PHYSICS

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MODERN PHYSICS

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MODERN PHYSICS

Q.1 If the threshold wavelength of light for photoelectric effect from sodium surface is 6800 A° then, the work function of sodium is

(1) 1.8 eV (2) 2.9 eV (3) 1.1 eV (4) 4.7 eV

Q.2 When the distance of a point light source from a photocell is r_1, photoelectric current is I_1, If the distance becomes r_2, then the current is I_2, The ratio $(I_1 : I_2)$ is equal to

(1) $r^2_2 : r^2_1$ (2) $r_2 : r_1$ (3) $r_1^2 : r_2^2$ (4) $r_1 : r_2$

Q.3 When stopping potential is applied in an experiment on photoelectric effect, no photocurrent is observed. This means that

(1) the emission of photoelectrons is stopped

(2) the photoelectrons are emitted but are reabsorbed by the emitter metal

(3) the photoelectrons are accumulated near the collector plate

(4) the photoelectrons are dispersed from the sides of the apparatus.

Q.4 The ratio of de broglie wavelengths of a proton and an alpha particle moving with the same velocity is

(1) 1 (2) 2 (3) 4 (4) 0.25

Q.5 Two particles have identical charges. If they are accelerated through identical potential differences, then the ratio of their deBroglie wavelength would be

(1) $\lambda_1 : \lambda_2 = 1 : 1$ (2) $\lambda_1 : \lambda_2 = m_2 : m_1$

(3) $\lambda_1 : \lambda_2 = \sqrt{m_2} : \sqrt{m_1}$ (4) $\lambda_1 : \lambda_2 = \sqrt{m_1} : \sqrt{m_2}$

Q.6 Which one of the series of hydrogen spectrum is in the visible region

(1) Lyman series (2) Balmer series (3) paschen series (4) Bracket series

Q.7 The energy required to knock out the electron in the third orbit of a hydrogen atom is equal to

(1) 13.6 eV (2) $+\frac{13.6}{9}$ eV (3) $-\frac{13.6}{3}$ eV (4) $-\frac{3}{13.6}$ eV

Q.8 The ionization potential for second He electron is

(1) 13.6 eV (2) 27.2 eV (3) 54.4 eV (4) 100 eV

Q.9 An electron makes a transition from orbit n= 4 to the orbit n = 2 of a hydrogen atom. The wave number of the emitted radiation (R = Rydberg's constant) will be

(1) $\frac{16}{3R}$ (2) $\frac{2R}{16}$ (3) $\frac{3R}{16}$ (4) $\frac{4R}{16}$

Q.10 In Bohr's model of hydrogen atom, the centripetal force is provided by the Coulomb attraction between the proton and the electron. If a_0 is the radius of the ground state orbit, *m* is the mass and *e* the charge of an electron and ε_0 is the vacuum permittivity, the speed of the electron is :

(1) zero (2) $\frac{e}{\sqrt{\varepsilon_0 a_0 m}}$ (3) $\frac{e}{\sqrt{4\pi\varepsilon_0 a_0 m}}$ (4) $\frac{\sqrt{4\pi\varepsilon_0 a_0 m}}{e}$

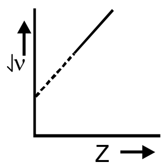
Q.11 In a hypothetical atom, if transition from n = 4 to n = 3 produces visible light then the possible transition to obtain infrared radiation is :

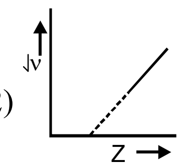
(1) n = 5 to n = 3 (2) n = 4 to n = 2 (3) n = 3 to n = 1 (4) none of these

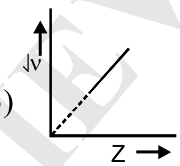
Q.12 The wavelength of the first line in balmer series in the hydrogen spectrum is λ. What is the wavelength of the second line :

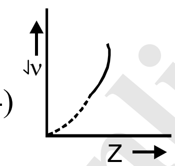
(1) $\frac{20\lambda}{27}$ (2) $\frac{3\lambda}{16}$ (3) $\frac{5\lambda}{36}$ (4) $\frac{3\lambda}{4}$

Q.13 The graph between the square root of the frequency of a specific line of characteristic spectrum of X-rays and the atomic number of the target will be

(1) 

(2) 

(3) 

(4) 

Q.14 The minimum wavelength λ_{min} in the continuous spectrum of X-rays is

(1) Proportional to the potential difference V between the cathode and anode.

