

CHEM 220 Problem Set 1

1. Name the following compounds using common "ous-ic" nomenclature:

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|-----------------------------|--------------------|
| A. Hg_2Cl_2 | F. HgCl_2 |
| B. FeCl_2 | G. FeCl_3 |
| C. CuO | H. CuCl_2 |
| D. ZnCl_2 | I. ZnCl_4 |
| E. Cu_2O | J. PbCl_2 |

2. Name the following using the rules of naming compounds, e.g. cation named first, anion named second:

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|---------------------------------|--------------------------------------|
| A. KCl | F. $\text{K}_2\text{Cr}_2\text{O}_7$ |
| B. NaOCl | G. KMnO_4 |
| C. Na_3PO_4 | H. $(\text{NH}_4)_3\text{PO}_4$ |
| D. $(\text{NH}_4)_2\text{SO}_4$ | I. $\text{Mg}_3(\text{PO}_4)_2$ |
| E. $\text{Ca}_3(\text{PO}_4)_2$ | J. CrO_3 |

3. Write the electronic structure for the following elements:

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|-------|-------|
| A. B | F. C |
| B. Mg | G. Ca |
| C. Na | H. K |
| D. Cl | I. He |
| E. S | J. Ar |

4. Write the electronic structures for the ionic forms in #3.

5. Draw the energy diagrams for the following:

- Elemental Carbon
- Carbon in an sp^3 hybrid
- Carbon in an sp^2 hybrid
- Carbon in an sp hybrid

6. Draw the geometric representations for the three hybrids in #5.

7. What is the hybridization that only Pt, Pd and Ni undergo? Draw that hybridization.

8. Name the following acids and bases:

- | | |
|----------------------------|---------------------------|
| A. HCl | F. HBr |
| B. H_2SO_4 | G. NaOH |
| C. H_3PO_4 | H. KOH |
| D. HNO_3 | I. HNO_2 |
| E. H_3PO_4 | J. NH_4OH |

9. Draw a generic titration curve for each of the following acids: HCl, H₂SO₄ and H₃PO₄ .

10. Using your generic curves in #9, show how you'd determine, graphically, the pK values for each hydrogen ion in the acids.