

Gen - chem Review for Orgo

Answers to Practice Quiz

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Tutorial Videos

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Step By Step video solutions + explanations

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Part 1 - Atom Basics

1a

Element	Atomic #	P	N	e ⁻	A
Carbon	6	6	7	6	13
Nitrogen	7	7	7	7	14
Chlorine	17	17	20	17	37
Sodium	11	11	12	11	23
Zirconium	40	40	51	40	91
Hydrogen	1	1	0	1	1

1b protium ${}^1_1\text{H}$ Nuc = +1 Mass = 1 amu
deuterium ${}^2_1\text{H}$ +1 2 amu
tritium ${}^3_1\text{H}$ +1 3 amu

1c - 17

1d Sulfur = +16
Sodium = +11
Manganese = +25
Xenon = +54
Strontium = +38

Part 2

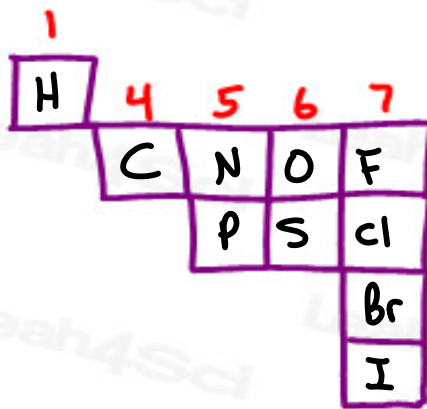
2a B Al Ga In Ti

2b 32

3c Fr Cs Al P Cl F

3d At I Br Cl F

2e

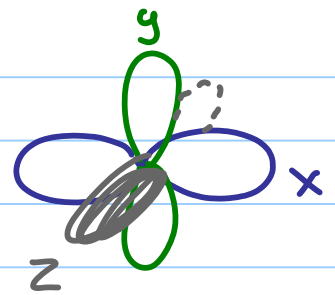


Part 3 Atomic Orbitals

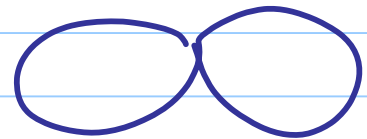
3a

1s 0

2p



4p_x



3b

2s = 2e⁻

6f = 14e⁻

3p_z = 2e⁻

4th shell = 32e⁻

3c



3d

S = 10

Be = none

F⁻ = 6

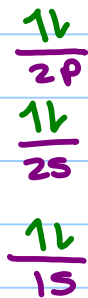
K⁺ = 12

Fe³⁺ = 12

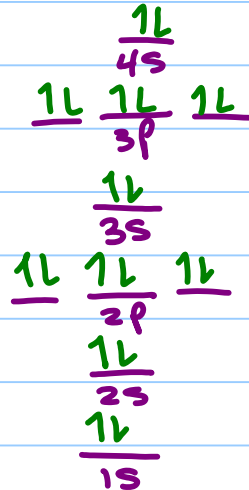
Part 4 Electron Configuration

4a

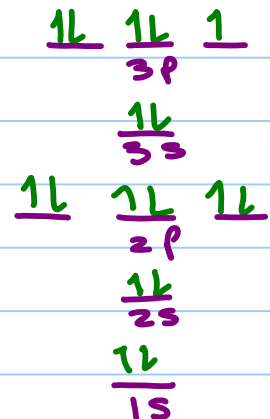
Carbon



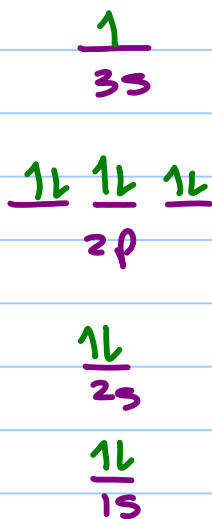
Calcium



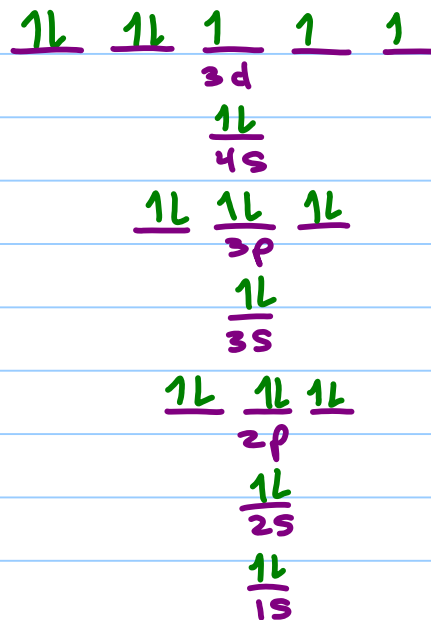
Chlorine



Sodium



Cobalt



Carbon: $1s^2 2s^2 2p^2$ or $[\text{He}] 2s^2 2p^2$

Calcium: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ or $[\text{Ar}] 4s^2$