(2) Inversely proportional to potential difference V between the cathode and anode.

(3) Proportional to the square root of the potential difference V between the cathode and the anode.

(4) Inversely proportional to the square root of the potential difference V between the cathode and the anode.

Q.15 For the structural analysis of crystals, X-rays are used because

(1) X-rays have wavelength of the order of the inter-atomic spacing.

(2) X-rays are highly penetrating radiations.

(3) Wavelength of X-rays is of the order of nuclear size.

(4) X-rays are coherent radiations.

Q.16 X-rays are produced

(1) During electric discharge at low pressure.

(2) During nuclear explosions.

(3) When cathode rays are reflected from the target.

(4) When electrons from higher energy state come back to lower energy state.

Q.17 The characteristic X-ray spectrum is emitted due to transition of

(1) valence electrons of the atom (2) inner electrons of the atom

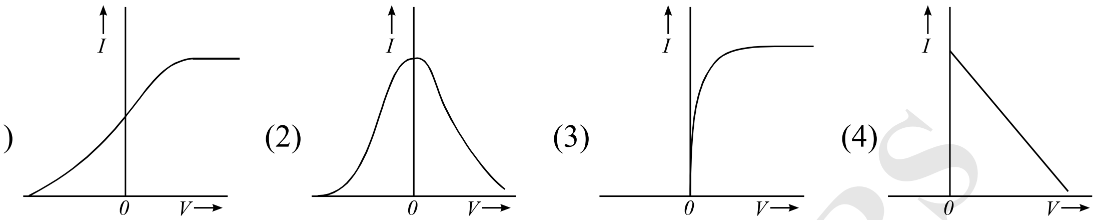
(3) nucleus of the atom (4) both, the inner electrons and the nucleus of the atom

Q.18 The energy of a photon of frequency ν is $E = h\nu$ and the momentum of a photon of wavelength λ is $p = h/\lambda$. From this statement one may conclude that the wave velocity of light is equal to :

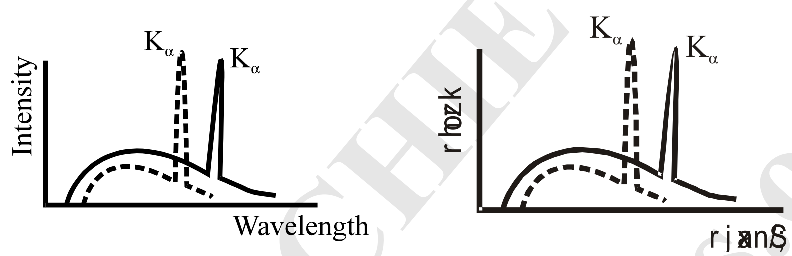
(1) $3 \times 10^8\ ms^{-1}$ (2) $\frac{E}{p}$ (3) $E\,p$ (4) $\left(\frac{E}{p}\right)^2$

Q.19 Which one of the following graphs in figure shows the variation of photoelectric current (I) with voltage (V) between the electrodes in a photoelectric cell ?

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



Q.20 Figure shows the intensity-wavelength relations of X-rays coming from two different Coolidge tubes. The solid curve represents the relation for the tube A in which the potential difference between the target and the filament is V_A and the atomic number of the target material is Z_A. These quantities are V_B and Z_B for the other tube. Then,



(1) $V_A > V_B, Z_A > Z_B$ (2) $V_A > V_B, Z_A < Z_B$ (3) $V_A < V_B, Z_A > Z_B$ (4) $V_A < V_B, Z_A < Z_B$

Q.21 If λ_{min} is minimum wavelength produced in X-ray tube and $\lambda_{k\alpha}$ is the wavelength of k_α line. As the operating tube voltage is increased.

