A) $4.08\,\text{eV}$
(B) $2.84\,\text{eV}$
(C) $1.60\,\text{eV}$
(D) $0.36\,\text{eV}$

Answer: (C) $1.60\,\text{eV}$ · The council's preliminary key

Q108 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

Which of the following statements is correct regarding photoelectric effect?

1. The electrons are emitted if emitting surface is at high temperature.
2. Photoemission occurs if wavelength is less than a critical value.
3. The K.E. of photoelectrons is proportional to the square of the amplitude of incident radiation.
4. The photoelectric current is proportional to the frequency of incident radiation.

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

Answer: (B) 2 · The council's preliminary key

Q109 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

If ultra-violet radiation of $6.2\ eV$ falls of an aluminum surface, then kinetic energy of the fastest emitted electron is (work function $= 4.2\ eV$)

(A) 3.2×10^{-19} J
(B) 3.2×10^{-21} J
(C) 7×10^{-25} J
(D) 9×10^{-31} J

Answer: (A) 3.2×10^{-19} J · The council's preliminary key

Q110 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

According to the photoelectric effect, the plot of kinetic energy of the emitted photo electrons from a metal versus the frequency of the incident radiation gives a straight line whose slope

(A) is the same for all metals and independent of the intensity of radiation
(B) depends only on the intensity of radiation
(C) depends both on the intensity of the radiation and the metal used
(D) depends on the nature of metals used

Answer: (A) is the same for all metals and independent of the intensity of radiation · Official TGCHE final key

---

Q111 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

A light of wavelength 310 nm is used in a photoelectric experiment. The metal electrode of work function of 2.5 eV is used in the experiment. The stopping potential for the photoelectrons will be (Assume hc = 1240 eV $-$nm)

(A) 1.0 V
(B) 1.5 V
(C) 2.0 V
(D) 2.5 V

Answer: (B) 1.5 V · Official TGCHE final key

Q112 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

When the energy of incident radiation is increased by 20 %, the kinetic energy of the photo electrons emitted from a metal surface increased from 0.5 eV to 0.8 eV. The work function of the metal is

(A) 0.65 eV
(B) 1.0 eV
(C) 1.3 eV
(D) 1.5 eV

Answer: (B) 1.0 eV · Official TGCHE final key

Q113 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

In a photoelectric effect experiment if the frequency of light is doubled, the stopping potential will

(A) be halved
(B) become more than double
(C) become less than double
(D) be doubled

Answer: (B) become more than double · Official TGCHE final key

Q114 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

Photons of energy 2.4 eV and wavelength λ fall on a metal plate and release photoelectrons with a maximum velocity v. By decreasing λ by 50 % the maximum velocity of photoelectrons becomes $3v$. The work function of the material of the metal plate is

(A) 2.1 eV
(B) 1.7 eV
(C) 2.8 eV
(D) 2.0 eV

Answer: (A) 2.1 eV · Official TGCHE final key

Q115 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

Let V_1 and V_2 be the maximum velocities of the emitted electrons when the surface of a metal is illuminated with light waves of energy E_1 = 4 eV and E_2 = 2.5 eV respectively. If the work function of the metal is 2 eV, then the ratio $\frac{V_1}{V_2}$ is

(A) 1.6
(B) 4
(C) 2
(D) 0.5

Answer: (C) 2 · Official TGCHE final key

Q116 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

A beam of photons with an energy of 10.5 eV strike a metal plate. The photoelectrons are emitted with maximum velocity of 1.6×10^6 m /s. The work function of the metal is (Assume mass of electron = 9×10^{-31} kg and Charge of electron = 1.6×10^{-19} C)

(A) $3.0\ \text{eV}$
(B) $3.1\ \text{eV}$
(C) $3.3\ \text{eV}$
(D) $3.5\ \text{eV}$

Answer: (C) $3.3\ \text{eV}$ · Official TGCHE final key

Q117 TS EAMCET 2019 · 6 May · Shift 1 MCQ

Match the following.
List - I
A) Michelson-Morley experiment
B) Stern-Gerlach experiment
C) Davisson-Germer experiment
D) Anderson discovery of positron
List - II
I) The existence of antimatter
II) The existence of de-Broglie matter waves
III) Electrons have spins
IV) The non-existence of ether
The correct match is

