

QUESTIONS

CHEMISTRY PRACTICE PROBLEMS FOR NON-TECHNICAL MAJORS

Section 1:

- 1.1 Define mole, Avogadro's number, GAW, and GFW. In 500 grams of Na_3PO_4 , how many grams and moles of each constituent element are there?

- 1.2 State the three classes of elements. Give several examples for each. What is a period on the periodic table? What is a group on the periodic table? What do each of these classifications indicate about the elements within them?
- 1.3 Given one neutral atom of magnesium, state the following:
- # of protons
 - # of electrons
 - # of neutrons
 - atomic weight
 - class of element
 - period
 - group
 - other elements with similar properties
- 1.4 Given that every atom of neutral calcium has two electrons in its outer shell, how many electrons does magnesium have in its outer shell? Why?

Section 2:

- 2.1 Describe the differences between ionic bonds and covalent bonds.

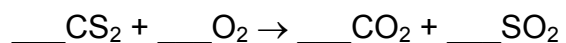
2.2 Describe the difference between covalent bonds and Van der Waals forces.

2.3 Explain the difference between solubility, solution, solvent, and solute.

2.4 Calculate the molarity of the resulting solution if 20 grams of HCl are placed in sufficient water to make exactly 5 liters of final solution.

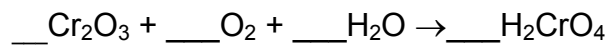
2.5 Prepare a 0.4 M solution of HCl.

2.6 Balance the following reaction equation:



2.7 How many grams of SO_2 would be produced in the preceding reaction from 200 g of CS_2 , assuming a sufficient amount of O_2 is available?

2.8 Balance the following reaction equation:



2.9 If 50 grams of H_2CrO_4 were produced when the preceding reaction took place in 0.5 liters of water, what was the molarity of the original Cr_2O_3 ?

Section 3:

3.1 State the problems associated with uncontrolled corrosion in a reactor plant.

3.2 State what happens to a metal during the oxidation step of a REDOX process. What might be the visible changes in the metal?

- 3.3 Define passivity.
- 3.4. Describe how the rate of corrosion is affected by temperature, oxygen, pH, and metal composition.
- 3.5 Identify and describe the action taken for the initial fill of a reactor system to minimize corrosion.
- 3.6 Define crud. List five problems associated with the presence or release of crud into the reactor coolant. List the causes of a crud burst.

3.7 Define galvanic corrosion. List and describe two ways by which galvanic corrosion can be prevented.

3.8 Define pitting corrosion. State the conditions necessary for pitting corrosion to occur. State the hazards and controls associated with pitting corrosion.

3.9 Define crevice corrosion.

3.10 Describe the O₂ pitting and crevice corrosion illustrated in Figure 12.

3.11 Answer Question 3.8 for chloride stress corrosion cracking (SCC).

3.12 Answer Question 3.8 for caustic stress corrosion cracking.