Chapter

3 Atomic Structure

Single Correct Option Type Questions

Q.1 For 3s orbital of hydrogen atom. the normalised wave function is given by

$$\psi_{3s} = \frac{1}{81\sqrt{3\pi}}\left(\frac{1}{a_0}\right)^{3/2}\left[27-\frac{18r}{a_0}+\frac{2r^2}{a_0^2}\right]e^{\frac{r}{3a_0}}$$

The above mentioned orbitals (3s) has two nodes at x a_0 and 7 a_0. Find the value of x.

(A) 2.5 (B) 1.9 (C) 3.5 (D) 8

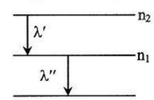
Q.2 The no. of d electron in Fe^{2+} $(z = 26)$ is equal to that of the

(A) P electron in Cl^- (B) P - electron in Cu (C) S - electron in O (D) P - electron in Ne

Q.3 An electron in a hydrogen atom in it's ground state absorbs 1.50 times as much energies as the minimum required for it to escape from the atom. What is wavelength of the emitted electron-

(A) 2.2×10^{-10} m (B) 4.7×10^{-10} m (C) 5.2×10^{-10} m (D) 1×10^{-10} m

Q.4 Find the quantum no. 'n' corresponding to excited state of He^+ ion if on transition to the ground ion emits two photons in succession with wavelength $\frac{108.5}{\lambda'}$ and $\frac{30.4nm}{\lambda''}$



(A) $n_2 = 3$ (B) $n_2 = 5$ (C) $n_2 = 6$ (D) $n_2 = 4$

Q.5 Photons of equal energy were allowed to strike on two different gas samples. One sample contains H-atoms is in some-excited state with a principal quantum number 'n' and other sample has H-atoms in ground state. The photonic beams totally ionise the H-atoms in both samples. If the difference in the kinetic energy of the ejected electrons in the two different cases is 12.75 eV. Then the principal quantum number 'n' of the excited state is :

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

Q.6 With a certain radiation of wavelength 97.25 nm, to which hydrogen atoms (ground state) are exposed, the maximum number of spectral lines obtainable in the emission spectrum is :

(A) 4 (B) 5 (C) 6 (D) 7

Q.7 The ionization energy of hydrogen atom is 1.312×10^6 J mol^{-1}. The energy required to excite the electron in the H-atom from n = 1 to n = 2 is

(A) 6.56×10^5 J mol^{-1} (B) 7.56×10^5 J mol^{-1} (C) 9.84×10^5 J mol^{-1} (D) 8.51×10^5 J mol^{-1}

Q.8 The total energy of an atom when electron in the 3rd orbit is –E. The total energy of an atom when electron in the first orbit will be

(A) –3E (B) $-\frac{E}{3}$ (C) $-\frac{E}{9}$ (D) –9E

Q.9 Li^{3+} and a proton are accelerated by the same potential, their de Broglie wavelengths λ_{Li} and λ_p have the ratio (assume $m_{Li} = 9m_p$)

(A) 1:2 (B) 1:4 (C) 1:1 (D) 1 : 3√3

Q.10 If the binding energy of 2nd excited state of a hypothetical H-like atom is 12 eV, then which is incorrect -

(A) I Excitation potential = 81 eV (B) II Excitation potential = 96 eV

(C) Ionisation potential = 192 eV (D) Binding energy of 2nd state = 27 eV

Q.11 The photon emitted due to electronic transition from 5^{th} excited state to 2^{nd} excited state in Li^{2+}, is used to excited the electron present in 1^{st} excited state of He^+. After absorbing the photon it reaches in an orbit where its total energy is –E. The value of total energy is

(A) –12.1 eV (B) –6.8 eV (C) –27.2 eV (D) –3.4 eV

Q.12 The ratio of slopes of KE_{max} vs ν and V_0 vs ν curves in photo electric effect gives

[ν = frequency, KE_{max} = maximum kinetic energy, V_0 = stopping potential]

(A) Plank's constant (B) Work function ($h\nu_0$)

(C) h/e (D) e(charge of electron)

Q.13 The radius of which of the following orbit is same as the radius of 2^{nd} Bohr's orbit of hydrogen atom.