(A) A-IV, B-II, C-I, D-III
(B) A-II, B-III, C-IV, D-I
(C) A-I, B-II, C-IV, D-III
(D) A-IV, B-III, C-II, D-I

Answer: (D) A-IV, B-III, C-II, D-I · Official TGCHE final key

Q118 TS EAMCET 2019 · 6 May · Shift 1 MCQ

A flashlight of intensity 9 W/cm^2 illuminates a perfectly reflective surface of area 300 cm^2. The average force exerted on the surface due to the incident light photons is

(A) 0 N
(B) 14 μN
(C) 18 μN
(D) 12 μN

Answer: (C) 18 μN · Official TGCHE final key

Q119 TS EAMCET 2019 · 6 May · Shift 1 MCQ

A parallel beam of monochromatic light of frequency 'ν' is incident on a surface. The intensity of the beam is I and area of the surface is A. Find the force exerted by the light beam on the surface if the surface is perfectly reflecting and the light beam is incident at an angle of incidence θ. (The speed of light is denoted as 'c')

(A) $\frac{2IA\sin^2\theta}{\pi c}$
(B) $\frac{IA\cos^2\theta}{c}$
(C) $\frac{2IA\cos^2\theta}{c}$
(D) $\frac{IA\cos^2\theta}{\sqrt{2}c}$

Answer: (C) $\frac{2IA\cos^2\theta}{c}$ · Official TGCHE final key

Q120 TS EAMCET 2019 · 4 May · Shift 1 MCQ

Albert Einstein was conferred with the Nobel Prize in physics for his work on:

(A) Special theory of relativity
(B) Bose-Einstein statistics
(C) Photoelectric effect
(D) General relativity

Answer: (C) Photoelectric effect · Official TGCHE final key

Q121 TS EAMCET 2019 · 4 May · Shift 1 MCQ

The wavelength of a charged particle of mass 8×10^{-31} kg, charge 1.6×10^{-19} C and kinetic energy 1 keV will be (Let $h=6.4\times10^{-34}$ J.s.)

(A) 0.4 Å
(B) 2.1 Å
(C) 1.0 Å
(D) 0.1 Å

Answer: (A) 0.4 Å · Checked by our team

Q122 TS EAMCET 2019 · 4 May · Shift 2 MCQ

A cobalt plate is placed at a distance of 1 m from a point source of power 1 W. Assume a circular area of the plate of radius $r=1$ Å is exposed to the radiation and ejects photoelectrons. The light energy

is considered to be spread uniformly and the work function of cobalt is 5 eV. The minimum time the target should be exposed to the light source to eject a photoelectron (assuming no reflection losses) is

(A) 320 s
(B) 450 s
(C) 860 s
(D) 100 s

Answer: (A) 320 s · Official TGCHE final key

Q123 TS EAMCET 2019 · 3 May · Shift 1 MCQ

A particle of charge q, mass m and energy E has de-Broglie wavelength λ. For a particle of charge $2q$, mass $2m$ and energy $2E$, the de-Broglie wavelength is

(A) $\frac{\lambda}{4}$
(B) 2λ
(C) 8λ
(D) $\frac{\lambda}{2}$

Answer: (D) $\frac{\lambda}{2}$ · Official TGCHE final key

Q124 TS EAMCET 2019 · 3 May · Shift 2 MCQ

A photodiode sensor is used to measure the output of a $300\ \mathrm{W}$ lamp kept $10\ \mathrm{m}$ away. The sensor has an opening of $2\ \mathrm{cm}$ in diameter. How many photons enter the sensor if the wavelength of the light is $660\ \mathrm{nm}$ and the exposure time is $100\ \mathrm{m\,s}$. (Assume that all the energy of the lamp is given off as light and $h = 6.6 \times 10^{-34}$ J-s)

(A) 3.6×10^{13}
(B) 2.8×10^{13}
(C) 2.5×10^{13}
(D) 1.8×10^{13}

Answer: (C) 2.5×10^{13} · Official TGCHE final key

Q125 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

Light of wavelength $488\ \mathrm{nm}$ produced by an Argon laser is used in the photoelectric effect. When light from this spectral line is incident on the cathode, the stopping potential of photoelectrons is $0.38\ \mathrm{V}$. The work function of the cathode material is

EdLoop EAPCET

(A) $2.16\ \text{eV}$
(B) $216\ \text{eV}$
(C) $21.6\ \text{eV}$
(D) $0.216\ \text{eV}$