(1) $(\lambda_k - \lambda_{min})$ increases (2) $(\lambda_k - \lambda_{min})$ decreases
(3) $\lambda_{k\alpha}$ increases (4) λ_{ka} decreases

Q.22 Which one of the following statements is NOT true for de Broglie waves ?

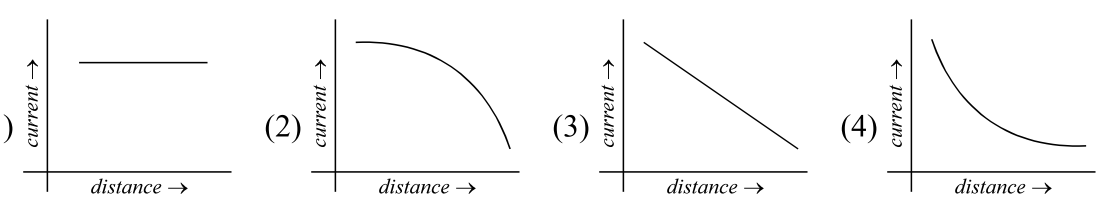
(1) All atomic particles in motion have waves of a definite wavelength associated with them
(2) The higher the momentum, the longer is the wavelength
(3) The faster the particle, the shorter is the wavelength
(4) For the same velocity, a heavier particle has a shorter wavelength

Q.23 Let ν_1 be the frequency of the series limited of the Lyman series, ν_2 be the frequency of the first line of the Lyman series, and ν_3 be the frequency of the series limited of the Balmer series.

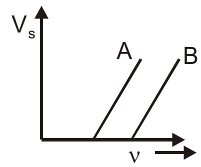
(1) $\nu_1 - \nu_2 = \nu_3$ (2) $\nu_2 - \nu_1 = \nu_3$ (3) $\nu_3 = \frac{1}{2}(\nu_1 + \nu_3)$ (4) $\nu_1 + \nu_2 = \nu_3$

Q.24 A point source causes photoelectric effect from a small metal plate. Which of the following curves may represent the saturation photocurrent as a function of the distance between the source and the metal?

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



Q.25 The stopping potential as a function of frequency of incident radiation is plotted for two different photo electric surfaces A and B. The graphs show the work function of A is



(1) Greater than that of B
(2) Smaller than that of B
(3) Same as that of B
(4) No comparison can be done from given graphs

Q.26 Masses of nucleus, neutron and protons are M, n_m and m_p respectively. If nucleus has been divided in to neutrons and protons, then
(1) $M = (A - Z)\ m_n + Zm_p$
(2) $M = Zm_n + (A - Z)\ m_p$
(3) $M < (A - Z)\ m_n + Zm_p$
(4) $M > (A - Z)m_n + Zm_p$

Q.27 The energy of the reaction $Li^7 + p \longrightarrow 2\ He^4$ is (the binding energy per nucleon in Li^7 and He^4 nuclei are 5.60 and 7.06 MeV respectively.)
(1) 17.3 MeV
(2) 1.73 MeV
(3) 1.46 MeV
(4) depends on binding energy of proton

Q.28 An α-particle is bombarded on ^{14}N. As a result, a ^{17}O nucleus is formed and a particle is emitted. This particle is a
(1) neutron (2) proton (3) electron (4) positron

Q.29 In one average-life
(1) half the active nuclei decay
(2) less than half the active nuclei decay
(3) more than half the active nuclei decay
(4) all the nuclei decay

Q.30 10 grams of ^{57}Co kept in an open container decays β–particle with a half-life of 270 days. The weight of the material inside the container after 540 days will be very nearly -
(1) 10 g (2) 7.5 g (3) 5 g (4) 2.5 g

Q.31 The half life of thorium (Th^{232}) is 1.4×10^{10} years. Then the fraction of thorium atoms decaying per year is very nearly -
(1) 1×10^{-11} (2) 4.95×10^{-11} (3) 0.69×10^{-11} (4) 7.14×10^{-11}

Q.32 If mass of the fissionable material is less than the critical mass, then
(1) fission and chain reactions both are impossible
(2) fission is possible but chain reaction is impossible
(3) fission is impossible but chain reaction is possible
(4) fission and chain reaction both are possible.