(A) 4^{th} orbit of He^+ (B) 2^{nd} orbit of Li^{2+} (C) 2^{nd} orbit of He^+ (D) 4^{th} orbit of Be^{3+}

Q.14 Hydrogen atoms in the ground state are excited by monochromatic radiation of wavelength λ. The resulting spectrum consists of maximum 10 different lines. The wavelength λ is ?

(A) 937.3 Å (B) 875.2 Å (C) 1025.6 Å (D) 949.6 Å

Q.15 Ratio of wavelength of the highest emission line of Balmer series in hydrogen atom to that of lowest emission line of Paschen series He^+ ion is :

(A) 3 : 5 (B) 2 : 3 (C) 7 : 9 (D) 5 : 3

Q.16 In measurement of quantum efficiency of photosynthesis in green plants, if was found that 10 quanta of red light of wavelength 6850 Å were needed to release one molecule of O_2. The average energy storage in this process is 112 kcal/mol O_2 evolved. What is the energy conversion efficiency in this experiment ?

Given : 1 cal = 4.18 J; $N_A = 6 \times 10^{23}$; $h = 6.63 \times 10^{-34}$ J.s

(A) 23.5 (B) 26.9 (C) 66.34 (D) 73.1

Q.17 The energy of 2^{nd} Bohr's orbit in hydrogen atom is –328 kJ mol^{-1}. The energy of 3^{rd} Bohr's orbit of He^+ is

(A) –583.11 kJ mol^{-1} (B) –853.11 kJ mol^{-1} (C) –145.78 kJ mol^{-1} (D) –511.83 kJ mol^{-1}

Q.18 If the wave function of an orbital is represented as $\psi_{3, 2, 0}$. Then that orbital is

(A) 3s (B) $3p_x$ (C) $3d_{z^2}$ (D) $4d_{xy}$

Q.19 The wave number of the first Balmer line of Li^{2+} ion is 1,36,800 cm^{-1} the wave number of the first line of Balmer series of hydrogen atom is (in cm^{-1})

(A) 68,400 (B) 15,200 (C) 76,000 (D) 30,800.

Q.20 A ball of mass 200 g is moving with a velocity of 10 m/sec. if the error is the measurement of velocity is 0.1 %, then the uncertainty in its position is

(A) 3.3×10^{-31} m (B) 3.3×10^{-27} m (C) 5.3×10^{-25} m (D) 2.6×10^{-32} m

Q.21 A sample of four hydrogen atoms, all in the nth excited state, de – excite to the ground state, and shows a maximum of six different spectral lines. Hence the value of 'n' is

(A) 3 (B) 4 (C) 5 (D) 6

Q.22 Identify the incorrect statement among the following :

(A) If Auf - bau rule is not followed, then Sn(atomic number = 50) would be placed in d - block of the periodic table

(B) 5^{th} ionization energy of As (Z = 33) is less than that of Ge (Z = 32)

(C) Increasing order of first I.E. of S, Se & Cl is Se < S < Cl

(D) Ionic radii of Mg^{2+} (Z = 12) is smaller than F^- (Z = 9)

Q.23 Potential energy of the electron at infinity is equal to

(A) 0 (B) ∞ (C) $-\frac{Ze^2}{R}$ (D) $-\frac{Z^2e}{R}$

Q.24 For a 4d electron the orbital angular momentum is

(A) $\sqrt{6}\,\hbar$ (B) $\sqrt{12}\,\hbar$ (C) $\sqrt{2}\,\hbar$ (D) Zero

Q.25 Green colour line is observed in an atomic spectra by the transition 5 → 3[O shell to M shell] of any atom. Which of the following option likely to have correct combination of colour and transition of the electron in the atom?