Answer: (A) $2.16\ \text{eV}$ · Official APSCHE final key

Q126 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

All electrons ejected from a metallic surface by incident light of wavelength 400 nm travelled 1 m in the direction of uniform electric field of $2\ \text{NC}^{-1}$ and came to rest. The work function of the surface is

(A) 1.1 eV
(B) 2.2 eV
(C) 3.1 eV
(D) 5.1 eV

Answer: (A) 1.1 eV · Official APSCHE final key

Q127 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

All electrons ejected from a metal surface by the incident light of wavelength $200\ \text{nm}$ can be stopped before travelling $1\ \text{m}$ in the direction of uniform electric field of $4\ \text{NC}^{-1}$. The work function of the metal surface is

(A) $2\ \text{eV}$
(B) $2.2\ \text{eV}$
(C) $4\ \text{eV}$
(D) $6.2\ \text{eV}$

Answer: (B) $2.2\ \text{eV}$ · Official APSCHE final key

Q128 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

The maximum kinetic energy of a photoelectron liberated from the surface of lithium with work function 2.35 eV by electromagnetic radiation whose electric component varies with time as $E = a\left[1+\cos(2\pi f_1 t)\right]\cos 2\pi f_2 t$ (where 'a' is a constant) is ($f_1 = 3.6\times10^{15}$ Hz, $f_2 = 1.2\times10^{15}$ Hz and Plank's constant = 6.6×10^{-34} J-s)

(A) 2.64 eV
(B) 7.55 eV
(C) 12.52 eV
(D) 17.45 eV

Answer: (D) 17.45 eV · Official APSCHE final key

Q129 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

An α-particle moves in a circular path of radius 1 cm in a uniform magnetic field of 0.125 T. The de Broglie wavelength associated with the α-particle is

(A) 1.65×10^{-12} m
(B) 3.3×10^{-12} m
(C) 4.95×10^{-12} m
(D) 6.6×10^{-12} m

Answer: (A) 1.65×10^{-12} m · Official APSCHE final key

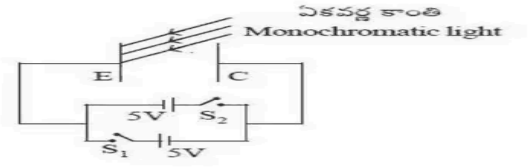
Q130 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

In a photoelectric experiment, a monochromatic light is incident on the emitter plate E, as shown in the figure. When switch S_1 is closed and switch S_2 is open, the photoelectrons strike the collector plate C with a maximum kinetic energy of 1 eV. If switch S_1 is open and switch S_2 is closed and the frequency of the incident light is doubled, the photoelectrons strike the collector plate with a maximum kinetic energy of 20 eV. The threshold wavelength of the emitter plate is
(see the figure above)

Question Number : 116 Question Id : 1874633796 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a photoelectric experiment, a monochromatic light is incident on the emitter plate E, as shown in the figure. When switch S_1 is closed and switch S_2 is open, the photoelectrons strike the collector plate C with a maximum kinetic energy of 1 eV. If switch S_1 is open and switch S_2 is closed and the frequency of the incident light is doubled, the photoelectrons strike the collector plate with a maximum kinetic energy of 20 eV. The threshold wavelength of the emitter plate is

పటంలో చూపిన విధంగా ఒక కాంతి విద్యుత్ ఫలిత ప్రయోగంలో ఉద్గారక పలక E పై ఒక ఏకవర్ణ కాంతి పతనమైనది. స్విచ్ S_1 ను మూసి, స్విచ్ S_2 ను తెరచినపుడు సేకరిణి పలక C ని ఫోటో ఎలక్ట్రానులు 1 eV గరిష్ఠ గతిజశక్తితో తాకును. స్విచ్ S_1 ను తెరచి, స్విచ్ S_2 ను మూసి, పతన కాంతి యొక్క పౌనఃపున్యాన్ని రెట్టింపు చేసిన, సేకరిణి పలకను ఫోటో ఎలక్ట్రానులు 20 eV గరిష్ఠ గతిజ శక్తితో తాకును. ఉద్గార పలక యొక్క ఆరంభ తరంగదైర్ఘ్యం