Q.33 Thermal neutron means

(1) neutron being heated

(2) the energy of these neutrons is equal to the energy of neutrons in a heated atom

(3) these neutron have energy of a neutron in a nucleus has at normal temperature

(4) such neutrons gather energy released in the fission process

Q.34 $_{92}U^{235}$ nucleus absorbs a slow neutron and undergoes fission into $_{54}X^{139}$ and $_{38}Sr^{94}$ nuclei.The other particles porduced in this fission process are

(1) 1 β and 1 α (2) 2 β and 1 neutron (3) 2 neturons (4) 3 neutrons

Q.35 Two lithium ^{6}Li nuclei in a lithium vapour at room temperature do not combine to form a carbon ^{12}C nucleus because

(1) a lithium nucleus is more tightly bound than a carbon nucleus

(2) carbon nucleus is an unstable particle

(3) it is not energetically favourable

(4) Coulomb repulsion does not allow the nuclei to come very close

Q.36 Fusion reaction is possible at high temperature because -

(1) atoms are ionised at high temperature

(2) molecules break-up at high temperature

(3) nuclei break-up at high temperature

(4) kinetic energy is high enough to overcome repulsion between nuclei.

Q.37 The graph of 2)21n (R/R_0) versus 2)21n A (R = radius of a nucleus and A = its mass number) is

(1) a straight line (2) a parabola (3) an ellipse (4) none of them

Q.38 A sample of radioactive material has mass *m*, decay constant λ, and molecular weight *M*. Avogadro constant = N_A. The initial acitvity of the sample is :

(1) λm (2) $\frac{\lambda m}{M}$ (3) $\frac{\lambda m N_A}{M}$ (4) $m N_A e^{\lambda}$

Q.39 Two radioactive sources *A* and *B* initially contain equal number of radioactive atoms. Source *A* has a half-life of 1 hour and source *B* has a half-life of 2 hours. At the end of 2 hours, the ratio of the rate of disintegration of *A* to that of *B* is :

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

Q.40 N atoms of a radioactive element emit n alpha particles per second at an instant. Then the half - life of the element is

(1) $\frac{n}{N}$ sec. (2) 1.44 $\frac{n}{N}$ sec. (3) 0.69 $\frac{n}{N}$ sec. (4) 0.69 $\frac{N}{n}$ sec.

Q.41 The binding energies of two nuclei P^n and Q^{2n} and x and y joules. If 2x > y then the energy released in the reaction

$P^n + P^n \rightarrow Q^{2n}$, will be

(1) 2x + y (2) 2x – y (3) –(2x – y) (4) x + y

Q.42 In a fission reaction

$^{236}{}_{92}U \longrightarrow {}^{117}X + {}^{117}Y + n + n$

the average binding energy per nucleon of X and Y is 8.5 MeV whereas that of ^{236}U is 7.6 MeV. The total energy liberated will be about :

(1) 200 keV (2) 2 MeV (3) 200 MeV (4) 2000 MeV

Q.43 How much uranium is required per day in a nuclear reactor of power capacity of 1 MW

(1) 15 mg (2) 1.05 gm (3) 105 gm (4) 10.5 kg

Q.44 A laser beam (λ = 633 nm) has an power of 3 mW. What will be the pressure exerted on a surface by this beam if the cross sectional area is 3 mm^2. (Assume perfect reflection and normal incidence)

(1) 6.6×10^{-3} N/m^2 (2) 6.6×10^{-6} N/m^2 (3) 6.6×10^{-9} N/m^2 (4) 6.6 N/m^2

Q.45 The maximum kinetic energy of photoelectrons emitted from a surface when photons of energy 6e V fall on it is 4 eV. The stopping potential in volt is :

(1) 4 (2) 6 (3) 8 (4) 10

Q.46 The work- function of a substance is 4.0 eV. The longest wavelength of light that can cause photoelectron emission from this substance is approximately :