(A) 4 → 3 [Red] (B) 6 → 3 [Orange] (C) 7 → 3 [Yellow] (D) 8 → 2 [Red]

Q.26 H-atoms in ground state are excited by monochromatic radiations of photon energy 12.09 eV. What will be the number of spectral lines emitted when the atoms come back to ground state?

(A) 1 (B) 3 (C) 6 (D) None of these

Statement Based Questions

Q.27 **Statement-1:** Spectral line would not be seen for a $2p_x - 2p_z$ transition

Statement-2: p – orbitals are degenerate orbitals

(A) Statement-1 is True, Statement-2 is True; Statement-2 **is** a correct explanation for Statement-1.

(B) Statement-1 is True, Statement-2 is True; Statement-2 **is NOT** a correct explanation for Statement-1.

(C) Statement-1 is True, Statement-2 is False.

(D) Statement-1 is False, Statement-2 is True.

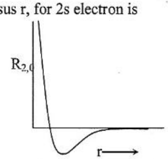
Multiple Correct Option Type Questions

Q.28 Which of the following contain magnetic moment equal -
(A) Fe^{3+} (B) Mn^{2+} (C) Co^{4+} (D) $K_4[Fe(CN)_6]$

Q.29 How many statements are correct -
(A) Speed and position of cricket ball can not be measured accurately
(B) Alcohol which give blue colour in victor mayer test react faster in LUCAS test compare to the alcohol which give red colour in victor mayer test
(C) Na^+ Mg^{2+}, Al^{3+}, F^- O^{2-} N^{2-} are isoelctronic
(D) 1% acidic $KMnO_4$ is known as Bayer reagent

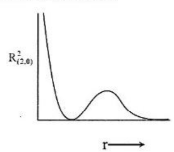
Q.30 In a sample of hydrogen atoms all electrons are in a particular excited state n, when all electrons returned to ground state, photons with 6 different wavelengths are emitted. Which of the following is/are incorrect?
(A) Out of 6 different photons only 2 photons have speed equal to that of visible light
(B) If highest energy photon emitted from above sample is incident on the metal plate having work function 8 eV, K.E. of liberated photo-electron may be equal to or less tan 4.75 eV.
(C) Total number of radial nodes in all the orbital of n^{th} shell is 6
(D) Total number of angular nodes in all the orbital in $(n-1)^{th}$ shell is 3

Q.31 Choose the correct statements among the following regarding hydrogen atom ? (All graphs given below are indicative in nature, not to the scale)
(A) Radial wave function R(r) gives information about the energy and size of the orbital
(B) Plot of $R_{(2,0)}(r)$ versus r, for 2s electron is

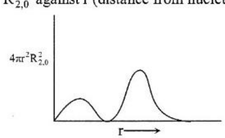


(r –distance from nucleus)

(C) Plot of $R^2_{(2,0)}$ versus r for 2s electron is



(D) Plot of function $4\pi r^2 R^2_{2,0}$ against r (distance from nucleus) is



Q.32 Which of the following statement (s) is/are incorrect ?
(A) If the value of azimuthal quantum number (ℓ) is zero, the electron distribution is spherical
(B) The shape of orbital is given by magnetic quantum number
(C) Angular momentum of 1s, 2s & 3s – electron are equal
(D) In an atom, all electrons travel with same velocity

Q.33 Which of the following statement (s) is/are correct regarding photoelectric effect?
(A) No electrons are ejected, regarding of the intensity of the radiation, unless the frequency exceeds a threshold value characteristic of the metal
(B) The kinetic energy of the ejected electrons increases linearly with the frequency of incident radiation but is independent of the intensity of the radiation
(C) Even at low intensities, electrons are ejected immediately if the wavelength is above threshold value
(D) It is a direct evidence for the dual nature of light

Q.34 Which set of quantum number are consistent with the quantum mechanical theory?
(A) $n = 2, l = 1, m = 1, s = \frac{1}{2}$ (B) $n = 4, l = 3, m = 2, s = -\frac{1}{2}$
(C) $n = 3, l = 2, m = 3, s = +\frac{1}{2}$ (D) $n = 4, l = 3, m = 3, s = +\frac{1}{2}$.

