Chemistry
Atomic Structure, Isotopes, and Ions Questions

1. Consider the three fundamental particles: electron (e^-), proton (p^+), neutron (n^o).

(a) Which one has the smallest mass ? _____ (b) Which one is uncharged ? _____

(c) Which one is found outside the nucleus ? _____ (d) Which two have nearly the same mass ? _____

2. Complete the following table using the information given.

Chemical Symbol	Atomic Number	Number of protons	Mass Number	Number of electrons	Number of neutrons	Net Charge
$^{222}_{86}Rn$						
$^{137}_{56}Ba^{2+}$						
	22				26	0
		35	80			-1
			39	18		+1

3. Consider the table below:

atom (ion) of element	a	b	c	d	e	f	g
number of electrons	5	7	9	12	7	6	9
number of protons	5	7	10	10	7	5	9
number of neutrons	5	7	10	10	8	6	10
Mass number	10	14	20	20	15	11	19

(a) Which of the above species are electrically neutral ? _____

(b) Which are negatively charged ? _____

(c) Which species are isotopes of the same element ? _____

(d) Using the periodic table write the conventional symbol for b, d, and f.

b = _____ d = _____ f = _____

4. How does the number of protons compare to the number of electrons in:

(a) an anion ? (b) a cation ?

5. a) How do the chemical properties of ^{12}C and ^{14}C compare?

b) How do the physical properties of ^{12}C and ^{14}C compare?

6. Consider the data table below:

atom (or ion) of element	a	b	c	d	e	f	g
number of protons	12	13	11	12	14	15	10
number of electrons	12	10	10	12	14	18	10
number of neutrons	12	14	12	13	14	16	10

a. Which of the above species are negatively charged? _____

b. Which species are isotopes of the same element? _____

c. Using your periodic table give the conventional chemical symbol (including charge) for species A, B, and F.

a = _____ b = _____ f = _____

7. What must be done to a neutral chlorine atom in order to change it into Cl^-? Be specific.

8. Complete the following table:

Chemical Symbol	Atomic Number	Number of neutrons	Mass Number	Number of electrons	Net Charge
	19	20			+1
		60	106		+2
$^{32}_{16}S^{2-}$					
	83	126			+3

9. Which two fundamental particles (e-, p+, n^o) have about the same mass ?

_____ and _____

10. What fundamental particle accounts for virtually all of an atom's volume ? _____

11. Exactly how does an atom of P differ from P^{3-}?

12. Given a neutral iron atom (Fe), what must be done to it in order to make it into a Fe^{2+} cation?