

UNIT 6 - RADIOACTIVITY AND NUCLEAR CHEMISTRY

6.1 HONORS CLASS WORKSHEET

1. Nuclear symbols - a review

Use this template for nuclear symbols and equations: ${}^b_aX \rightarrow {}^b_aX + {}^b_aX$

(a)	Define the term "atomic number".	Number of protons in the nucleus
(b)	Define the term "mass number".	Sum of the number of protons and the number of neutrons in a nucleus
(c)	Define the term "isotopes".	Atoms with same number of protons (or the same atomic number) but different numbers of neutrons (or the same mass number)
(d)	Write the symbol for an atom containing 90 protons and 131 neutrons	${}^{221}_{90}\text{Th}$
(e)	Give the name of the atom in (d)	Thorium-221
(f)	Deduce the number of protons and neutrons in ${}^{131}_{54}\text{Xe}$	54 protons 77 neutrons

2. Principles of nuclear stability and radioactivity

(a)	Describe an alpha particle and give its chemical symbol.	Two protons and two neutrons ${}^4_2\alpha$
(a)	Why do some nuclei release alpha particles?	Nucleus has too many protons Nucleus needs to become smaller in order to become more stable
(c)	Describe a beta particle and give its chemical symbol.	Fast moving electron ${}^0_{-1}\beta$
(d)	Describe what happens inside a nucleus as a beta particle is emitted.	A neutron changes into a proton and an electron
(e)	Why do some nuclei release beta particles?	Nucleus has too many neutrons Nucleus needs to rebalance proton-neutron ratio in order to become more stable
(f)	What is gamma radiation? Why is gamma radiation sometimes released alongside alpha and beta particles?	High energy photon/electromagnetic radiation Atoms decrease their potential energy when they emit alpha or beta particles; this energy is converted into a photon.