Q.35 Certain sun glasses having small crystal of AgCl incorporated in the lenses, on exposure to light of appropriate wavelength turns to grey colour to reduce the glare following the reaction :

$$AgCl \xrightarrow{h\nu} \underset{Grey}{Ag} + Cl$$

If heat of reaction for the decomposition of AgCl is 248 kJ mol^{-1}, the maximum wavelength that is needed to induce the desired process is
(A) 4830 Å (B) 5830 Å (C) 6830 Å (D) 2830 Å

Passage Based Questions

Passage # 1 (Ques. 36 - 37)

Consider a hypothetical hydrogen like atom. The wavelength in Å for the spectral lines for transitions from n = P to n = 1 are given by

$$\lambda = \frac{1500.P^2}{P^2 - 1} \quad \text{where } P = 2, 3, 4$$

hc = 1240 eV-nm

Q.36 Find the wavelength of the least energetic and most energetic photons in this series.-
(A) 150 nm, 300 nm (B) 150 nm, 200 nm
(C) 200 nm, 150 nm (D) 300 nm, 150 nm

Q.37 Construct an energy level diagram for this element representing at least three energy levels. What is the value of 1^{st} excitation energy -
(A) 5.20 (B) 7.20 (C) 6.20 (D) None of these

Passage # 2 (Ques. 38 - 40)

The electrons in a polyelectronic atom are filled one by one in order of increasing energy level. The energy of subshells and orientation of orbitals depends upon the values of three quantum numbers (i.e. n, ℓ and m respectively) derived from schodinger wave equation. The different orbitals of a subshell however possess same energy level and are called degenerate orbitals but their energy level changes in presence of magnetic field and the orbitals are non-degenerate. A spectral line is noticed if an electron jumps from one level to other. The paramagnetic nature of element is due to the presence of unpaired electrons.

Q.38 Which in each pair is most stable ion : Cu^+ or Cu^{2+} and Fe^{2+} or Fe^{3+}

(A) Cu^+, Fe^{3+} (B) Cu^{2+}, Fe^{3+} (C) Cu^{2+}, Fe^{2+} (D) Cu^+, Fe^{2+}

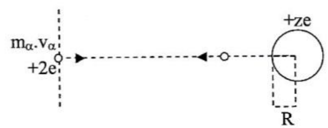
Q.39 The total magnetic moment of Ni^{2+} ion is -

(A) $\sqrt{6}$ BM (B) $\sqrt{8}$ BM (C) $\sqrt{15}$ BM (D) $\sqrt{12}$ BM

Q.40 Energy of 4s of hydrogen is .... compare to 4 p -

(A) greater (B) less (C) same (D) ½ time

Passage # 3 (Ques. 41 - 42)



The approximate size of the nucleus can be calculated by using energy conservation theorem in Rutherford's α-scattering experiment. If an α-scattering experiment. If an α-particle is projected from infinity with speed v, towards the nucleus having z protons, then the α-particle which is reflected back or which is deflected by 180° must have approached closet to the nucleus. It can be approximated that α-particle collides with the nucleus and gets back. Now, if we apply the energy conservation equation at initial point and collision point, then :

$$(\text{Total energy})_{\text{initial}} = (\text{Total Energy})_{\text{final}}$$

$$(KE)_I + (PE)_I = (KE)_f + (PE)_r$$

$(PE)_I = 0$, since PE of two charge system separated by infinite distance is zero. Finally the particle stops and then starts coming back.

$$\frac{1}{2}m_\alpha v_\alpha^2 + 0 = 0 + \frac{Kq_1q_2}{R}$$

$$\Rightarrow \frac{1}{2}m_\alpha v_\alpha^2 = K\frac{2e \times ze}{R} \Rightarrow R = \frac{4Kze^2}{m_\alpha v_\alpha^2}$$

