

Isotopes

The number of protons in a nucleus determines the identity of the element. For example, any atom having 6 protons will be a "carbon" atom. If we were to add an extra proton to the nucleus, we would have an entirely different element. For example,



On the other hand, if we add an extra NEUTRON to a nucleus we simply end up with the same element, just a little heavier, since the charge on the nucleus would be unchanged.

ISOTOPES of a given element have the same ATOMIC NUMBER but a *different* ATOMIC MASS.

In other words, isotopes have the same number of protons but a different number of neutrons. An isotope is identified by its mass number, the sum of the protons and neutrons. The most common isotope of Carbon has a mass number of 12 and can be written as Carbon-12, two other isotopes are Carbon-13 and Carbon-14. Despite their different mass numbers, all three carbon isotopes react the same way chemically.

PART I. Answer the questions based on the above reading.

1. What is an isotope? element that has same # of protons but a different # of neutrons (atomic # same, mass # different)
2. What does the number next to isotopes signify? the mass number (the number of protons + the number of neutrons)
3. How can you tell isotopes of the same element apart? they will have a different mass #.

PART II. For each of the following isotopes, write the number of protons, neutrons, and electrons. Assume all atoms are neutral.

	Chromium-58	Chromium-63
# of protons	24	24
# of neutrons	34	39
# of electrons	24	24

	Carbon-12	Carbon-13	Carbon-14
# of protons	6	6	6
# of neutrons	6	7	8
# of electrons	6	6	6

	Nitrogen-15	Nitrogen-20
# of protons	7	7
# of neutrons	8	13
# of electrons	7	7

	Sulfur-23	Sulfur-25
# of protons	16	16
# of neutrons	7	9
# of electrons	16	16

	Sodium-12	Sodium-20
# of protons	11	11
# of neutrons	1	9
# of electrons	11	11

	Selenium-50	Selenium-55
# of protons	34	34
# of neutrons	16	21
# of electrons	34	34

PART III. Fill in the isotope names and any missing information on the chart. Use your periodic table and the information provided. Assume all atoms are neutral.

	Manganese-42	Manganese-40
# of protons	25	25
# of neutrons	17	15
# of electrons	25	25

	Germanium-62	Germanium-64
# of protons	32	32
# of neutrons	30	32
# of electrons	32	32

	Palladium-94	Palladium-97
# of protons	46	46
# of neutrons	48	51
# of electrons	46	46

	Cesium-168	Cesium-166
# of protons	55	55
# of neutrons	113	111
# of electrons	55	55

	Iron-53	Iron-56
# of protons	26	26
# of neutrons	27	30
# of electrons	26	26

	Iodine-85	Iodine-88
# of protons	53	53
# of neutrons	32	35
# of electrons	53	53