ATOMIC STRUCTURE

NEET PYQs (1988-2025)

"These are not just assignments. These are questions that once decided someone's rank. Solve them seriously... they might decide yours."

Topic–1 : Early Atomic Models

1. **Which of the following is never true for cathode rays? [CBSE AIPMT 1994]**
   (a) They possess kinetic energy
   (b) They are electromagnetic waves
   (c) They produce heat
   (d) They produce mechanical pressure

2. **Who modified Bohr's theory by introducing elliptical orbits for electron path? [CBSE AIPMT 1999]**
   (a) Hund
   (b) Thomson
   (c) Rutherford
   (d) Sommerfeld

Topic–2: Discoveries Before Bohr's model

EM Radiation, Blackbody Radiation Planck Theory,& Photoelctric effect

1. **A particular station of All India Radio, New Delhi, broadcasts on a frequency of** 1,368 **kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is**
   Speed of light, $c = 3.0 \times 10^8$ **ms**$^{-1}$**] [NEET 2021]**
   (a) 219.3 m
   (b) 219.2 m
   (c) 2192 m
   (d) 21.92 cm

2. **The value of Planck's constant is** 6.63×10^{-34} **Js. The velocity of light is** 3.0×10^8 **ms**$^{-1}$**. Which value is closest to the wavelength in nanometers of a quantum of light with frequency of** 8×10^{15} **s**$^{-1}$**? [CBSE AIPMT 2003]**
   (a) 4×10^1

(b) 3×10^{7}
(c) 2×10^{-25}
(d) 5×10^{-18}

3. **The value of Planck's constant is 6.63×10^{-34} Js. The speed of light is 3×10^{17} nm s^{-1}. Which value is closest to the wavelength in nanometer of a quantum of light with frequency of 6×10^{15} s^{-1}? [NEET 2013]**
(a) 10
(b) 25
(c) 50
(d) 75

4. **Calculate the energy in joule corresponding to light of wavelength 45 nm (Planck's constant, $h = 6.63 \times 10^{-34}$ Js; speed of light, $c = 3 \times 10^{8}$ ms^{-1}). [CBSE AIPMT 2014]**
(a) 6.67×10^{15}
(b) 6.67×10^{11}
(c) 4.42×10^{-15}
(d) 4.42×10^{-18}

5. **The energy of photon is given as $\Delta e/\text{atom} = 3.03 \times 10^{-19}$ J $atom^{-1}$, then the wavelength (λ) of the photon is [CBSE AIPMT 2000]**
(Given, $h = 6.63 \times 10^{-34}$ Js, $c = 3.00 \times 10^{8}$ ms^{-1})
(a) 6.56 nm
(b) 65.6 nm
(c) 656 nm
(d) 0.656 nm

6. **According to the law of photochemical equivalence, the energy absorbed (in ergs/mole) is given as ($h = 6.62 \times 10^{-27}$ erg s, $c = 3 \times 10^{10}$ cm s^{-1}, $N_A = 6.02 \times 10^{23}$ mol^{-1}). [Karnataka NEET 2013]**
(a) $\dfrac{1.196 \times 10^{8}}{\lambda}$
(b) $\dfrac{2.859 \times 10^{5}}{\lambda}$
(c) $\dfrac{2.859 \times 10^{16}}{\lambda}$
(d) $\dfrac{1.196 \times 10^{16}}{\lambda}$

7. **The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths i.e. λ_1 and λ_2 will be [CBSE AIPMT 2011]**
(a) $\lambda_1 = 2\lambda_2$
(b) $\lambda_1 = 4\lambda_2$
(c) $\lambda_1 = \frac{1}{2}\lambda_2$

(d) $\lambda_1 = \lambda_2$

8. **In the photoelectron emission, the energy of the emitted electron is [CBSE AIPMT 1994]**
   (a) greater than the incident photon
   (b) same as that of the incident photon
   (c) smaller than the incident photon
   (d) proportional to the intensity of incident photon

Topic–3 : Bohr's Model & Hydrogen Spectrum

1. **Which of the following statements do not form a part of Bohr's model of hydrogen atom? [CBSE AIPMT 1989]**
   (a) Energy of the electrons in the orbits are quantised
   (b) The electron in the orbit nearest the nucleus has the lowest energy
   (c) Electrons revolve in different orbits around the nucleus
   (d) The position and velocity of electrons in the orbit cannot be determined simultaneously

