Dougherty Valley HS Chemistry
Half Life Calculations 1

Worksheet #4

Name: **Period:** **Seat#:**

Complete each problem. Some answers are included at the end of the question, underlined and in italics so you can check your work. Show work!

1) The half-life of Zn-71 is 2.4 minutes. If one had 100.0 g at the beginning, how many grams would be left after 7.2 minutes has elapsed? *12.5 g remain*

2) Pd-100 has a half-life of 3.6 days. If one had 6.02×10^{23} atoms at the start, how many atoms would be present after 20.0 days?

3) Os-182 has a half-life of 21.5 hours. How many grams of a 10.0-gram sample would have decayed after exactly three half-lives? *8.75 g decayed*

4) After 24.0 days, 2.00 milligrams of an original 128.0-milligram sample remain. What is the half-life of the sample?

5) U-238 has a half-life of 4.46×10^9 years. How much U-238 should be present in a sample 2.5×10^9 years old, if 2.00 grams was present initially? *1.36 g remain*

6) How long will it take the 40.0 grams sample of I-131 (half-life = 8.040 days) to decay to 1/100 its original mass?

7) Fermium-253 has a half-life of 0.334 seconds. A radioactive sample is considered to be completely decayed after 10 half-lives. How much time will elapse for this sample to be considered gone?

8) At time zero, there are 10.0 grams of W-187. If the half-life is 23.9 hours, how much will be present at the end of one day? Two days? Seven days?

9) 100.0 grams of an isotope with a half-life of 36.0 hours is present at time zero. How much time will elapse before 50.0 grams remains? Before 5.00 grams remains?

10) How much time will be required for a sample of H-3 to lose 75% of its radioactivity? The half-life of tritium is 12.26 years. *24.52 years*

11) Rn-222 has a half-life of 3.82 days. How long before only 1/16 of the original sample remains? *15.3 days*

12) Iodine-131 has a half-life of 8.040 days. If we start with a 40.0 gram sample, how much will remain after 24.0 days? How much remains after 20 days? *24 days: 5.05 g*

13) If you start with 2.97×10^{22} atoms of molybdenum-99 (half-life = 65.94 hours), how many atoms will remain after one week? One (non-leap) year? *one week: $5.08E^{21}$*

14) How long will it take for a 64.0 g sample of Rn-222 (half-life = 3.8235 days) to decay to 8.00 g? *11.4705 days*