Thus the radius of nucleus can be calculated using above equation. The nucleus is so small a particle that we can't define a sharp boundary for it. Experiments show that the average radius R of a nucleus may be written as :

$R = R_0(A)^{1/3}$

where $R_0 = 1.2 \times 10^{-15}$ m

A – mass number of atom

R – radius of nucleus

Q.41 If the diameter of two different nuclei are in the ratio 1 : 2, then their mass number are in the ratio

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

Q.42 An α-particle with speed v_0 is projected from infinity and it approaches up to r_0 distance from a nuclei. Then, the speed of α-particle which approaches upto $2r_0$ distance from the nucleus is-

(A) $\sqrt{2}v_0$ (B) $\frac{v_0}{\sqrt{2}}$ (C) $2v_0$ (D) $\frac{v_0}{2}$

Passage # 4 (Ques. 43 - 45)

The phenomena of ejecting an electron from metal when a light of particular frequency incident on it is called as photo electric effect. The energy required to overtake the attraction between nucleus and electron is called a threshold energy. Photoelectric effect was explained by Einstein. According to Einstein $h\nu = \omega + KE$.

Here ν = frequency of incident light

ω = work function

KE = KE of ejected electron

Q.43 ν = frequency of incident radiation

ν_0 = threshold frequency

ν_1 = frequency of radiation whose energy is equal to K.E. of ejected electron.

The plot drawn between ν_1 (x – axis) and ν(y – axis) is

(A) a straight line with –ve slope = 1 (B) a straight line with +ve slope = 1

(C) a straight line with –ve slope = h (D) a straight line with +ve slope = h

Q.44 If the frequency of incident light on metal surface is double then the K.E. of ejected electron is

(A) double (B) halved (C) more than double (D) quadmple

Q.45 If λ is wavelength of incident radiation and λ_0 is wavelength of radiation whose energy is equal to threshold energy 'm' is mass of electron then velocity of ejected electron is

(A) $\frac{2hc}{m}\sqrt{\frac{(\lambda_0-\lambda)}{\lambda_0\lambda}}$ (B) $\sqrt{\frac{m}{2hc}\frac{(\lambda_0\lambda)}{\lambda_0\lambda}}$ (C) $\sqrt{\frac{2hc}{m}\frac{(\lambda_0-\lambda)}{\lambda_0\lambda}}$ (D) $\sqrt{\frac{2hc}{m}\frac{\lambda_0\lambda}{\lambda_0-\lambda}}$

Passage # 5 (Ques. 46- 48)

Werner Heisenberg stated the uncertainty principle which is the consequence of dual behaviour of matter and radiation. It states that if is impossible to determine simultaneously, the exact position and exact Mathematically, it can be given as the equation :

$$\Delta x \times \Delta p \geq \frac{h}{4\pi}$$

Where Δx is the uncertainty in position and Δp_x (or ΔV_x) is the uncertainty in momentum (or velocity) of the particle.

If the position of the electron known with high degree of accuracy (Δx is small), then the velocity of the electron will be uncertain [$\Delta(V_x)$ is larger]. On the other hand, if the velocity of the electron is known precisely [$\Delta(V_x)$ is small],then the position of the electron will be uncertain (Δx will be large). Thus if we carry out some physical measurements on the electron's position or velocity, the outcome will always depict a fuzzy or blue picture.

Q.46 An electron moves around the nucleus in a circle of radius r. Assuming that the uncertainty of the momentum of electron is of the same order as momentum itself, the momentum of the electron would be

(A) $\frac{h}{4\pi r}$ (B) $2\pi hr$ (C) $\frac{h}{2\pi r}$ (D) $4\pi hr$

Q.47 The uncertainty in the velocity of a cricket ball of mass 100 g, when uncertainty in its position is of the order of 1A°, would be

(A) $\geq 5.27 \times 10^{-24}\ ms^{-1}$ (B) $\geq 2.35 \times 10^{-23}\ ms^{-1}$