2. **Based on the equation $E = -2.178 \times 10^{-18}$ J $\left(\frac{Z^2}{n^2}\right)$, certain conclusions are written. Which of them is not correct? [NEET 2013]**
   (a) Equation can be used to calculate the change in energy when the electron changes orbit
   (b) For $n = 1$, the electron has a more negative energy than it does for $n = 6$, which means that the electron is more loosely bound in the smallest allowed orbit
   (c) The negative sign in the equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electron were at an infinite distance from the nucleus
   (d) Larger the value of n, the larger is the orbit radius

3. **If r is the radius of the first orbit, the radius of n^{th} orbit of H-atom is given by [CBSE AIPMT 1988]**
   (a) rn^2
   (b) rn
   (c) $\frac{r}{n}$
   (d) $\frac{r}{n^2}$

4. **The radius of hydrogen atom in the ground state is 0.53 Å. The radius of Li^{2+} ion (at. no. = 3) in a similar state is [CBSE AIPMT 1995]**
   (a) 0.17 Å
   (b) 0.53 Å
   (c) 0.265 Å
   (d) 1.06 Å

5. **Bohr radius for the hydrogen atom ($n = 1$) is approximately 0.530 Å. The radius for the first excited state ($n = 2$) is (in Å) [CBSE AIPMT 1998]**
   (a) 0.13
   (b) 1.06
   (c) 4.77
   (d) 2.12

6. **The energy of an electron in the n^{th} Bohr orbit of hydrogen atom is [CBSE AIPMT 1992]**
   (a) $-\frac{13.6}{n^4}$ eV
   (b) $-\frac{13.6}{n^3}$ eV
   (c) $-\frac{13.6}{n^2}$ eV
   (d) $-\frac{13.6}{n}$ eV

7. **The energy of second Bohr orbit of the hydrogen atom is -328 kJ mol^{-1}, hence the energy of fourth Bohr orbit would be [CBSE AIPMT 2005]**
   (a) -41 kJ mol^{-1}
   (b) -1312 kJ mol^{-1}
   (c) -164 kJ mol^{-1}
   (d) -82 kJ mol^{-1}

7. **When an electron of charge e and mass m moves with a velocity v about the nuclear charge Ze in circular orbit of radius r, the potential energy of the electron is given by [CBSE AIPMT 1994]**
   (a) $\frac{Ze^2}{r}$
   (b) $-\frac{Ze^2}{r}$
   (c) $\frac{Ze}{r^2}$
   (d) $\frac{mv^2}{r}$

8. **In hydrogen atom, energy of first excited state is -3.4 eV. Then, KE of same orbit of hydrogen atom is [CBSE AIPMT 2002]**
   (a) +3.4 eV
   (b) -6.8 eV
   (c) -13.6 eV
   (d) +13.6 eV

9. **If ionisation potential for hydrogen atom is 13.6 eV, then ionisation potential for He^+ will be [CBSE AIPMT 1993]**
   (a) 54.4 eV
   (b) 6.8 eV

(c) 13.6 eV
(d) 24.5 eV

10. **The spectrum of helium is expected to be similar to that of [CBSE AIPMT 1988]**
(a) H
(b) Na
(c) Li^+
(d) He^+

11. **Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region? [NEET 2019]**
(a) Brackett series
(b) Lyman series
(c) Balmer series
(d) Paschen series

12. **According to the Bohr theory, which of the following transitions in the hydrogen atom will give rise to the least energetic photon? [2011]**
(a) $n = 6 \rightarrow n = 1$
(b) $n = 5 \rightarrow n = 4$
(c) $n = 6 \rightarrow n = 5$
(d) $n = 5 \rightarrow n = 3$

13. **What will be the longest wavelength line in the Balmer series of spectrum? [1996]**
(a) 546 nm
(b) 656 nm
(c) 566 nm
(d) 556 nm

14. **In Bohr's model of an atom, when an electron jumps from $n = 1$ to $n = 3$, how much energy will be emitted or absorbed? [1996]**
(a) 2.389×10^{-12} ergs
(b) 0.239×10^{-10} ergs
(c) 2.15×10^{-11} ergs
(d) 0.1936×10^{-10} ergs

