

Week 2 Chemistry Questions

[Submit via course website](#) prior to class Jan. 26th

1. Determine the symbol, number of protons, neutrons and electrons for each neutral atom listed below.

ISOTOPE	SYMBOL	PROTONS	NEUTRONS	ELECTRONS
Cadmium-113	¹¹³ Cd	48	70	48
Lead-208	²⁰⁸ Pb	82	126	82
Arsenic-95	⁹⁵ As	33	62	33
Mercury-202	²⁰² Hg	80	122	80
Barium-138	¹³⁸ Ba	56	82	56

2. How many electrons do each of the following ions have?



3. Write the electron configuration for each elements from Problem 1. Mercury and Lead are tougher than the others – they involve the f orbitals. Please refer to the WUtopia! videos for a review.

see below

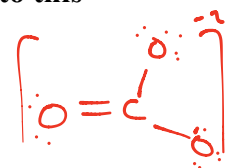
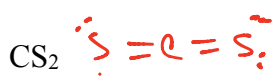
4. Determine how many **valence** electrons are present in each element in problem 1.



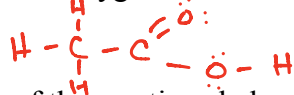
5. Determine how many **valence** electrons are present in each ion in problem 2.



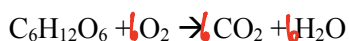
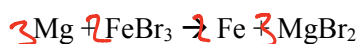
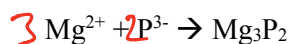
6. Draw a Lewis structure for each of the following compounds: **Please bring your answers to this question in class on Tuesday.**



CH₃COOH (both oxygens are attached to the same carbon)



7. Balance each of the reactions below:



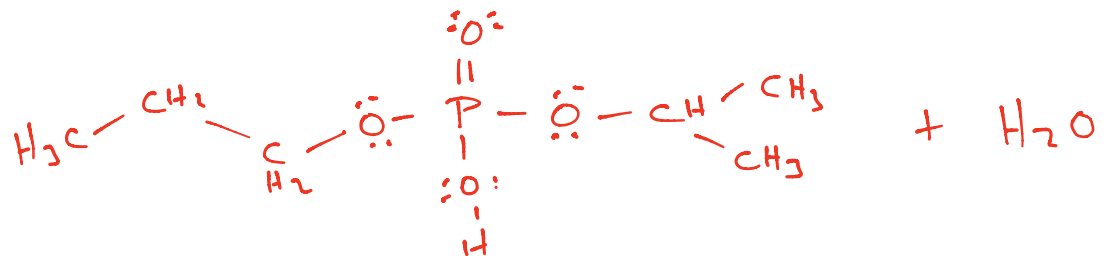
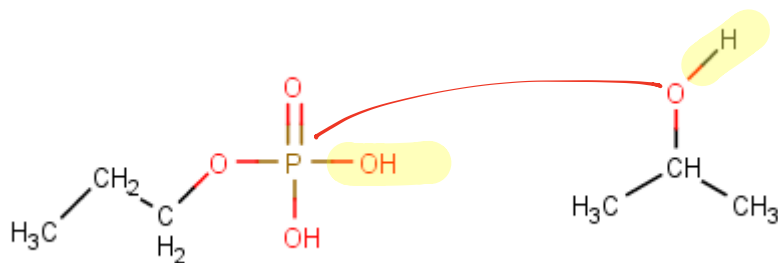
8. The first four elements in problem 1 are toxic metals. Determine which of these are commonly ingested through diet. For these metals, what foods are commonly associated with accumulation?

Hg → fish Pb → paint As → ground water ← Cd

9. Barium is used in medicine. Determine how it is used. It is a contrast agent for MRI. It works well b/c it has large nucleus (compared to normal atoms) and is not toxic.

10. Listen to the [mp3 file that you can find here](#). In one paragraph, summarize the advice Dr. Ludwig gives.

11. Predict the product of the condensation reaction. Please bring this with you to class on Tuesday to submit.



3. Cd: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10}$

Pb: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^2$

As: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$

Hg: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10}$

Ba: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2$