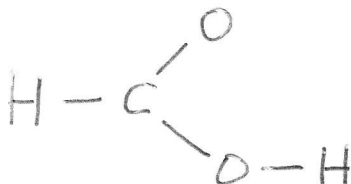


1. A piece of metal weighs 89.5 g. When the metal is placed in a graduated cylinder containing 65.9 mL of liquid, the volume increases to 98.9 mL. What is the density of the metal?
2. The +3 ion of an unknown element has the same electronic configuration as argon ( $Z = 18$ ). What is the element?
3. How many neutrons are present in the mass 202 isotope of mercury (Hg)?
4. Give the formula of chromium(III) oxide.
5. What is the proper IUPAC name of  $\text{PCl}_5$ ?
6. What is the formula of sodium carbonate?
7. Complete the Lewis octet structure of formic acid. The molecular skeleton is shown.



8. I am a d-block element. But my ground-state electronic configuration holds only one 3d electron. Who could I be?
9. I am an alkali metal. But I prefer to assume the same electronic configuration as the -1 ion of iodine. Who am I?
10. Comment briefly on the following statement, indicating at a minimum whether you agree or disagree. "Tap water is a pure substance".

11. What is the formula of the bromide of aluminum?

12. Matching: Match the geometry with the compound.

- |                     |                                     |
|---------------------|-------------------------------------|
| ___ Bent            | A. Boron trifluoride, $\text{BF}_3$ |
| ___ Pyramidal       | B. Ammonia, $\text{NH}_3$           |
| ___ Tetrahedral     | C. Water                            |
| ___ Trigonal planar | D. Methane, $\text{CH}_4$           |
| ___ Linear          | E. Carbon dioxide, $\text{CO}_2$    |

13. One of the following is not a strong electrolyte. Circle it.

- NaCl       $\text{NH}_3$        $\text{NH}_4\text{Cl}$        $\text{K}_2\text{CO}_3$        $\text{Ca}(\text{NO}_3)_2$

14. Draw the Lewis octet structure of nitrogen,  $\text{N}_2$ .

15. Arrange the following elements in order of increasing electronegativity, most electronegative last.

\_\_\_ Scandium (Sc); \_\_\_ Silicon (Si), \_\_\_ Strontium (Sr), \_\_\_ Sulfur (S).

(Most electronegative = 4; least electronegative = 1).

16. Arrange the following compounds in order of increasing polarity, most polar last.

\_\_\_  $\text{CH}_3\text{Cl}$ ; \_\_\_  $\text{CH}_2\text{Cl}_2$ ; \_\_\_  $\text{CHCl}_3$ ; \_\_\_  $\text{CCl}_4$

(Most polar = 4; least polar = 1).

17. Arrange the following elements in order of increasing ionization potential, highest IP last.

\_\_\_ Neon (Ne); \_\_\_ Sodium (Na); \_\_\_ Magnesium (Mg)

Highest IP = 3; lowest IP = 1).

18. The dichromate ion,  $\text{Cr}_2\text{O}_7^{2-}$ , has neither Cr-Cr nor O-O bonds. Draw a Lewis structure. (Hint: chromium has 6 valence electrons). (See HW problem 4.105).

19. What is the maximum number of electrons that a p sub-shell can hold?

20. Is calcium hydride,  $\text{CaH}_2$ , more likely to be a \_\_\_ salt or a \_\_\_ molecular compound?

Scoring.

Page one \_\_\_\_\_ (35)

Page two \_\_\_\_\_ (40)

Page three \_\_\_\_\_ (25)

Total \_\_\_\_\_ (100)

Class median \_\_\_\_\_

Your adjusted score \_\_\_\_\_

Your letter grade equivalent \_\_\_\_\_