15. **The frequency of radiation emitted when the electron falls from $n = 4$ to $n = 1$ in a hydrogen atom will be (Given ionisation energy of H = 2.18×10^{-18} J atom^{-1} and $h = 6.625 \times 10^{-34}$ Js) [CBSE AIPMT 2004]**
(a) 1.54×10^{15} s^{-1}
(b) 1.03×10^{15} s^{-1}
(c) 3.08×10^{15} s^{-1}

(d) 2.00×10^{15} s^{-1}

Topic–4 :De-brogle's Hypothesis & Heisenberg's Uncertainty Principle

1. **The de-Broglie wavelength of a particle with mass 1 g and velocity 100 m/s is [CBSE AIPMT 1999]**
   (a) 6.63×10^{-33} m
   (b) 6.63×10^{-34} m
   (c) 6.63×10^{-35} m
   (d) 6.65×10^{-36} m

2. **In hydrogen atom, the de-Broglie wavelength of an electron in the second Bohr orbit is Given that, Bohr radius, $a_0 = 52.9$ pm] [NEET (Odisha) 2019]**
   (a) 211.6 pm
   (b) 211.6π pm
   (c) 52.9π pm
   (d) 105.8 pm

3. **The momentum of a particle having a de-Broglie wavelength of 10^{-17} m is (Given, $h = 6.625 \times 10^{-34}$ J s) [CBSE AIPMT 1996]**
   (a) 3.3125×10^{-7} kg m s^{-1}
   (b) 26.5×10^{-7} kg m s^{-1}
   (c) 6.625×10^{-17} kg m s^{-1}
   (d) 13.25×10^{-17} kg m s^{-1}

4. **The electron was shown experimentally to have wave properties by [CBSE AIPMT 1994]**
   (a) de-Broglie
   (b) N Bohr
   (c) Davisson and Germer
   (d) Schrödinger

5. **The measurement of the electron position is associated with an uncertainty in momentum, which is equal to 1×10^{-18} g cm s^{-1}. The uncertainty in electron velocity is (mass of an electron is 9×10^{-28} g) [CBSE AIPMT 2008]**
   (a) 1×10^{9} cm s^{-1}
   (b) 1×10^{6} cm s^{-1}
   (c) 1×10^{5} cm s^{-1}
   (d) 1×10^{11} cm s^{-1}

6. **The uncertainty in momentum of an electron is 1×10^{-5} kg m s^{-1}. The uncertainty in**

its position will be (Given, $h = 6.62 \times 10^{-34}$ kg m^2 s^{-1}) [CBSE AIPMT 1999]

(a) 1.05×10^{-28} m
(b) 1.05×10^{-26} m
(c) 5.27×10^{-30} m
(d) 5.25×10^{-28} m

7. **If uncertainty in position and momentum are equal, then uncertainty in velocity is [CBSE AIPMT 2008]**

(a) $\frac{h}{2\pi m}$
(b) $\frac{h}{2\pi}$
(c) $\frac{h}{\pi m}$
(d) $\frac{h}{\pi}$

8. **Given, the mass of electron is 9.11×10^{-31} kg, Planck's constant is 6.626×10^{-34} Js, the uncertainty involved in the measurement of velocity within a distance of 0.1 Å is [CBSE AIPMT 2006]**

(a) 5.79×10^{6} ms^{-1}
(b) 5.79×10^{7} ms^{-1}
(c) 5.79×10^{8} ms^{-1}
(d) 5.79×10^{5} ms^{-1}

9. **The position of both, an electron and a helium atom is known within 1.0 mm. Further the momentum of the electron is known within 5.0×10^{-26} kg m s^{-1}. The minimum uncertainty in the measurement of the momentum of the helium atom is [CBSE AIPMT 1998]**

(a) 50 kg m s^{-1}
(b) 80 kg m s^{-1}
(c) 80×10^{-26} kg m s^{-1}
(d) 5.0×10^{-26} kg m s^{-1}

10. **Uncertainty in position of an electron (mass of an electron is 9.1×10^{-28} g) moving with a velocity of 3×10^{4} cm s^{-1} accurate upto 0.001% will be (use $\frac{h}{4\pi}$ in uncertainty expression where $h = 6.626 \times 10^{-27}$ erg s) [CBSE AIPMT 1995]**

