Worksheet: Nuclei

ISC · Class 12 · Physics · 9 questions · 27 marks

Name: _____ Date: _____ Score: _____ / 27

Q1. Find the ratio of the nuclear radii of carbon-12 and oxygen-16. *[2 marks]*

Q2. A nucleus has a mass defect of 0.25 u. Find its binding energy in MeV. *[2 marks]*

Q3. A nucleus of mass number 238 and atomic number 92 emits an alpha particle. Find the mass number and atomic number of the product. *[2 marks]*

Q4. Find the binding energy per nucleon of helium-4, given its atomic mass is 4.002603 u. *[3 marks]*

Q5. A reaction has total reactant mass 20.001000 u and total product mass 19.997000 u. Find its Q value and state whether it is exothermic. *[3 marks]*

Q6. Show that a nucleus of mass number 125 has a radius five times that of a nucleus of mass number 1. *[3 marks]*

Q7. How much energy is released if all the nuclei in 0.5 kg of uranium-235 undergo fission, releasing 200 MeV each? *[4 marks]*

Q8. Using the binding energy curve, explain why energy is released both when uranium splits and when hydrogen nuclei fuse. *[4 marks]*

Q9. Two protons of radius 1.2 fm approach head on. Find the height of the Coulomb barrier when they just touch. *[4 marks]*