(1) 540 nm (2) 400 nm (3) 310 nm (4) 220 nm

Q.47 In coolidge tube the potential difference between cathode and anticathode is 120 kV. The maximum energy of emitted X-rays will be :–

(1) 1.2×10^5 eV (2) 10^{10} eV (3) 10^{15} eV (4) 10^{20} eV

Q.48 The ionisation energies of K–shell for cobalt, copper, and molebdenum are 7.8, 9.0 and 20.1 keV respectively. If any metal out of these is used as target in an X–ray tube operated at 15KV, then :–

(1) the K–series of characteristic X-ray will be emitted by Co only

(2) the K–series of characteristic X–rays will be emitted by Cu and Co only

(3) the K–series of characteristic X–rays will be emitted by Cu, Co and Mo

(4) the minimum wavelength of continuous X–rays emitted by the three metals will not be same

Q.49 When 50 keV electrons are made incident on a target material, the wavelength of K_α X–ray line was found to be 0.5Å. When the accelerating potential is increased to 100 kV, then the wavelength of K_α–line from the same target will be

(1) 0.25 Å (2) 0.5 Å (3) 0.75 Å (4) 1.0 Å

Q.50 Probability of remains active of a nucleus in one mean life is :-

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

Q.51 A nuclear fission is given below

$A^{240} \rightarrow B^{100} + C^{140} + Q(\text{energy})$

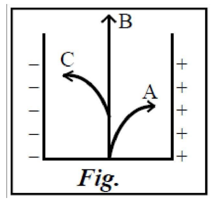
Let binding energy per nucleon of nucleus A, B and C is 7.6 MeV, 8.1 MeV and 8.1 MeV respectively. Value of Q is :-(Approximately)

(1) 20 MeV (2) 220 MeV (3) 120 MeV (4) 240 MeV

Q.52 Atomic weight of a radioactive element is M_w gm. Radioactivity of m gm. of its mass is :–
(N_A = Avogadro number, λ = decay constant)

(1) $N_A \lambda$ (2) $\left(\frac{N_A}{M_w} m\right)\lambda$ (3) $\left(\frac{N_A}{m}\right)\lambda$ (4) $\left(\frac{N_A}{m} M_w\right)\lambda$

Q.53 A radioactive source is kept in an uniform electric field α, β and γ- particle are emitting. α,β,γ are respectively :-



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

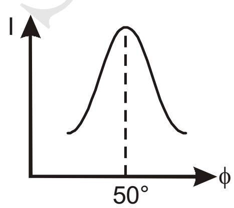
Q.54 If $N_t = N_o e^{-\lambda t}$, then number of disintegrated atoms between t_1 to t_2 ($t_2 > t_1$) will be :-
(1) $N_o [e^{\lambda t_2} - e^{\lambda t_1}]$ (2) $N_o [-e^{-\lambda t_2} - e^{-\lambda t_1}]$
(3) $N_o [e^{-\lambda t_1} - e^{-\lambda t_2}]$ (4) None

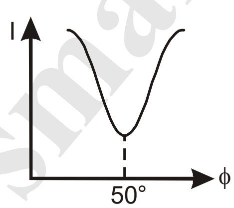
Q.55 The speed of a proton is $\frac{c}{20}$. The wavelength associated with it will be -
(1) 2.64×10^{-24} mm (2) 2.64×10^{-24} nm (3) 2.64×10^{-24} Å (4) 2.64×10^{-14} m

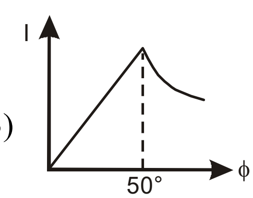
Q.56 The wavelength of very fast moving electron ($v \approx c$) is :

