

Radioactivity/Isotopes : Notes/W.S.-25

A radioactive isotope of carbon is carbon-14. The 14 is the mass number of the isotope. The mass number is the sum of the number of protons and neutrons in the nucleus.

The atomic number (see periodic table) is equal to the number of protons. So carbon-14 has 6 protons and 8 neutrons.

One way to represent an isotope is shown below.



This is the symbol for the isotope, uranium-238. The atomic number is 92 and the mass number is 238.

1) Name the following isotopes. Give the number of protons and neutrons.

	Isotope	Name	#protons	#neutrons
a)	${}_{83}^{212}\text{Bi}$			
b)	${}_{93}^{239}\text{Np}$			
c)	${}_{17}^{35}\text{Cl}$			
d)	${}_{88}^{226}\text{Ra}$			
e)	${}_{49}^{116}\text{In}$			
f)	${}_{15}^{32}\text{P}$			

2) A radioactive isotope of oxygen has a half-life of 2.1 minutes. The isotope is;



If we start with a sample of 0.16 grams of this isotope, how much will be left after the following times?

a) 4.2 min

b) 21 min

c) At what time will there be 0.000625 grams left?

Answers: 1)a) bismuth-212, $p=83$, $n=129$, b) neptunium-239, $p=93$, $n=146$, c) chlorine-35, $p=17$, $n=18$, d) radium-226, $p=88$, $n=138$, e) indium-116, $p=49$, $n=67$, f) phosphorus-32, $p=15$, $n=17$, 2)a) 0.040 grams, b) 0.000156 grams, c) 16.8 minutes.