C1401 Tutorial 2 10-09-2018

1.

^{14}X

(subscript on right of X is 6)

(a) Given the notation above of the unknown element **X**, identify the following:

- atomic number
- mass number
- number of neutrons

What is the identity of the element?

(b) Give all the values that can be determined given the following notation:-

$(^{24}Mg)^{2+}$

-atomic number _____

- mass number _____

- number of neutrons_____

- number of protons_____

(c) An ion contains 53 protons, 74 neutrons and 54 electrons. Give the following for this particular ion: (i) mass number, charge, and identity of the ion.

2. Several compounds containing only sulfur (S) and fluorine (F) are known. Three of them have the following composition:

(I) 1.188 g of F for every 1.000 g of S

(II) 2.375 g of F for every 1.000 g of S

(III) 3.563 g of F for every 1.000 g of S

How do this data illustrate the law of multiple proportions? State the law of multiple proportions.

3. A student has determined the mass-charge-ratio for an electron to be 5.64×10^{-12} Kg/C. In another experiment, using Millikan's oil apparatus , he found the charge on the electron to be 1.605×10^{-19} C. What would be the mass of the electron according to this data

4.

(a) What is atomic mass unit?

(b) What is the difference between the mass number and the atomic weight (relative atomic mass) of an element?

(c) Give the mass number of each of each of the following atoms

(i) beryllium with 5 neutrons

(ii) titanium with 26 neutrons

(iii) gallium with 39 neutrons

(a) give the complete symbol for each of the following atoms

(i) nitrogen with 8 neutrons

(ii) Zinc with 34 neutrons

(iii) Xenon with 75 neutrons

(d) A natural sample of gallium consists of two isotopes with masses of 68.95 amu and 70.95 amu and with percentage abundances of 60.16% and 39.84%, respectively. What is the relative atomic mass of gallium?

(e) Silicon is found in nature combined with oxygen to give sand, quartz, agate and similar materials. The element has three stable isotopes

Exact mass	**Percentage Abundance**
27.97693	92.23
28.97649	4.67
29.97376	3.10

(f) Calculate the relative atomic mass (atomic weight) from the above data.

5. (a) identify the group and the period for each of the following:
C, Pb, Cr, Mg, B, Se, Cs, Fe, Cu, Br
Determine whether the element is a metal, nonmetal or metalloid.

(b) Give one example (atomic symbol and name) for each of the following:

- a main group (representative) element in the second period
- an alkali metal
- a transition metal in the fourth period
- a lanthanide

Note: Question 6 is on the next page!

6. Complete the table by placing symbols, formula and names in the blanks

Cation	**Anion**	**Name**	**Formula**
		Ammonium bromide	
Ba^{2+}			BaS
	Cl^-	Iron(II) chloride	
	F^-		PbF_2
Al^{3+}	CO_3^{2-}		
		Iron(III) oxide	
			$LiClO_4$
		Aluminium phosphate	
	Br^-	Lithium bromide	
			$Ba(NO_3)_2$
Al^{3+}		Aluminium oxide	
		Iron(III) carbonate	