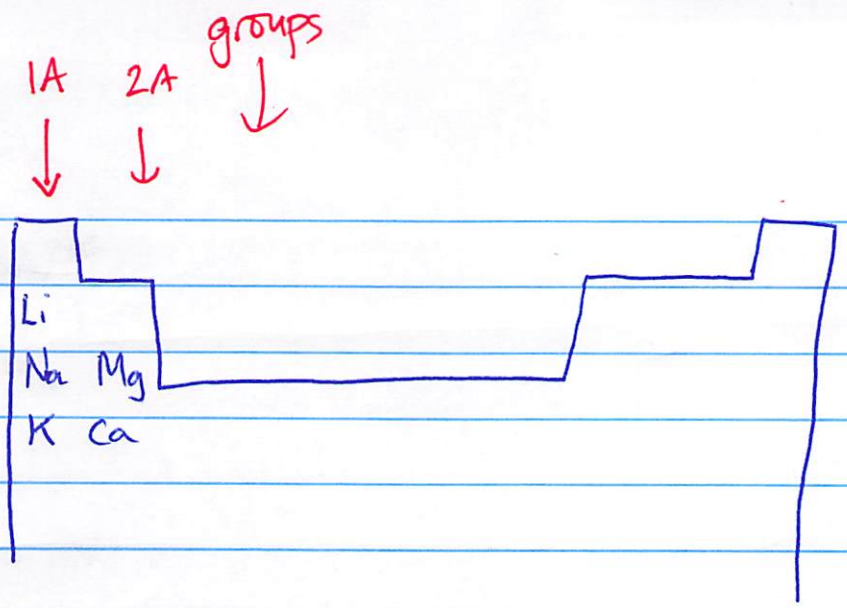
9/9/2019



group IA

Alkali metals: react violently w/ H_2O!
- form alkali solution (can neut. acids)

Li, Na, K

group 2A or IIA

Alkaline earth metals: react moderately w/ H_2O (form alkaline solution)

Mg, Ca

group 7A or VIIA

Halogens: react violently + form "salts"

F, Cl, Br, I

group 8A, or VIIIA

Noble / Inert gases: unreactive

ex: He, Ne, Ar

Ions (charged atoms) + PT

pattern:

1A	2A	...	3A	4A	5A	6A	7A	8A
H^+								He
Li^+					N^{3-}	O^{2-}	F^-	Ne
Na^+	Mg^{2+}		Al^{3+}			S^{2-}	Cl^-	Ar
K^+	Ca^{2+}					Se^{2-}	Br^-	Kr

Q: Predict charges on: P^{3-}

Cs^+

Ga^{3+}

I^-

Atomic mass

- average mass of all the atoms of an element
  - weighted average

ex: chlorine: 75.77% $^{35}_{17}Cl$, 34.97u

24.23% $^{37}_{17}Cl$, 36.97u

$$\text{Atomic mass} = \left(\frac{75.77}{100}\right) \times 34.97u + \left(\frac{24.23}{100}\right) \times 36.97u$$

$$= 35.45u$$

(atomic weight
relative atomic mass
relative atomic weight)

in general, $\text{atomic mass} = \sum_{n}^{!} (\%\ \text{abundance}) \times (\text{isotope mass})$

Sigma = Sum

ex: Jonesium,

		atomic mass?	
J-88,	12.5%	88.00u	lp
J-89,	48.2%	89.00u	"
J-90,	39.30%	90.00u	"
		assume	1u

$$\text{Atomic Mass} = \left(\frac{12.5}{100}\right) \times 88.0u + \left(\frac{48.2}{100}\right) \times 89.00u + \left(\frac{39.30}{100}\right) \times 90.00$$

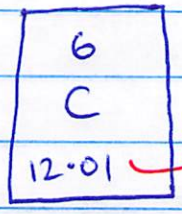
$$= 89.27u$$

Molar mass: counting by weighing

2 = pairs
12 = doz
20 = score

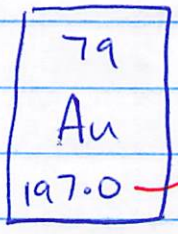
6.022×10^{23} = mole (mol)

↑ Avogadro's # ("chemist's dozen")



→ 1 atom C = 12.01u C

6.022×10^{23} atoms C = 12.01g C
1 mol C = 12.01g C



→ 6.022×10^{23} atoms Au = 197.0g Au
1 mol Au = 197.0g Au