

Name: _____ date: _____ period: _____

Ch. 4 & 5 atom

test

⁵⁰
~~55~~ points

honors chemistry

1. Fill-in the below table (might be hypothetical atom / ion); need not show work. [15 points]

symbol	# protons	# neutrons	# electrons	charge	Atomic mass
$^{145}\text{La}^{3+}$	57	88	54	-3	145
$^{123}\text{Sb}^{-3}$	51	72	54	-3	123
$^{200}\text{Au}^{+4}$	79	121	75	+4	200

2. A hypothetical sample has

% abundance	isotope	mass
75.0%	^{53}Cr	52.941
15.0%	^{52}Cr	51.941
10.0%	^{51}Cr	50.945

what is the average atomic mass of Cr in the sample? [10 points]

3 pt
5 pt

$$\begin{aligned} \bar{x} &= \sum m_i P_i \\ &= m_{53} P_{53} + m_{52} P_{52} + m_{51} P_{51} \\ &= 52.941 (75\%) + 51.941 (15\%) + 50.945 (10\%) \\ &= 39.706 + 7.791 + 5.0945 \\ &= 52.6 \text{ amu} \end{aligned}$$

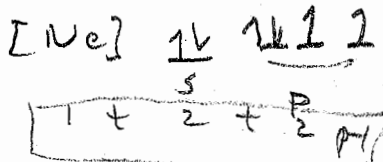
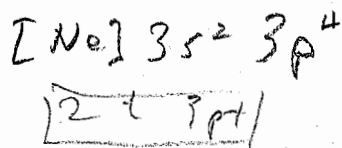
2

3. Sketch the d_{xy} atomic orbital; include the x-, y-, and / or z- axis to illustrate the orientation of the atomic orbital to these axis. [5 points]

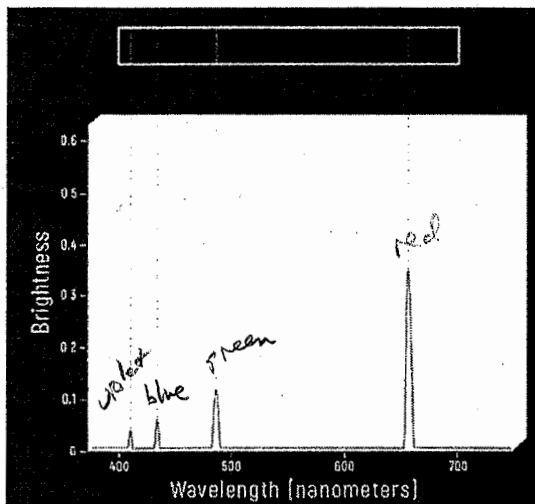


shape: d_{xy}
orientation: xy

4. What is the electron configuration and orbital diagram for sulfur, may use the "noble gas short hand" notation. [10 points]



5. In regards to the hydrogen emission spectrum: [15 points]



SOURCE: <https://webbtelescope.org/contents/articles/spectroscopy-101--how-absorption-and-emission-spectra-work>

a. What is the source / origin of the emission spectral lines?

decrease in e- energy level

b. Why is there no signal between 500 – 600 nm?

∃ no Δ e- energy levels transitions that correspond to these λ

c. The colors in the spectrum are ___; match the color to its wavelength (~ 410, 430, 480, and 650 nm).

red: 660

Red G Blu

blue: 440

green: 490

violet: 410