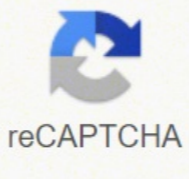




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2. For Iridium-178 (atomic number 77)

a. Determine the number of protons, neutrons, and electrons

#p = 77 #n = 101 #e = 77

b. Write its electron configuration using noble gas notation



c. How many unpaired electrons does it contain? 3

33. Name the element represented by each of the following electron configurations and determine the number of unpaired electrons each contains:

- a. $1s^22s^22p^63s^23p^4$ sulfur 2 unpaired e⁻
- b. $[Kr]5s^24d^0$ cadmium 2 unpaired e⁻
- c. $[Xe]6s^24f^{14}5d^{10}6p^2$ lead 2 unpaired e⁻

34. Determine which of the following electron configurations represent an atom in the excited state and identify that element. (Circle choice and name the element)

- a. $1s^22s^22p^63s^23p^6$
- b. $1s^22s^12p^63s^23p^5$ sulfur
- c. $1s^23s^22s^22p^63p^6$

35. Three isotopes of argon occur in nature, Ar-36, Ar-38, and Ar-40. Calculate the atomic mass of argon to two decimal places, given the following relative atomic masses and abundances of each of the isotopes: argon-36 (35.97 u; 0.337%), argon-38 (37.96 u; 0.063%), and argon-40 (39.96 u; 99.600%).

$$0.00337(35.97) + 0.00063(37.96) + 0.99600(39.96) = 39.95 \text{ u}$$

36. Calculate the mass in grams of each of the following:

- a. 3.00 mol Al $3.00 \text{ mol Al} \times \frac{26.98 \text{ g}}{1 \text{ mol}} = 80.9 \text{ g}$
- b. 2.56×10^{24} atoms Li $2.56 \times 10^{24} \text{ atoms} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \times \frac{6.94 \text{ g}}{1 \text{ mol}} = 29.5 \text{ g Li}$

ISOTOPES AND AVERAGE ATOMIC MASS

Elements come in a variety of isotopes, meaning they are made up of atoms with the same atomic number but different atomic masses. These atoms differ in the number of neutrons. The average atomic mass is the weighted average of all the isotopes of an element.

Example: A sample of calcium is 75% ⁴⁰Ca, 20% ⁴²Ca and 5% ⁴⁴Ca. What is its average atomic mass?

Answer: $.75 \times 133 = 99.75$
 $.20 \times 132 = 26.4$
 $.05 \times 134 = 6.7$
 total = 132.85 amu = average atomic mass

Determine the average atomic mass of the following mixtures of isotopes.

- 80% ¹⁹F, 17% ¹⁸F, 3% ²⁰F
- 50% ¹⁹⁷Au, 50% ¹⁹⁹Au
- 15% ¹⁶O, 85% ¹⁷O
- 99% ¹H, 0.8% ²H, 0.2% ³H
- 90% ¹⁴N, 3% ¹⁵N, 2% ¹⁶N
- 98% ¹²C, 2% ¹³C

Acid-Base Solutions

Notes: Acids are abbreviated HA, with the H representing the proton (H⁺) the acid donates to the solution. The A is referred to as the acidic anion (A⁻) that is left in solution as the proton is donated, HA → H⁺ + A⁻.

Strong Bases are abbreviated MOH, with the OH representing the hydroxide ion (OH⁻) the base donates to the solution. The M is cation (M⁺) that is left in solution as the hydroxide is donated, MOH → M⁺ + OH⁻.

Procedure: PRACT Simulation → Play With Sims → Chemistry → Acid-Base Solutions → Introduction at 0.010 (10⁻²) Molar.

	Strong Acid	Weak Acid	Strong base	Weak base	Water
pH meter read (value)	2.00	4.50	12.00	9.50	7.00
pH paper (color)	red	orange	blue	green	yellow
Conductivity	high	low	high	low	low

Isotope Practice Worksheet

Learning Target: Use isotope notation to determine: element name/symbol, atomic number, number of electrons, number of neutrons, number of protons, mass number, atomic number, atomic mass. Isotope Notation:

- Here are three isotopes of an element: ¹²C, ¹³C, ¹⁴C
 - The element is _____
 - The number 6 refers to the _____
 - The numbers 12, 13, and 14 refer to the _____
 - How many protons and neutrons are in the first isotope? _____
 - How many protons and neutrons are in the second isotope? _____
 - 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					

3. Naturally occurring europium (Eu) consists of two isotopes with a mass of 151 and 153. Europium-151 has an abundance of 48.03% and Europium-153 has an abundance of 51.97%. What is the atomic mass of europium?

Element	Symbol	Atomic Number	Number of electrons	Number of Neutrons	Mass number	Isotope Notation	Atomic Mass
Helium			2	2			
	Ti	22	22	50			Ti-50
		73	68	108			
Gallium		28	28	39			
						¹³⁷ Cs	
						²⁰⁹ Pb	
		83	83	127			