Options :
1. 5233.3 Å
2. 4133.3 Å
3. 4166.7 Å
4. 5336.7 Å

(A) 5233.3 Å
(B) 4133.3 Å
(C) 4166.7 Å
(D) 5336.7 Å

Answer: (B) 4133.3 Å · Official APSCHE final key

Q131 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

An electron of charge 'e' and mass 'm' moving with an initial velocity $v_0\hat{i}$ is subjected to an electric field $E_0\hat{j}$. The de-Broglie wavelength of the electron at a time 't' is (Initial de-Broglie wavelength of the electron = λ_0)

(A) λ_0

(B) $\lambda_0\sqrt{1+\frac{e^2E_0^2t^2}{m^2v_0^2}}$

(C) $\frac{\lambda_0}{\sqrt{1+\frac{e^2E_0^2t^2}{m^2v_0^2}}}$

(D) $\frac{\lambda_0}{\left(1+\frac{e^2E_0^2t^2}{mv_0^2}\right)}$

Answer: (C) $\frac{\lambda_0}{\sqrt{1+\frac{e^2E_0^2t^2}{m^2v_0^2}}}$ · Official APSCHE final key

Q132 TS EAMCET 2018 · 5 May · Shift 1 MCQ

A photon of energy 4 eV imparts all its energy to an electron that leaves a metal surface with 1.1 eV of kinetic energy. The work function of the metal is

(A) 2.9 eV

(B) 5.1 eV

(C) 3.64 eV

(D) 4.4 eV

Answer: (A) 2.9 eV · The council's preliminary key

Q133 TS EAMCET 2018 · 5 May · Shift 2 MCQ

Light of frequency 4×10^{14} Hz is incident on a metal surface of work function 2.14 eV resulting in photoemission of electrons. The maximum kinetic energy of the emitted electrons is $[h=6.63\times10^{-34}$ Js$]$

(A) 0.35 eV

(B) 0.14 eV

(C) 2.14 eV

(D) 0 eV

Answer: (D) 0 eV · The council's preliminary key

Q134 TS EAMCET 2018 · 5 May · Shift 2 MCQ

If a proton is accelerated through a potential difference of 1000 V, its deBroglie wave length is (Given $m_p=1.67\times10^{-27}$ kg, $h=6.63\times10^{-34}$ Js)

(A) 9.1×10^{-13} m
(B) $9.1 \times 10^{+13}$ m
(C) 1.09×10^{-15} m
(D) $1.09 \times 10^{+15}$ m

Answer: (A) 9.1×10^{-13} m · The council's preliminary key

Q135 TS EAMCET 2018 · 4 May · Shift 1 MCQ

At an incident radiation frequency of ν_1, which is greater than the threshold frequency, the stopping potential for a certain metal is V_1. At frequency $2\nu_1$ the stopping potential is $3V_1$. If the stopping potential at frequency $4\nu_1$ is nV_1, then n is

(A) 2
(B) 3
(C) 6
(D) 7

Answer: (D) 7 · The council's preliminary key

Q136 TS EAMCET 2018 · 4 May · Shift 1 MCQ

The de Broglie wavelength of an electron of kinetic energy 9eV is (take $h = 4 \times 10^{-15}$ eV.sec, $c = 3 \times 10^{10}$ cm/sec and the mass m_e of electron as $m_e c^2 = 0.5$ MeV)

(A) 4×10^{-8} cm
(B) 3×10^{-8} cm
(C) 4×10^{-7} cm
(D) 3×10^{-7} cm

Answer: (A) 4×10^{-8} **cm** · The council's preliminary key

Q137 TS EAMCET 2018 · 4 May · Shift 2 MCQ

An isolated lead ball is charged upon continuous irradiation by EM radiation of wavelength (λ) = 221 nm. The maximum potential attained by the lead ball, if its work function is 4.14 eV, is
(Take $h = 6.63 \times 10^{-34}$ J.s, $c = 3 \times 10^{8}$ m/s, $e = 1.6 \times 10^{-19}$ C)

(A) 1.49 V
(B) 2.67 V
(C) 3.14 V
(D) 0.51 V

Answer: (A) 1.49 V · The council's preliminary key

Q138 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

When light of frequency 'ν' incidents on two metallic plates A and B, photo electrons are emitted. If the work function of A is more than that of B, the correct curve of the following curves drawn between stopping potential 'V' and incident frequency 'ν' is

(see the figure above)



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (D) · The council's preliminary key

Q139 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

When photons of energy 5 eV incident on a photo metal of work function 4.36 eV, photo electrons are emitted. The maximum impulse of the metal surface is ___