(a) 1.93 cm
(b) 3.84 cm
(c) 5.76 cm
(d) 7.68 cm

11. **Which one is the wrong statement? [NEET 2017]**

(a) de-Broglie's wavelength is given by $\lambda = \frac{h}{mv}$, where m = mass of the particle, v = group

velocity of the particle

(b) The uncertainty principle is $\Delta E\,\Delta t \geq \dfrac{h}{4\pi}$

(c) Half-filled and fully filled orbitals have greater stability due to greater exchange energy, greater symmetry and more balanced arrangement

(d) The energy of $2s$-orbital is less than the energy of $2p$-orbital in case of hydrogen like atoms

Topic–5 : Quantum Numbers

1. **How many electrons can fit in the orbital for which $n = 3$ and $l = 1$? [NEET (Phase II) 2016]**
   (a) 2
   (b) 6
   (c) 10
   (d) 14

2. **Maximum number of electrons in a subshell with $l = 3$ and $n = 4$ is [CBSE AIPMT 2012]**
   (a) 14
   (b) 16
   (c) 10
   (d) 12

3. **The total number of electrons that can be accommodated in all the orbitals having principal quantum number 2 and azimuthal quantum number 1 are [CBSE AIPMT 1990]**
   (a) 2
   (b) 4
   (c) 6
   (d) 8

4. **For azimuthal quantum number $l = 3$, the maximum number of electrons will be [CBSE AIPMT 1991]**
   (a) 2
   (b) 6
   (c) 0
   (d) 14

5. **What is the maximum numbers of electrons that can be associated with the following set of quantum numbers?**
   $n = 3$, $l = 1$ and $m = -1$ [NEET 2013]
   (a) 10
   (b) 6

(c) 4
(d) 2

6. **The following quantum numbers are possible for how many orbital(s)? $n = 3,\ l = 2$ and $m = +2$ [CBSE AIPMT 2001]**
   (a) 1
   (b) 2
   (c) 3
   (d) 4

7. **If an electron has spin quantum number $+\frac{1}{2}$ and magnetic quantum number -1, it cannot be present in [CBSE AIPMT 1994]**
   (a) d-orbital
   (b) f-orbital
   (c) p-orbital
   (d) s-orbital

8. **The orientation of an atomic orbital is governed by [CBSE AIPMT 2006]**
   (a) azimuthal quantum number
   (b) spin quantum number
   (c) magnetic quantum number
   (d) principal quantum number

9. **Two electrons occupying the same orbital are distinguished by [NEET (Phase I) 2016]**
   (a) Magnetic quantum number
   (b) Azimuthal quantum number
   (c) Spin quantum number
   (d) Principal quantum number

10. **Maximum number of electrons in a subshell of an atom is determined by the following [CBSE AIPMT 2009]**
    (a) $4l + 2$
    (b) $2l + 1$
    (c) $4l - 2$
    (d) $2n^2$

11. **The maximum number of electrons in a subshell is given by the expression [CBSE AIPMT 1989]**
    (a) $4l - 2$
    (b) $4l + 2$
    (c) $2l + 2$
    (d) $2n^2$

12. **Which of the following is not permissible arrangement of electrons in an atom? [CBSE AIPMT 2009]**
    (a) $n = 4,\ l = 0,\ m = 0,\ s = -\frac{1}{2}$
    (b) $n = 5,\ l = 3,\ m = 0,\ s = +\frac{1}{2}$
    (c) $n = 3,\ l = 2,\ m = -3,\ s = -\frac{1}{2}$
    (d) $n = 3,\ l = 2,\ m = -2,\ s = -\frac{1}{2}$

13. **Consider the following sets of quantum numbers.**
    $n\ ;l\ ;m\ ;s$
    (i) $3\ 0\ 0\ +\frac{1}{2}$
    (ii) $2\ 2\ 1\ +\frac{1}{2}$
    (iii) $4\ 3\ -2\ -\frac{1}{2}$
    (iv) $1\ 0\ -1\ -\frac{1}{2}$
    (v) $3\ 2\ 3\ +\frac{1}{2}$
    Which of the following sets of quantum number is not possible? [CBSE AIPMT 2007]
    (a) (ii), (iii) and (iv)
    (b) (i), (ii), (iii) and (iv)
    (c) (ii), (iv) and (v)
    (d) (i) and (iii)

