

Starter #07

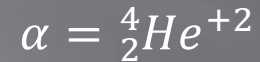
Chapter 33

- 1) **Why did Wilhelm Roentgen call his discovery “X-rays”?**
They were of an unknown nature. Usually we use X for unknowns
- 2) **What are the three main types of radioactivity?**
Alpha Particles, Beta Particles, and Gamma Rays
- 3) **What is the unit for absorbed radiation and what does it mean?**
RAD = Radiation Absorbed Dose
- 4) **What is the unit for radiation dosage on potential damage and what does it mean?**
REM = Roentgen Equivalent Man
- 5) **What is the level of radiation dosage that is dangerous to humans?**
500 rem is the 50% lethal dose
- 6) **What is one use of radiation that helps humans?**
X-Ray, Radiation Treatment, Radioactive Tracers
- 7) **What is the name of the force that holds the nucleus together?**
Strong Nuclear Force
- 8) **All nuclei with more than how many protons are radioactive?**
82 – Lead is the last nucleus that is not radioactive.

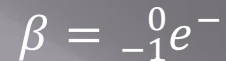
Quiz #07

Chapter 33

- 1) **What is the formula and charge for an alpha particle (α)?**



- 2) **What is the formula and charge for a beta particle (β)?**



- 3) **List the three types of radiation from least dangerous to most dangerous:**

Alpha, Beta, Gamma

- 4) **Explain why the most and least dangerous are what they are:**

Alpha has largest mass, so it has the least penetrating power

Gamma has no mass, so it has the most penetrating power

- 5) **What can stop an alpha particle?**

Skin or piece of paper

- 6) **What can stop a beta particle?**

Wood or metal foil

- 7) **What can stop gamma ray?**

Feet of concrete or several inches of lead can stop most of it

Starter #08

Chapter 33

1) **What is a half-life?**

The time it takes for half the quantity of a radioactive isotope to decay

2) **What are the 5 types of radiation detectors discussed in the book?**

Geiger Counter, Cloud Chamber, Bubble Chamber, Spark Chamber, Scintillation Counter

3) **What is transmutation?**

The changing of one chemical element to another

4) **What are the two basic types of natural transmutation?**

Alpha Decay & Beta Decay

5) **Who was the first person to artificially transmute an element?**

Ernest Rutherford in 1919

6) **What is carbon dating and how far back can it work?**

The use of measuring the current level of radioactivity of a carbon-based artifact to determine its age using the half-life of Carbon-14

Quiz #08

Chapter 33

- 1) **Silicon-32 has a half-life of 170 years. What percent of a sample of Silicon-32 will be left after 680 years?**

$$680 \text{ years} \left| \frac{1 \text{ half life}}{170 \text{ years}} \right| = 4 \text{ H.L.} = \left(\frac{1}{2} \right)^4 = \frac{1}{16} = 6.25\%$$

- 2) **The half-life of Carbon-14 is 5730 years. If you find a fossilized leaf in your back yard that contains 12.5% of the Carbon-14 a living organism should have, how long ago did the leaf die?**

$$0.125 = \frac{1}{8} = \left(\frac{1}{2} \right)^3 = 3 \text{ H.L.} \left| \frac{5730 \text{ years}}{1 \text{ H.L.}} \right| = 17,190 \text{ years ago}$$

- 3) **Show the alpha decay of Uranium-238 (${}^{238}_{92}\text{U}$)**



- 4) **Show the beta decay of Potassium-40 (${}^{40}_{19}\text{K}$)**

