

Atomic Structure: Ions & Isotopes

Part One: Ions

1) For each of the ions listed, identify the total number of electrons for each.

i) Al^{+3} _____

ii) Fe^{+3} _____

iii) Mg^{+2} _____

iv) Sn^{+2} _____

v) Co^{+2} _____

vi) Co^{+3} _____

vii) Li^{+1} _____

viii) Cr^{+3} _____

ix) Rb^{+1} _____

x) Pt^{+2} _____

2) Determine the charges on the following:

a) An atom having lost two electrons _____

b) An atom having lost six electrons _____

c) An atom having gained one electron _____

d) An atom having gained three electrons _____

e) An atom having lost five electrons _____

f) An atom having gained two electrons _____

g) An atom having lost one electron _____

h) An atom having gained four electrons _____

Part Two: Isotopes

1) Here are three isotopes of an element: $^{12}\text{C}_6$ $^{13}\text{C}_6$ $^{14}\text{C}_6$

a) The element is _____

b) The number 6 refers to the _____

c) The numbers 12, 13, and 14 refer to the _____

d) How many protons and neutrons are in the first isotope? _____

e) How many protons and neutrons are in the second isotope? _____

f) How many protons and neutrons are in the third isotope? _____

2) Complete the following chart.

Isotope name	Atomic #	Mass #	# of protons	# of neutrons	# of electrons
92 uranium-235					
92 uranium-238					
5 boron-10					
5 boron-11					

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Answers

Part One: Ions

1) For each of the ions listed, identify the total number of electrons for each.

- i) Al^{+3} 10 ii) Fe^{+3} 23 iii) Mg^{+2} 10 iv) Sn^{+2} 48
v) Co^{+2} 25 vi) Co^{+3} 24 vii) Li^{+1} 2 viii) Cr^{+3} 21
ix) Rb^{+1} 36 x) Pt^{+2} 76

2) Determine the charges on the following:

- a) An atom having lost two electrons +2 b) An atom having lost six electrons +6
c) An atom having gained one electron -1 d) An atom having gained three electrons -3
e) An atom having lost five electrons +5 f) An atom having gained two electrons -2
g) An atom having lost one electron +1 h) An atom having gained four electrons -4

Part Two: Isotopes

1) Here are three isotopes of an element: $^{12}\text{C}_6$ $^{13}\text{C}_6$ $^{14}\text{C}_6$

- a) The element is carbon
b) The number 6 refers to the atomic number
c) The numbers 12, 13, and 14 refer to the mass number
d) How many protons and neutrons are in the first isotope? 6 protons and 6 neutrons
e) How many protons and neutrons are in the second isotope? 6 protons and 7 neutrons
f) How many protons and neutrons are in the third isotope? 6 protons and 8 neutrons

2) Complete the following chart.

Isotope name	Atomic #	Mass #	# of protons	# of neutrons	# of electrons
92 uranium-235	92	235	92	143	92
92 uranium-238	92	238	92	146	92
5 boron-10	5	10	5	5	5
5 boron-11	5	11	5	6	5