14. **The angular momentum of electrons in d orbital is equal to [CBSE AIPMT 2015]**
    (a) $6h$
    (b) $2h$
    (c) $2\sqrt{3}\,h$
    (d) $0h$

15. **The orbital angular momentum of a p-electron is given as [JEE Main 2012]**
    (a) $\frac{h}{2\pi}\sqrt{2}$
    (b) $\frac{h}{2\pi}\sqrt{3}$
    (c) $\frac{h}{2\pi}\sqrt{\frac{3}{2}}$
    (d) $\frac{h}{2\pi}\sqrt{6}$

Topic–6 : Shape and Nodes of orbitals

1. **Which of the following pairs of d-orbitals will have electron density along the axes? [NEET–II 2016]**
    (a) $d_{z^2},\ d_{xz}$

(b) $d_{xz},\ d_{yz}$
(c) $d_{z^2},\ d_{x^2-y^2}$
(d) $d_{xy},\ d_{x^2-y^2}$

2. **The number of spherical nodes in $3p$-orbital is/are [CBSE AIPMT 1988]**
(a) one
(b) three
(c) two
(d) None of the above

3. **The number of angular nodes and radial nodes in $3s$ orbital are [NEET (Oct.) 2020]**
(a) 0 and 2, respectively
(b) 1 and 0, respectively
(c) 3 and 0, respectively
(d) 0 and 1, respectively

4. **Orbital having 3 angular nodes and 3 total nodes is [NEET (Odisha) 2019]**
(a) $5p$
(b) $3d$
(c) $4f$
(d) $6d$

Topic–7 : Electronic Configuration & Filling Rules

1. **In a given atom no two electrons can have the same values of all the four quantum numbers. This is called [CBSE AIPMT 1991]**
(a) Hund's rule
(b) Aufbau principle
(c) Uncertainty principle
(d) Pauli's exclusion principle

2. **The orbitals are called degenerate when [CBSE AIPMT 1996]**
(a) they have the same wavefunctions
(b) they have the same wavefunctions but different energies
(c) they have different wavefunctions but same energy
(d) they have the same energy

3. **For which one of the following sets of four quantum numbers, an electron will have the highest energy? [CBSE AIPMT 1994]**
(a) $n = 3,\ l = 2,\ m = 1,\ s = +\frac{1}{2}$
(b) $n = 4,\ l = 2,\ m = -1,\ s = +\frac{1}{2}$

(c) $n = 4,\ l = 1,\ m = 0,\ s = -\frac{1}{2}$

(d) $n = 5,\ l = 0,\ m = 0,\ s = -\frac{1}{2}$

4. **The order of filling of electrons in the orbitals of an atom will be [CBSE AIPMT 1991]**

(a) $3d \to 4s \to 4p \to 5s$

(b) $4s \to 3d \to 4p \to 5s$

(c) $5s \to 4d \to 3p \to 3s$

(d) $3d \to 4p \to 5s \to 3s$

5. **$4d$, $5f$, $5p$ and $6p$-orbitals are arranged in the order of decreasing energy. The correct option is [NEET (National) 2019]**

(a) $6p > 5f > 5d > 4p$

(b) $5p > 5f > 4d > 5p$

(c) $5f > 6p > 4d > 5p$

(d) $5f > 6p > 5p > 4d$

6. **If $n = 6$, the correct sequence for filling of electrons will be [CBSE AIPMT 2011]**

(a) $ns \to nd \to nf \to np$

(b) $ns \to nf \to np \to nd$

(c) $ns \to np \to nd \to nf$

(d) $ns \to nf \to nd \to np$

7. **Which is the correct order of increasing energy of the listed orbitals in the atom of titanium? [CBSE AIPMT 2015]**

