

Atoms

NEET previous year questions · Physics

4 questions from the official papers: NEET 2026 (1), Re-NEET 2026 (2), NEET 2020 (1). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q10

In the first excited state of hydrogen atom, the energy of its electron is -3.4 eV. The radial distance of the electron from the hydrogen nucleus in this case is approximately:

(Take $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$, $e = 1.6 \times 10^{-19} \text{ C}$ and $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ N m}^2/\text{C}^2$)

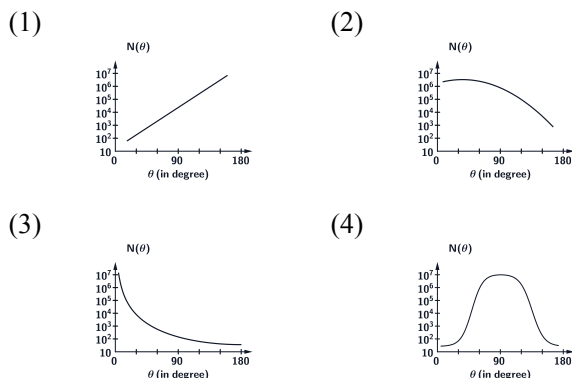
- (1) $2.1 \times 10^{-9} \text{ m}$ (2) $2.1 \times 10^{-8} \text{ m}$
(3) $2.1 \times 10^{-10} \text{ m}$ (4) $2.1 \times 10^{-11} \text{ m}$

Answer (3)

Sol. For the hydrogen atom the magnitude of the total energy equals half the magnitude of the potential energy, so $\frac{KQ^2}{2r} = 3.4 \text{ eV}$. Solving, $r = \frac{9 \times 10^9 \times (1.6 \times 10^{-19})^2}{2 \times 3.4 \times 1.6 \times 10^{-19}} \approx 2.1 \times 10^{-10} \text{ m}$, option (3). This is the $n = 2$ Bohr orbit radius, i.e. $4a_0 \approx 2.1$ angstrom.

2. Re-NEET 2026 · Q35

In Geiger-Marsden experiment, the number of scattered α -particles $N(\theta)$ is plotted as a function of scattering angle θ . Which of the following options represents the correct plot?



Answer (3)

Sol. Rutherford's scattering formula gives $N(\theta) \propto \frac{1}{\sin^4(\theta/2)}$, so the count is enormous for small deflections and drops by several orders of magnitude as θ increases - which is exactly why the plots are drawn on a logarithmic vertical axis. The experimental finding was that the overwhelming majority of α -particles pass almost undeviated, with only a tiny fraction turned through large angles by the nucleus. NCERT Class 12, Atoms (alpha-particle scattering).

Why the other options are wrong:

- (1) reverses the physics, implying most particles suffer large deflections and the atom is uniformly dense
- (2) captures the falling trend but far too weakly - it misses that the drop spans many orders of magnitude
- (4) invents a preferred scattering angle, as if the nucleus deflected particles by a characteristic amount

3. Re-NEET 2026 · Q40

Consider that an electron is revolving in an excited state of Hydrogen atom with velocity $\sqrt{25.6} \times 10^5 \text{ ms}^{-1}$. The radius of the orbit is $x \times 10^{-9} \text{ m}$. The value of x is: [Take the mass of electron to be $9 \times 10^{-31} \text{ kg}$, charge of electron = $-1.6 \times 10^{-19} \text{ C}$ and $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$]

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

Answer (4)

Sol. In a Bohr orbit the Coulomb attraction supplies the centripetal force: $\frac{ke^2}{r^2} = \frac{mv^2}{r}$, which rearranges to $r = \frac{ke^2}{mv^2}$. Substituting $v^2 = 25.6 \times 10^{10} = 2.56 \times 10^{11}$, the numerator is $9 \times 10^9 \times (1.6 \times 10^{-19})^2 = 2.304 \times 10^{-28}$ and the denominator is $9 \times 10^{-31} \times 2.56 \times 10^{11} = 2.304 \times 10^{-19}$. Their ratio is $1 \times 10^{-9} \text{ m}$, so $x = 1$. NCERT Class 12, Atoms (Bohr model).

4. NEET 2020 · Q141

For which one of the following, Bohr model is not valid ?

- (1) Singly ionised helium atom (He^+)
- (2) Deuteron atom
- (3) Singly ionised neon atom (Ne^+)
- (4) Hydrogen atom

Answer (3)

Sol. The Bohr model is valid for hydrogen-like atoms, which have one electron. Hydrogen, singly ionised helium, and deuteron all fit this criterion. Singly ionised neon, however, has more than one electron, making the Bohr model inapplicable. Chapter: Atoms.

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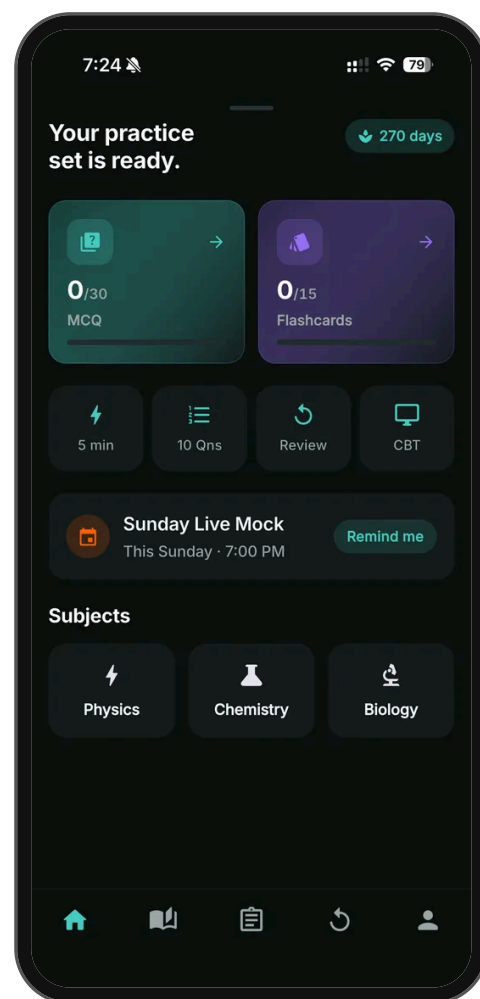
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