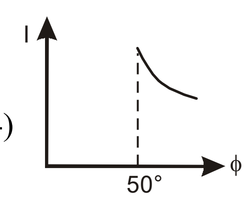
(1) $\lambda = \frac{h}{m_0 v}$ (2) $\lambda = \frac{h}{\sqrt{2mE}}$ (3) $\lambda^2 = \frac{h^2}{\sqrt{2mE}}$ (4) $\lambda = \frac{h}{m_0 v \Big/ \sqrt{1 - \frac{v^2}{c^2}}}$

Q.57 The correct curve between intensity of scattering (I) and the angle of diffraction ϕ in Davison - Germer experiment is :

(1) 

(2) 

(3) 

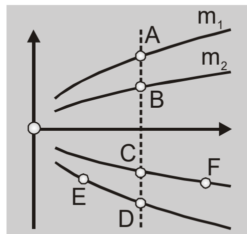
(4) 

Q.58 When cathode rays (tube voltage ~ 10 kV) collide with the anode of high atomic weight then we get :–
(1) positive rays (2) X–rays (3) gamma rays (4) cosmic rays

Q.59 In Bainbridge mass spectrograph electric field E, magnetic field B and velocity V of the moving particles were in mutually perpendicular directions. Then velocity selector allows particles of velocity V to pass undeflected when :–

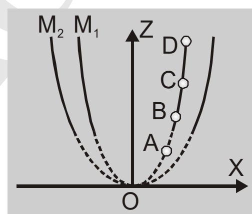
(1) V = BE (2) $V = \frac{E}{B}$ (3) $V = \frac{B}{E}$ (4) $V = \frac{B^2}{E}$

Q.60 For figure the $\frac{q}{m}$ is the same for ions reaching points :–



(1) E and F (2) C and D (3) C and F (4) C, D, E and F

Q.61 In thomson mass spectrograph experiment two parbola as shown in diagram are observed, then the ralation between velocities of positive ions will be –



(1) $V_A > V_B > V_C > V_D$ (2) $V_A = V_E = V_C = V_D$
(3) $V_D > V_C > V_B > V_A$ (4) $V_D > V_A$ and $V_B = V_C$

Q.62 What is the stopping potential when the metal of work function 0.6 eV is illuminated by the light of 2 eV :
(1) 2.6 V (2) 3.6 V (3) 0.8 V (4) 1.4 V

Q.63 If the frequency of light in a photoelectric experiment is doubled, the stopping potential will
(1) be doubled (2) halved
(3) become more than doubled (4) become less than double

Q.64 By increasing the intensity of incident light keeping frequency ($\nu > \nu_0$) fixed on the surface of metal
(1) kinetic energy of the photoelectrons increases
(2) number of emitted electrons increases
(3) kinetic energy and number of electrons increases
(4) no effect

Q.65 When the wavelength of incident light is 4000 Å, stopping potential is 2 volt. If the wavelength of light is 3000 Å then stopping potential will be :
(1) 2 volt (2) More than 2 volt
(3) Less than 2 volt (4) Information is not complete

Q.66 Two identical, photocathodes receive light of frequencies f_1 and f_2. If the velocities of the photoelectrons (of mass m) coming out are respectively v_1 and v_2, then :

(1) $v_1^2 - v_2^2 = \frac{2h}{m}(f_1 - f_2)$
(2) $v_1 + v_2 = \left[\frac{2h}{m}(f_1 + f_2)\right]^{-1/2}$

(3) $v_1^2 + v_2^2 = \frac{2h}{m}(f_1 + f_2)$
(4) $v_1 + v_2 = \frac{2h}{m}\left[\frac{2h}{m}(f_1 - f_2)\right]^{-1/2}$

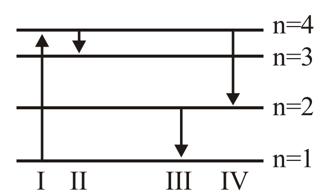
Q.67 The surface of a metal is illuminated with the light of 400 nm. The kinetic energy of the ejected photoelectrons was found to be 1.68 eV. the work function of the metal is : (hc = 1240 eV–nm)
(1) 1.51 eV (2) 1.68 eV (3) 3.09 eV (4) 1.41 eV