(a) $3s < 4s < 3p < 3d$

(b) $4s < 3s < 3p < 3d$

(c) $3s < 3p < 3d < 4s$

(d) $3s < 3p < 4s < 3d$

8. **The electronic configuration of Cu (at. no. = 29) is [CBSE AIPMT 1991]**

(a) $1s^2\,2s^2\,3s^2\,3p^6\,4s^2\,3d^9$

(b) $1s^2\,2s^2\,3s^2\,3p^6\,4s^1\,3d^{10}$

(c) $1s^2\,2s^2\,3s^2\,3p^6\,4s^2\,3d^8\,4p^1$

(d) $1s^2\,2s^2\,3s^2\,3p^6\,4s^2\,3d^8$

9. **Electronic configuration of calcium atom can be written as [CBSE AIPMT 1992]**

(a) $[\mathrm{Ne}]\,4p^2$

(b) $[\mathrm{Ar}]\,4s^2$

(c) $[\mathrm{Ne}]\,4s^2$

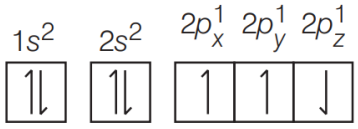
(d) $[\mathrm{Kr}]\,4p^2$

10. **Number of unpaired electrons in N^{2+} is/are [CBSE AIPMT 1989]**
    (a) 2
    (b) 0
    (c) 1
    (d) 3

11. **The number of d-electrons in Fe^{2+} ($Z = 26$) is not equal to the number of electrons in which one of the following? [CBSE AIPMT 2015]**
    (a) s-electrons in Mg ($Z = 12$)
    (b) p-electrons in Cl ($Z = 17$)
    (c) d-electrons in Fe ($Z = 26$)
    (d) p-electrons in Ne ($Z = 10$)

12. **Which of the following configuration is correct for iron? [CBSE AIPMT 1999]**
    (a) $1s^2\,2s^2\,3s^2\,3p^6\,3d^6$
    (b) $1s^2\,2s^2\,3s^2\,3p^6\,4s^2\,3d^5$
    (c) $1s^2\,2s^2\,3s^2\,3p^6\,4s^2\,3d^7$
    (d) $1s^2\,2s^2\,3s^2\,3p^6\,4s^2\,3d^6$

13. **The correct set of four quantum numbers for the valence electron of rubidium atom (at. no. = 37) is [CBSE AIPMT 2012]**
    (a) $5, 1, 1, +\frac{1}{2}$
    (b) $6, 0, 0, +\frac{1}{2}$
    (c) $5, 0, 0, +\frac{1}{2}$
    (d) $5, 1, 0, +\frac{1}{2}$

14. **Which one is a wrong statement? [NEET 2018]**
    (a) The electronic configuration of N-atom is 

    (b) An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers
    (c) Total orbital angular momentum of electron in 's' orbital is equal to zero
    (d) The value of m for d_{z^2} is zero

15. **An ion has 18 electrons in the outermost shell, it is [1990]**
    (a) Cu^+
    (b) Th^{4+}
    (c) Cs^+
    (d) K^+

16. **The electronic configuration of gadolinium (at. no. = 64) is [CBSE AIPMT 1997]**
    (a) $[\mathrm{Xe}]\,4f^8\,5d^6\,6s^2$
    (b) $[\mathrm{Xe}]\,4f^7\,5d^1\,6s^2$
    (c) $[\mathrm{Xe}]\,4f^6\,5d^2\,6s^2$
    (d) $[\mathrm{Xe}]\,4f^3\,5d^5\,6s^2$

Topic–8 :NEET 2025-2022

1. **Energy and radius of first Bohr orbit of He^+ and Li^{2+} are (Given : $R_H = 2.18 \times 10^{-18}$ J, $a_0 = 52.9$ pm) [NEET 2025]**
    (a) $E_n(Li^{2+}) = -19.62 \times 10^{-16}$ J;
    $r_n(Li^{2+}) = 17.6$ pm
    $E_n(He^+) = -8.72 \times 10^{-16}$ J;
    $r_n(He^+) = 26.4$ pm
    (b) $E_n(Li^{2+}) = -8.72 \times 10^{-16}$ J;
    $r_n(Li^{2+}) = 17.6$ pm
    $E_n(He^+) = -19.62 \times 10^{-16}$ J;
    $r_n(He^+) = 17.6$ pm
    (c) $E_n(Li^{2+}) = -19.62 \times 10^{-18}$ J;
    $r_n(Li^{2+}) = 17.6$ pm
    $E_n(He^+) = -8.72 \times 10^{-18}$ J;
    $r_n(He^+) = 26.4$ pm
    (d) $E_n(Li^{2+}) = -8.72 \times 10^{-18}$ J;
    $r_n(Li^{2+}) = 26.4$ pm
    $E_n(He^+) = -19.62 \times 10^{-18}$ J;
    $r_n(He^+) = 17.6$ pm