(C) $\geq 3.16 \times 10^{-22}\ ms^{-1}$ (D) $\geq 8.51 \times 10^{-24}\ ms^{-1}$

Q.48 If one tries to find the exact location of an electron to an uncertainty of only 10^{-6} m, then uncertainty in velocity, i.e. ΔV would be

(A) $10^{-4}\ ms^{-1}$ (B) $10^{4}\ ms^{-1}$ (C) $10^{-8}\ ms^{-1}$ (D) $10^{8}\ ms^{-1}$

Column Matching Type Questions

Q.49

Column I (Orbital)	Column II (Set of n, ℓ, m)
(A) 2s	(P) n = 4, ℓ = 2, m = 0
(B) $2p_z$	(Q) n = 4, ℓ = 1, m = + 1
(C) $4d_{z^2}$	(R) n = 2, ℓ = 1, m = 0
(D) $4p_x$	(S) n = 2, ℓ = 0, m = 0

Q.50

List-I	List-II
(P) Frequency	(1) Linear distance traveled by a wave per unit time
(Q) Wavelength	(2) Number of waves passing through a point in one second
(R) Time period	(3) Linear distance between starting and end point of one complete wave
(S) Speed	(4) Time taken for one complete wave to pass through a point

Codes:

	P	Q	R	S
(A)	2	3	4	1
(B)	2	3	1	4
(C)	3	2	4	1
(D)	1	3	2	4

Q.51

List-I (Orbital)	List-II (Set of n, ℓ, m)
(P) 2s	(1) n = 4, λ = 2, m = 0
(Q) $2p_z$	(2) n = 4, λ = 1, m = + 1
(R) $2p_z$	(3) n = 2, λ = 1, m = 0
(S) $4p_x$	(4) n = 2, Q = 0, m = 0

Codes :

	P	Q	R	S
(A)	1	2	3	4
(B)	2	3	4	1
(C)	2	3	1	4
(D)	4	3	1	2

Q.52 Match the electronic configuration listed in Column-II with the descriptions listed in Column-I

Column I	Column II	
(A) Violation of Aufbau's rule	(p)	[↑↓] [↑↑ | ↑ |]
(B) Violation of Pauli's exclusion principle	(q)	[↑↓] [↑↓ | ↑ |]
(C) Violation of Hund's rule	(r)	[↑↓] [↑↑ | ↑ | ↑]
(D) Violation of both Pauli's and Hund's rules	(s)	[↑] [↑↓ | ↑ | ↑]

Numeric Response Type Questions

Q.53 The no. of electrons having $M_{(\ell)}$ (magnetic quantum no.) = −1 in phosphorus atom is.

Q.54 How many species contain same no. of unpaired electrons are there in each of the following in the ground state.

(i) O (ii) O^+ (iii) O^{2+} (iv) Fe

(v) Mn (vi) S (vii) F (viii) Ar

Q.55 How many column match are correct –

Column-I	Column-II
(A) Ratio of velocity of electron in 5^{th} & 3^{rd} excited level for H atom	(P) 4/1
(B) Ratio of wavelength of series limit of Balmer to Lyman series for H atom is	(Q) 2/3
(C) Ratio of wavelength of photon corresponding to β-line of Lyman series and γ-line of paschen series for a H-atom is	(R) 1/4
(D) Ratio of energy difference between 3^{rd} and 1^{st} orbit of H-atom and He^+ ion is	(S) 3/32

Q.56 A light source of power 16 watt emits light of wavelength 310 nm. If all the emitted photons are made to strike a metal plate of work function 1.5 eV, then find the magnitude of photocurrent if 50 % of the incident photon eject photo electrons. (hc = 1240 eV – nm)

Q.57 Maximum no. of electron that have the same spin in Al.

