

Name: _____

Period: _____

Seat#: _____

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

- 1) The half-life of iodine-131 is 8.1 days. How long will it take for three-fourths of a sample to decay? 16.2 d

- 2) Radon-222 is a radioactive gas with a half-life of 3.82 days. How long would it take for fifteen-sixteenths of a sample of radon-222 to decay? 15.28 d

- 3) Uranium-238 decays very slowly, with a half-life of 4.47 billion years. What percentage of a sample of uranium-238 would remain after 13.4 billion years? 12.5%

- 4) A sample of Strontium-90 is found to have decayed to one-eighth of its original amount after 87.3 years. What is the half-life of strontium-90? 29.1 yrs

- 5) A sample of Francium-212 will decay to one-sixteenth its original amount after 80 minutes. What is the half-life of francium-212? 20 minutes

- 6) The ratio of carbon-14 to carbon-12 of a prehistoric wooden artifact is measured to be one-eighth of the ratio measured in a fresh sample of wood from the same region. The half-life of carbon-14 is 5,715 years. Determine its age. 17145 yrs

- 7) Health officials are concerned about radon levels in homes. The half-life of radon-222 is 3.82 days. If a sample of gas contains 4.38 mg of radon-222, how much will remain in the sample after 15.2 days? 0.278 mg

- 8) Bismuth-212 undergoes a combination of alpha and beta decays to form lead-208. Depending on which decay process occurs first, different isotopes are temporarily formed during the process. Identify these isotopes by completing the equations: (you have to write the nuclear Equations for this question)

- 9) Sodium-24 has a half-life of 15 hours. How much will remain in an 18.0 g sample after 60 hours? 1.125 g
- 10) After 42 days a 2.0 g sample of phosphorus-32 contains only 0.25 g of the isotope. What is the half-life of phosphorus-32? 14 d
- 11) Polonium-214 has a relatively short half-life of 164 seconds. How many seconds would it take for 8.0 g of this isotope to decay to 0.25 g? 820 s
- 12) By approximately what factor would the mass of a sample of copper-66 decrease in 51 minutes? The half-life of copper-66 is 5.10 minutes. 0.0977%
- 13) In 5.49 seconds, 1.20 g of argon-35 decay to leave only 0.15 g. What is the half-life of argon-35? 1.83s
- 14) The half-life of Pa-234 is 6.75 hr. How much (what fraction) of a sample of this isotope remains after 20.25 hr? 0.124 or about 1/8th
- 15) The half-life of Rn-222 is 3.823 day. What was the original mass of a sample of this isotope if 0.0500g remains after 7.646 day? 0.2 g
- 16) The half-life of Th-227 is 18.2 day. How many days are required for 70% of a given sample to decay? 32 d
- 17) An object taken from a cave has a carbon-14 fraction which is 0.89 of the amount in a living organism. How old is the object? (half-life for C-14 is 5730 yr) 960 yrs