2. **The ratio of the wavelengths of the light absorbed by a Hydrogen atom when it undergoes $n = 2 \to 3$ and $n = 4 \to 6$ transitions, respectively, is [NEET 2025]**
    (a) $\frac{1}{9}$
    (b) $\frac{1}{4}$
    (c) $\frac{1}{36}$
    (d) $\frac{1}{16}$

3. **The quantum numbers of four electrons are given below. The correct decreasing order of energy of these electrons is [NEET 2024 Re]**
    I. $n = 4;\ l = 2;\ m_l = -2;\ s = -\frac{1}{2}$
    II. $n = 3;\ l = 2;\ m_l = 1;\ s = +\frac{1}{2}$
    III. $n = 4;\ l = 1;\ m_l = 0;\ s = +\frac{1}{2}$
    IV. $n = 3;\ l = 1;\ m_l = -1;\ s = +\frac{1}{2}$

(a) IV > II > III > I
(b) I > III > II > IV
(c) III > I > II > IV
(d) I > II > III > IV

4. **Given below are two statements : [NEET 2024 Re]**

Statement I: The Balmer spectral line for H atom with lowest energy is located at $\frac{5}{36}R_H$ cm^{-1}.
Statement II : When the temperature of black body increases, the maxima of the curve (intensity and wavelength) shifts to shorter wavelength.

(a) Statement I is true but Statement II is false
(b) Statement I is false but Statement II is true
(c) Both Statement I and Statement II are true
(d) Both Statement I and Statement II are false

5. **The energy of an electron in the ground state ($n = 1$) for He^+ ion is $-x$ J, then that for an electron in $n = 2$ state for Be^{3+} ion in J is [NEET 2024]**

(a) $-x$
(b) $-\frac{x}{9}$
(c) $-4x$
(d) $-\frac{4x}{9}$

6. **Match List I with List II [NEET 2024]**

List I (Quantum number)
A. m_l
B. m_s
C. l
D. n
List II (Information provided)
I. Shape of orbital
II. Size of orbital
III. Orientation of orbital
IV. Orientation of spin of electron

(a) A-I, B-III, C-II, D-IV
(b) A-III, B-IV, C-I, D-II
(c) A-III, B-IV, C-II, D-I
(d) A-II, B-I, C-IV, D-III

7. **Select the correct statements from the following [NEET 2023]**

A. Atoms of all elements are composed of two fundamental particles.
B. The mass of the electron is 9.10939×10^{-31} kg.
C. All the isotopes of a given element show same chemical properties.
D. Protons and electrons are collectively known as nucleons.

E. Dalton's atomic theory regarded the atom as the ultimate particle of matter.

(a) C, D and E only
(b) A and E only
(c) B, C and E only
(d) A, B and C only

8. **The relation between n_m (number of permissible values of magnetic quantum number) for a given value of azimuthal quantum number (l), is [NEET 2023]**

(a) $l = 2n_m + 1$
(b) $n_m = 2l + 1$
(c) $n_m = l + 2$
(d) $n_m = 2l + 1$

9. **Incorrect set of quantum numbers from the following is : [NEET 2023 MPR]**

(a) $n = 4,\ l = 3,\ m_l = -3, -2, -1, 0, +1, +2, +3,\ m_s = -\frac{1}{2}$
(b) $n = 5,\ l = 2,\ m_l = -2, -1, 0, +1, +2,\ m_s = +\frac{1}{2}$
(c) $n = 4,\ l = 2,\ m_l = -2, -1, 0, +1, +2,\ m_s = -\frac{1}{2}$
(d) $n = 5,\ l = 3,\ m_l = -3, -2, -1, 0, +1, +2, +3,\ m_s = +\frac{1}{2}$

10. **Given below are two statements : [NEET 2023 MPR]**

Statement I : The value of wave function, Ψ depends upon the coordinates of the electron in the atom.