(A) $2.41 \times 10^{-25}\ \text{kgms}^{-1}$
(B) $2.31 \times 10^{-25}\ \text{kgms}^{-1}$
(C) $4.31 \times 10^{-25}\ \text{kgms}^{-1}$
(D) $1.31 \times 10^{-24}\ \text{kgms}^{-1}$

Answer: (C) $4.31 \times 10^{-25}\ \text{kgms}^{-1}$ · The council's preliminary key

Q140 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

An α - particle and a proton are accelerated from rest by the same potential, then the ratio of their de-Broglie wavelengths is _____

(A) $2\sqrt{2} : 1$
(B) $1 : 2\sqrt{2}$
(C) $1 : 2$
(D) $2 : 1$

Answer: (B) $1 : 2\sqrt{2}$ · The council's preliminary key

Q141 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

Photons of wavelength λ emitted by a source of power P incident on a photo cell. If the current produced in the cell is I, The percentage of incident photons which produce current in the photo cell is
(h is Planck's constant and c is the speed of light in vacuum)

(A) $\frac{100\,ePc}{Ih\lambda}$
(B) $\frac{100\,eP\lambda}{Ihc}$
(C) $\frac{100\,Ih\lambda}{ePc}$
(D) $\frac{100\,Ihc}{eP\lambda}$

Answer: (D) $\frac{100\,Ihc}{eP\lambda}$ · The council's preliminary key

Q142 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

Photons of frequencies equal to the frequencies of H_β and H_∞ lines of hydrogen incident on a photosensitive plate whose threshold frequency is equal to the frequency of H_α line of hydrogen. The ratio of the maximum kinetic energies of the emitted electrons is

(A) $7 : 16$
(B) $3 : 4$
(C) $8 : 27$
(D) $5 : 36$

Answer: (A) $7 : 16$ · The council's preliminary key

Q143 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

Hydrogen atom is in its nth energy state. If de-Broglie wavelength of the electron is λ, then

(A) $\lambda \propto \frac{1}{n^2}$
(B) $\lambda \propto \frac{1}{n}$
(C) $\lambda \propto n^2$
(D) $\lambda \propto n$

Answer: (D) $\lambda \propto n$ · The council's preliminary key

Q144 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

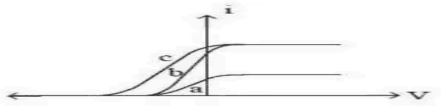
The figure shows the variation of photocurrent (i) with anode potential (V) for three different radiations. Let I_a, I_b and I_c be the intensities and f_a, f_b and f_c be the frequencies for the curves a, b and c respectively. Then

(see the figure above)

Question Number : 116 Question Id : 45573443956 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The figure shows the variation of photocurrent (i) with anode potential (V) for three different radiations. Let I_a, I_b and I_c be the intensities and f_a, f_b and f_c be the frequencies for the curves a, b and c respectively. Then

పటంలో మూడు వేర్వేరు వికిరణాలకు కాంతి విద్యుత్ ప్రవాహానికి (i) మరియు ఆనోడు పొటెన్షియల్ (V) ల మధ్య సంబంధం చూపబడినది. a, b మరియు c వక్రాలకు సంబంధించిన తీవ్రతలు వరుసగా I_a, I_b మరియు I_c, పౌనఃపున్యాలు వరుసగా f_a, f_b మరియు f_c అయితే



Options :

1. $f_a = f_b$ and $I_a \neq I_b$
   $f_a = f_b$ మరియు $I_a \neq I_b$
2. $f_a = f_c$ and $I_a = I_c$
   $f_a = f_c$ మరియు $I_a = I_c$
3. $f_a = f_b$ and $I_a = I_b$
   $f_a = f_b$ మరియు $I_a = I_b$
4. $f_b = f_c$ and $I_b = I_c$
   $f_b = f_c$ మరియు $I_b = I_c$

(A) $f_a = f_b$ and $I_a \neq I_b$
(B) $f_a = f_c$ and $I_a = I_c$
(C) $f_a = f_b$ and $I_a = I_b$
(D) $f_b = f_c$ and $I_b = I_c$

Answer: (A) $f_a = f_b$ **and** $I_a \neq I_b$ · The council's preliminary key

Q145 TS EAMCET 2017 · 12 May · Offline MCQ

The energy that should be added to an electron to reduce its de-Broglie wavelength from 1 nm to 0.5 nm is

