Worksheet: Atoms

Gujarat 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]*