Chlorine: $1s^2 2s^2 2p^6 3s^2 3p^5$ or $[\text{Ne}] 3s^2 3p^5$

Sodium: $1s^2 2s^2 2p^6 3s^1$ or $[\text{Ne}] 3s^1$

Cobalt: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$ or $[\text{Ar}] 4s^2 3d^7$

4c.1 $1s^2 2s^2 2p^1 = \text{Boron}$

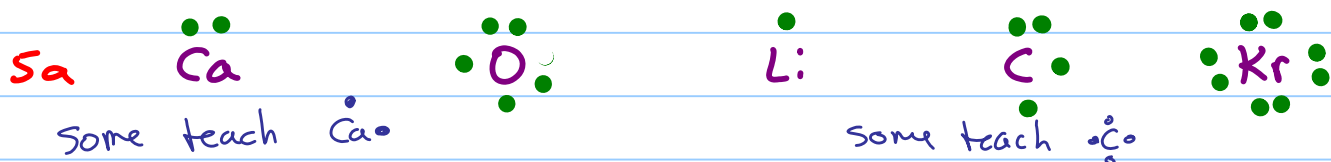
c.2 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 \text{ Xenon}$

c.3 $[\text{Kr}] 4d^{10} 5s^2 5p^5 \text{ Iodine}$

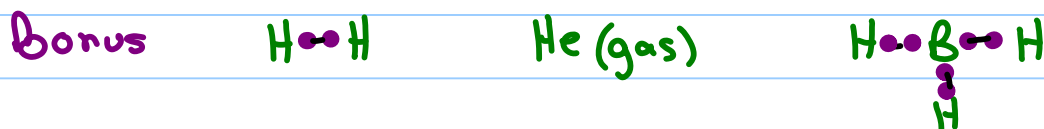
4d.1 +2 ion: $1s^2 2s^2 2p^6 3s^2 3p^6 \text{ Calcium +2}$

d.2 +3 ion $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 \text{ Iron +3}$

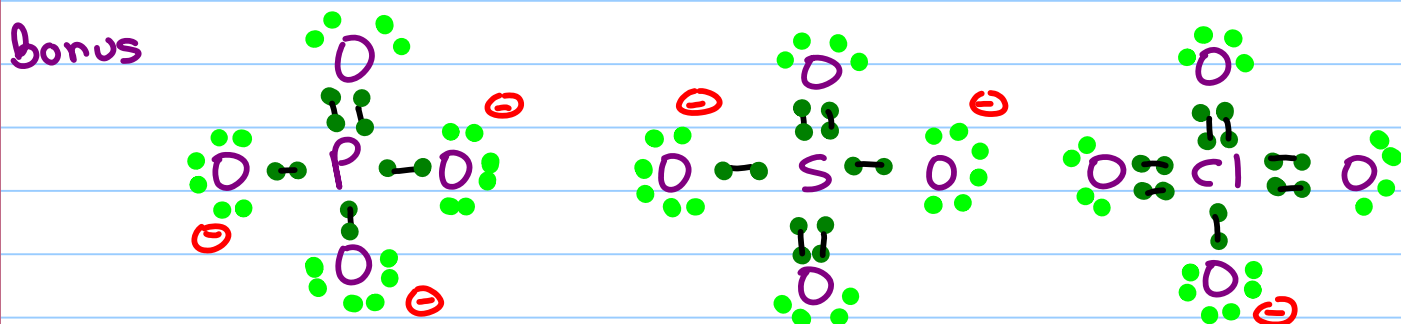
Part 5 - Lewis Dot & Octet Rule



5b < 8 H, He, B (there are more)
Smaller orbitals hold fewer e^-



5c > 8 P, S, Cl (there are more)
can hybridize with larger d-orbital > 8



5d octet = 8 = full s + p orbital for stability
atoms will gain/lose e^- or attract to reach octet