(A) four-times the initial energy
(B) equal to the initial energy
(C) two-times the initial energy
(D) three-times the initial energy

Answer: (D) three-times the initial energy · The council's preliminary key

Q146 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

Both an electron and a photon have same de-Broglie wavelength of 1.2 Å. The ratio of their energies is nearly

(A) $1:1$
(B) $1:10$
(C) $1:100$
(D) $1:1000$

Answer: (C) $1:100$ · The council's preliminary key

Q147 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

The ratio of de-Broglie wavelength of molecules of hydrogen and helium which are at temperatures 27 °C and 127 °C respectively is _____

(A) $2:3$
(B) $2\sqrt{2}:\sqrt{3}$
(C) $\sqrt{3}:2\sqrt{2}$
(D) $\sqrt{2}:\sqrt{3}$

Answer: (B) $2\sqrt{2}:\sqrt{3}$ · The council's preliminary key

Q148 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

The threshold frequency for a certain metal is 'υ_0'. When a certain radiation of frequency $2\upsilon_0$ is incident on this metal surface, maximum velocity of the photo electrons emitted is $2\times10^6\ \mathrm{ms}^{-1}$. If radiation of frequency $3\upsilon_0$ is incident on the same metal surface, the maximum velocity of the photo electrons emitted is _____

(A) $\sqrt{2}\times10^{-6}\ \mathrm{ms}^{-1}$
(B) $2\sqrt{2}\times10^{6}\ \mathrm{ms}^{-1}$
(C) $4\times10^{6}\ \mathrm{ms}^{-1}$
(D) $5\times10^{6}\ \mathrm{ms}^{-1}$

Answer: (B) $2\sqrt{2}\times10^{6}\ \mathrm{ms}^{-1}$ · The council's preliminary key

Q149 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

If the momentum of an electron changes by 'P' then the de-Broglie wavelength associated with it changes by 5%. Then the initial momentum of the electron is

(A) $\frac{20}{P}$
(B) $20\,P$
(C) $\frac{P}{20}$
(D) $30\,P$

Answer: (B) $20\,P$ · The council's preliminary key

Q150 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

de Broglie wavelengths associated with a proton and an electron are in the ratio 2:1. The stopping potentials are approximately in the ratio of

(A) $1 : \sqrt{86}$
(B) $\sqrt{86} : 1$
(C) $1 : (86)^2$
(D) $1 : 86$

Answer: (C) $1 : (86)^2$ · The council's preliminary key

Q151 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

A point source of light emits photons of energy 4.8 eV at the rate 10^5 photons per second. These photons incident on a photo-sensitive sphere of work function 2.8 eV and radius 9 mm. The sphere is initially neutral and the emitted photo electrons are instantly swept away. The time after which the photo electric emission stops is

(A) 250 s
(B) 125 s
(C) 375 s
(D) 175 s

Answer: (B) 125 s · The council's preliminary key

Q152 TS EAMCET 2016 · 15 May · Offline MCQ

Electron microscope is based on the principle

(A) Photoelectric effect
(B) Wave nature of electron
(C) Superconductivity
(D) Laws of electromagnetic induction

Answer: (B) Wave nature of electron · Official TGCHE final key

Q153 TS EAMCET 2016 · 15 May · Offline MCQ

A charged particle is accelerated from rest through a certain potential difference. The de Broglie wavelength is λ_1 when it is accelerated through V_1 and is λ_2 when accelerated through V_2. The ratio λ_1/λ_2 is

(A) $V_1^{3/2} : V_2^{3/2}$
(B) $V_2^{1/2} : V_1^{1/2}$
(C) $V_1^{1/2} : V_2^{1/2}$
(D) $V_1^2 : V_2^2$

Answer: (B) $V_2^{1/2} : V_1^{1/2}$ · Official TGCHE final key

Q154 AP EAMCET 2016 · 29 Apr · Offline MCQ

A photo sensitive metallic surface emits electrons when X-rays of wavelength 'λ' fall on it. The de Broglie wavelength of the emitted electrons is (Neglect the work function of the surface, m is mass of the electron. h-Planck's constant, c-velocity of light)

(A) $\sqrt{\frac{2mc}{h\lambda}}$
(B) $\sqrt{\frac{h\lambda}{2mc}}$
(C) $\sqrt{\frac{mc}{h\lambda}}$
(D) $\sqrt{\frac{h\lambda}{mc}}$