Statement II : The probability of finding an electron at a point within an atom is proportional to the orbital wave function.

(a) Statement I is true but Statement II is false
(b) Statement I is false but Statement II is true
(c) Both Statement I and Statement II are true
(d) Both Statement I and Statement II are false

11. **Match List I with List II and choose the correct answer from the options given below [NEET Re-2022]**

List–I (quantum number)	List–II (orbital)
(a) $n = 2,\ l = 1$	(i) $2s$
(b) $n = 3,\ l = 2$	(ii) $3s$
(c) $n = 3,\ l = 0$	(iii) $2p$
(d) $n = 2,\ l = 0$	(iv) $3d$

(a) (a)–(iii), (b)–(iv), (c)–(ii), (d)–(i)
(b) (a)–(iii), (b)–(iv), (c)–(i), (d)–(ii)
(c) (a)–(iv), (b)–(iii), (c)–(i), (d)–(ii)
(d) (a)–(iv), (b)–(iii), (c)–(ii), (d)–(i)

12. **When electromagnetic radiation of wavelength 300 nm falls on the surface of a metal, electrons are emitted with the kinetic energy of 1.68×10^5 J mol^{-1}. What is the minimum energy needed to remove an electron from the metal ? ($h = 6.626 \times 10^{-34}$ Js, $c = 3 \times 10^8$ ms^{-1}, $N_A = 6.022 \times 10^{23}$ mol^{-1}) [NEET Re-2022]**
    (a) 2.31×10^5 J mol^{-1}
    (b) 2.31×10^6 J mol^{-1}
    (c) 3.84×10^4 J mol^{-1}
    (d) 3.84×10^{-19} J mol^{-1}

13. **Identify the incorrect statement from the following [NEET 2022]**
    (a) All the five 5d orbitals are different in size when compared to the respective 4d orbitals.
    (b) All the five 4d orbitals have shapes similar to the respective 3d orbitals.
    (c) In an atom, all the five 3d orbitals are equal in energy in free state.
    (d) The shapes of d_{xy}, d_{yz} and d_{zx} orbitals are similar to each other; and $d_{x^2-y^2}$ and d_{z^2} are similar to each other.

14. **If radius of second Bohr orbit of the He^+ ion is 105.8 pm, what is the radius of third Bohr orbit of Li^{2+} ion? [NEET 2022]**
    (a) 158.7 pm
    (b) 15.87 pm
    (c) 1.587 pm
    (d) 158.7 Å

Chapter Analysis : Atomic Structure (NEET 1988–2025)

A total of **85 questions** have been asked from this chapter in NEET:

- **71 questions** from **1988–2022**
- **14 questions** from **2022–2025**

This clearly shows that **Atomic Structure is a consistently tested and high-importance chapter** in NEET Physical Chemistry.

Topic-wise Weightage

Topic	No. of Questions
Quantum Numbers	20
Shape and Nodes of Orbitals	4
Electronic Configuration & Filling Rules	18
de Broglie Hypothesis & Uncertainty Principle	11
Bohr's Model & Hydrogen Spectrum	20
Discoveries Before Bohr's Model	9
Early Atomic Models	3
Total	**85**

Key Insight: Nearly **70% of questions** come from **Bohr's Model + Quantum Numbers + Electronic Configuration**.

NEET Trend Observations

- **Quantum Numbers** and **Bohr's Model** together form the core of this chapter
- **Electronic Configuration** is a high-return topic with repeated PYQ patterns
- **Recent NEET papers (2022–2025)** show increased focus on:
  - Conceptual statement-based questions
  - Match-the-column formats
  - Hydrogen-like species comparisons
- Lengthy numericals are rare; most questions are **logic + formula based**

NEET Strategy

- Memorise all **Bohr formulas** (E_n, r_n, spectrum series, hydrogen-like ions)
- Practice **quantum number validity** and ordering questions thoroughly
- Focus on **electronic configuration exceptions** (Cr, Cu, ions)
- Do PYQs of **de Broglie & uncertainty** carefully — numericals are direct

Conclusion: Atomic Structure is a **high-yield, concept-driven chapter**. Strong command over this chapter can fetch **3–4 assured questions** in NEET.