# Worksheet: Atoms

Kerala State Board · Class 12 · Physics · 9 questions · 27 marks

Name: _____ Date: _____ Score: _____ / 27

**Q1.** Find the energy of the n = 3 level of hydrogen. *[2 marks]*

**Q2.** The Bohr radius is 0.53 x 10^-10 m. Find the radius of the n = 4 orbit. *[2 marks]*

**Q3.** The total energy of an electron in a hydrogen orbit is -3.4 eV. Find its kinetic and potential energies. *[2 marks]*

**Q4.** Find the wavelength of the photon emitted when a hydrogen atom falls from n = 3 to n = 2. *[3 marks]*

**Q5.** To which series does a transition ending on n = 2 belong, and in which region of the spectrum does it lie? *[3 marks]*

**Q6.** An alpha particle of kinetic energy 5.0 MeV is fired head-on at a gold nucleus of Z = 79. Find the distance of closest approach. *[3 marks]*

**Q7.** Find the ratio of the orbital periods of the n = 2 and n = 4 levels of hydrogen. *[4 marks]*

**Q8.** A hydrogen atom in the ground state absorbs a photon and is excited to n = 3. Find the wavelength of the absorbed photon and the number of spectral lines that can then be emitted. *[4 marks]*

**Q9.** Show that requiring a whole number of de Broglie wavelengths to fit around a Bohr orbit reproduces the angular momentum quantisation condition. *[4 marks]*