Answer: (B) $\sqrt{\frac{h\lambda}{2mc}}$ · The council's preliminary key

Q155 AP EAMCET 2014 · 22 May · Offline MCQ

The energy of a photon is equal to the kinetic energy of a proton. If λ_1 is the de Broglie wavelength of a proton, λ_2 the wavelength associated with the photon, and if the energy of the photon is E, then (λ_1/λ_2) is proportional to

(A) E^4
(B) $E^{1/2}$
(C) E^2
(D) E

Answer: (B) $E^{1/2}$ · The council's preliminary key

Q156 AP EAMCET 2013 · 10 May · Offline MCQ

Initially a photon of wavelength λ_1 falls on photocathode and emits an electron of maximum energy E_1. If the wavelength of the incident photon is changed to λ_2, the maximum energy of the electron emitted becomes E_2. Then value of hc (h = Planck's constant, c = Velocity of light) is

(A) $hc = \dfrac{(E_1 + E_2)\lambda_1\lambda_2}{\lambda_2 - \lambda_1}$

(B) $hc = \dfrac{E_1 - E_2}{\lambda_2 - \lambda_1} \cdot (\lambda_1\lambda_2)$

(C) $hc = \dfrac{(E_1 - E_2)(\lambda_2 - \lambda_1)}{\lambda_1\lambda_2}$

(D) $hc = \dfrac{\lambda_2 - \lambda_1}{\lambda_1\lambda_2 E_2} \cdot E_1$

Answer: (B) $hc = \dfrac{E_1 - E_2}{\lambda_2 - \lambda_1} \cdot (\lambda_1\lambda_2)$ · The council's preliminary key

---

Q157 AP EAMCET 2013 · 10 May · Offline MCQ

The work function of a metal is 2 eV. If a radiation of wavelength 3000 Å is incident on it, the maximum kinetic energy of the emitted photoelectrons is (Planck's constant $h = 6.6 \times 10^{-34}$ JS; Velocity of light $c = 3 \times 10^8$ m/s; $1\ \text{eV} = 1.6 \times 10^{-19}$ J)

(A) 4.4×10^{-19} J

(B) 5.6×10^{-19} J

(C) 3.4×10^{-19} J

(D) 2.5×10^{-19} J

Answer: (C) 3.4×10^{-19} J · The council's preliminary key

Q158 AP EAMCET 2012 · 12 May · Offline MCQ

The de Broglie wavelength of an electron moving with a velocity of 1.5×10^8 m/s is equal to that of a photon. The ratio of kinetic energy of the electron to that of the photon ($C = 3 \times 10^8$ m/s)

(A) 2

(B) 4

(C) $\frac{1}{2}$

(D) $\frac{1}{4}$

Answer: (D) $\frac{1}{4}$ · Official APSCHE final key

Q159 AP EAMCET 2012 · 12 May · Offline MCQ

A proton when accelerated through a potential difference of V, has a de Broglie wavelength λ associated with it. If an alpha particle is to have the same de Broglie wavelength λ, it must be accelerated through a potential difference of

(A) $\frac{V}{8}$

(B) $\frac{V}{4}$

(C) 4 V

(D) 8 V

Answer: (A) $\frac{V}{8}$ · Official APSCHE final key

Q160 AP EAMCET 2011 · 8 May · Offline MCQ

Two photons of energy 2.5 eV and 3.5 eV fall on a metal surface of work function 1.5 eV. The ratio of the maximum velocities of the photoelectrons emitted from the metal surface is :

(A) $1:4$
(B) $2:1$
(C) $1:2$
(D) $1:\sqrt{2}$

Answer: (D) $1:\sqrt{2}$ · The council's preliminary key

Q161 AP EAMCET 2010 · 30 May · Offline MCQ

Photoelectric emission is observed from a metallic surface for frequencies ν_1 and ν_2 of the incident light ($\nu_1 > \nu_2$). If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio $1 : n$, then the threshold frequency of the metallic surface is :

(A) $(\nu_1 - \nu_2)/(n-1)$
(B) $(n\nu_1 - \nu_2)/(n-1)$
(C) $(n\nu_2 - \nu_1)/(n-1)$
(D) $(\nu_1 - \nu_2)/n$

Answer: (B) $(n\nu_1 - \nu_2)/(n-1)$ · Official APSCHE final key

EdLoop EAPCET