# 120 – Review – Significant Figures, Nomenclature, and Dimensional Analysis

Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

## Significant Figures

1. State the number of significant figures in the following measurements:

|  |  |  |
| --- | --- | --- |
|  | Measurement | # sf |
|  | 0.00548 g |  |
|  | 64.07 mL |  |
|  | 12.110 nm |  |
|  | 21,000 s |  |
|  | 6.7 × 10-3 J |  |

1. Complete the following calculations:

## Dimensional Analysis

1. On April 12, 1934, a wind gust of 231 miles per hour was recorded at the summit of Mount Washington, NH. What is the world-record wind speed in SI units of meters per second?
2. At a distance of 1.3 parsecs, Proxima Centauri is the nearest star to our solar system. What is the distance to Proxima Centarui in kilometers? One parsec is 3.26 years and the speed of light is 3.00 × 108 m/s.
3. Aspirin has a density of 1.40 g/cm3. What is the volume, in teaspoons, of a tablet weighing 325 mg? 1 cup = 48 teaspoons
4. The anesthetic procaine hydrochloride is often used to deaden pain during dental surgery. The compound is packaged as a 10.% solution (by mass; d = 1.0 g/mL) in water. If your dentist injects 0.50 mL of the solution, what mass of procaine hydrochloride (in milligrams) is injected?
5. A small hole in the wing of a space shuttle requires a 20.7 cm2 patch. If the patching material costs NASA $3.25/in2.
   1. What is the patch’s area in square kilometers, km2?
   2. What is the cost of the patch?
6. Challenge Problem: A box contains a mixture of small copper spheres (density 8.96 g/mL) and small lead spheres (density 11.4 g/cm3). The total volume of both metals is measured by the displacement of water to be 427 mL and the total mass is 4.36 kg. What percentage of the spheres are copper?

## Nomenclature

1. Complete the following table:

|  |  |  |
| --- | --- | --- |
|  | Name | Formula |
|  | Copper(II) oxide or Cupric oxide |  |
|  | Carbonic acid |  |
|  | Silver iodide |  |
|  | Zinc bromide |  |
|  | Copper(I) sulfate or Cuprous sulfate |  |
|  | Hydrochloric acid |  |
|  | Sodium chlorate |  |
|  | Tetraphosphorus decaoxide |  |
|  | Titanium(II) acetate |  |
|  | Ammonia |  |
|  | Potassium nitride |  |
|  | Iron(III) phosphate or Ferric phosphate |  |
|  | Calcium nitrite |  |
|  | Cobalt(II) hydroxide |  |
|  | Chromium(II) sulfate heptahydrate |  |
|  | Ammonium sulfide |  |
|  | Bromine trifluoride |  |
|  | Oxalic acid |  |
|  | Indium(III) nitrate pentahydrate |  |
|  | Hypobromous acid |  |
|  | Magnesium bicarbonate |  |
|  | Mercury(I) fluoride or mercurous fluoride |  |