Q.58 During the excitation of an electron from ground state, it travels a distance of nearly 0.795 nm in the hydrogen atom. Calculate the maximum number of spectral lines formed during the de-excitation
(Given : Radius of H atom in ground state = 0.53 Å)

Q.59 A photon is emitted in β-line of Balmer series of He^+ ion. This photon is absorbed by an electron present in ground state of hydrogen atom. Calculate the value of z. Where $z = \frac{\lambda}{0.529\pi}$. λ = De Broglie wave length associated with electron in final orbit of hydrogen atom. (in A)

Q.60 An electron is excited by a potential of 1.5 V from rest. If uncertainty in position is in order of De Broglie wave length. Calculate the value of z. where $z = 2\pi\Delta\lambda$. (λ in Å)

Q.61 A unipositive charged particle accelerated from rest by a potential difference of 40V is projected towards nucleus of a metal. What is the value of $\left(\frac{z}{10}\right)$? Given : z = atomic number of metal, closest distance of approach = 14.4 Å.

Q.62 He^+ ions in its ground state are irradiated with photons of energy 67.15 eV. Electrons ejected from He^+ strikes the H-atom in its ground state.
Give the maximum number of spectral lines which can be obtained from de-excitation of H-atoms.

Q.63 What will be the maximum number of lines possible for Balmer series when a set of 8 hydrogen atoms are irradiated with light and all are excited to 6^{th} excited state and spectrum is obtained?

Q.64 How many times does the electron go round the first Bohr's orbit of hydrogen in one second ? Give your answer in term of multiply 10^{-15}

Q.65 The number of revolutions made by an electron in one second in H-atom in its n^{th} orbit is eight times of number of revolutions made by electron in one second in 2^{nd} orbit of H-atom, then n is ......

Q.66 Minimum number of electrons in an elements with atomic number = 31, satisfying the condition $\ell = 1$ & S = +1/2, are ....

Q.67 A sample of four hydrogen atoms, all in the nth excited state, de – excite to the ground state, and shows a maximum of six different spectral lines. Hence the value of 'n' is.

Q.68 In hydrogen atom, the electron is de excited from 5^{th} orbit to 1^{st} orbit. The maximum number of different spectral lines appear in the visible region of the spectrum is.

Q.69 Find energy level of Li^{2+} having velocity 2.18×10^6 m/sec.

ANSWER KEY

Single Correct Option type Questions

1. (B)	**2.** (D)	**3.** (B)	**4.** (B)	**5.** (D)	**6.** (C)	**7.** (C)
8. (D)	**9.** (D)	**10.** (C)	**11.** (D)	**12.** (D)	**13.** (D)	**14.** (D)
15. (C)	**16.** (B)	**17.** (A)	**18.** (C)	**19.** (B)	**20.** (B)	**21.** (A)
22. (A)	**23.** (A)	**24.** (A)	**25.** (A)	**26.** (B)		

Statement Based Questions

27. (A)

Multiple Correct Option type Questions

28. (A,B,C,)	**29.** (B)	**30.** (A,C,D)	**31.** (A,B,C,D)	**32.** (B,D)	**33.** (A,B)	**34.** (A,B,D)
35. (A)						

Passage Based Questions

36. (D)	**37.** (C)	**38.** (B)	**39.** (B)	**40.** (C)	**41.** (C)	**42.** (B)
43. (B)	**44.** (C)	**45.** (C)	**46.** (A)	**47.** (A)	**48.** (D)	

Column Matching Type Questions

49. [**A** $\rightarrow$ S; **B** $\rightarrow$ R; **C** $\rightarrow$ P; **D** $\rightarrow$ Q]
50. [A]
51. [D]
52. [**A** $\rightarrow$ S; **B** $\rightarrow$ P,R; **C** $\rightarrow$ P,Q; **D** $\rightarrow$ P]

Numerical Response Type Questions

53. (3)	**54.** (3)	**55.** (0)	**56.** (2)	**57.** (7)	**58.** (6)	**59.** (4)
60. (5)	**61.** (4)	**62.** (6)	**63.** (5)	**64.** (7)	**65.** (1)	**66.** (6)
67. (4)	**68.** (3)	**69.** (3)				