HOMEWORK PROBLEMS:

1a. A student heats 1.000 gram of zinc and 0.600 gram of sulfur in a closed container. She obtains 1.490 grams of zinc sulfide and recovers 0.110 grams of unreacted sulfur. Are these results consistent with the law of conservation of mass? Explain.

Answer:

Yes, 1.000 g + 0.600g = 1.600g ; 1.490g + 0.110 g = 1.600g ; the mass that she began with is the same as the mass when the reaction was completed.

1b. Which subatomic particle determines a specific element?

Answer:

Protons. The number of protons identifies the type of atom. Neutrons determines the type of Isotope for the atom.

1c. When 0.2250 grams of magnesium is heated with 0.5331 grams of nitrogen in a closed container, the magnesium is completely converted to 0.3114 grams of magnesium nitride. What mass of unreacted nitrogen must remain?

Answer:

0.2250 g Mg + 0.5331 g N_2 = 0.7581 g

0.7581 g - 0.3114 g Mg_3N_2 = 0.4467g unreacted

1d. What is the mass of an element that contains 20 protons and 22 neutrons?

Answer:

20 protons + 22 neutrons = 42 atomic mass units (protons and neutrons)

1e. An atom of sodium contains 11 electrons. What is the atomic number of this atom?

Answer:

Atomic number is equal to the number of PROTONS. A Proton identifies the type of atom you are looking at. Since the atom is identified as SODIUM, there must be 11 protons.

1f. How many protons and neutrons are in the following atoms?

$^{108}_{47}Ag$ ***Protons = 47 Neutrons = 61***	$^{94}_{40}Zr$ ***Protons = 40 Neutrons = 54***
$^{53}_{24}Cr$ ***Protons = 24 Neutrons = 29***	$^{92}_{40}Zr$ ***Protons = 40 Neutrons = 52***

1g. Write the correct element's symbol (as illustrated in the notes for potassium-39) for each of the following: Also, include any charge that may be represented.

	i.	ii.	iii.	iv.	v.	vi.	vii.
Number of **Protons**	16	20	19	18	20	22	20
Number of **Neutrons**	18	20	21	22	24	26	28
Number of **Electrons**	18	20	18	17	18	22	20
Answer:	$^{34}_{16}S^{-2}$	$^{40}_{20}Ca$	$^{40}_{19}K^{+1}$	$^{40}_{18}Ar^{+1}$	$^{44}_{20}Ca^{+2}$	$^{48}_{22}Ti$	$^{48}_{20}Ca$

1h. Find the average atomic mass of the unknown element if the relative amounts are as follows:

Isotope Mass	Percentage
45.0	12.42
47.0	7.71
48.0	19.22
52.0	48.83
55.0	11.82

Answer:

45.0 x 0.1242 = 5.589

47.0 x 0.0771 = 3.6237

48.0 x 0.1922 = 9.2256

52.0 x 0.4883 = 25.3916

55.0 x 0.1182 = 6.501

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