Q.68 An electron has a mass of 9.1×10^{-31} kg. it revolves around the nucleus in a circular orbit of radius 0.529×10^{-10} metre at a speed of 2.2×10^6 m/s. The magnitude of its linear momentum in this motion is:
(1) 1.1×10^{-34} kg – m/s
(2) 2.0×10^{-24} kg – m/s
(3) 4.0×10^{-24} kg – m/s
(4) 4.0×10^{-31} kg – m/s

Q.69 The energy of a hydrogen atom in its ground state is –13.6 eV. the energy of the level corresponding to the quantum number n = 2 (first excited state) in the hydrogen atom is :
(1) – 2.72 eV (2) – 0.85 eV (3) – 0.54 eV (4) – 3.4 eV

Q.70 In any Bohr orbit of the hydrogen atom, the ratio of kinetic energy to potential energy of the electron is
(1) 1/2 (2) 2 (3) – 1/2 (4) – 2

Q.71 The diagram shown the energy levels for an electron in a certain atom. Which transition shown represents the emission of a photon with the most energy?
(1) III (2) IV (3) I (4) II



Q.72 Energy levels A, B, C of a certain atom correspond to increasing values of energy, i.e. $E_A < E_B < E_C$. If λ_1, λ_2, λ_3, are the wavelengths of radiations for the transitions C → B, B → A and C → A respectively, which of the following statements is correct

(1) $\lambda_3 = \lambda_1 + \lambda_2$ (2) $\lambda_3 = \frac{\lambda_1\lambda_2}{\lambda_1 + \lambda_2}$ (3) $\lambda_1 + \lambda_2 + \lambda_3 = 0$ (4) $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

Q.73 In hydrogen and hydrogen like atoms, the ratio of difference of energies $E_{4n} – E_{2n}$ and $E_{2n} – E_n$ varies with its atomic number z and n as:
(1) z^2/n^2 (2) z^4/n^4 (3) z / n (4) $z^0 n^0$

Q.74 In X–rays spectrum wave length λ of line K_α depends on atomic number Z as :

(1) $\lambda \propto Z^2$ (2) $\lambda \propto (Z-1)^2$ (3) $\lambda \propto \frac{1}{(Z-1)}$ (4) $\lambda \propto \frac{1}{(Z-1)^2}$

Q.75 In an X–ray tube, electrons accelerated through a potential difference of 15000 V strike a copper target. The speed of the emitted X–rays from the tube is :
[e = charge on electron, m = mass of electron, Z = atomic number of target]

(1) $\sqrt{\frac{2\times 2e\times 1500}{m}}$ (2) $\sqrt{\frac{2\times e\times 1500}{m}}$ (3) $\sqrt{\frac{2Ze\times 1500}{m}}$ (4) 3×10^{8} m/s

Q.76 X–rays are produced in X–ray tube operating at a given acceleration voltage. The wavelength of the continuous X–rays has values from :
(1) 0 to ∞
(2) λ_{min} to ∞, where $\lambda_{min} > 0$
(3) 0 to $\lambda_{max.}$, where $\lambda_{max.} < \infty$
(4) λ_{min} to $\lambda_{max.}$, where $0 < \lambda_{min} < \lambda_{max.} < \infty$

Q.77 5000 V is applied on an electronic X–ray tube. Then minimum wave length of X–ray will be :
(1) 1.24×10^{-11} m (2) 2.48×10^{-10} m (3) 3.72×10^{-11} m (4) 4.96×10^{-11} m

Q.78 If the frequencies of K_α, K_β and L_α X-rays for a material ν_{K_α}, ν_{K_β}, ν_{L_α} respectively, then

(1) $\nu_{K_\alpha} = \nu_{K_\beta} + \nu_{L_\alpha}$ (2) $\nu_{L_\alpha} = \nu_{K_\alpha} + \nu_{K_\beta}$ (3) $\nu_{K_\beta} = \nu_{K_\alpha} + \nu_{L_\alpha}$ (4) none of these

Q.79 The structure of solids is studied by –
(1) X–rays (2) γ–rays (3) Cosmic rays (4) Infrared rays

ANSWER KEY

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