$\qquad$ Date: $\qquad$

### 10.6 Half Life Guided Notes

HALF LIFE: $\qquad$

Example 1: How much of a $100-\mathrm{mg}$ sample of nitrogen-16 will remain after 28.8 seconds of decay? Use: GUESS

Given = Step 1. Write the given (include units!).

Unknown = Step 2. What are we looking for (include units!)

Equation = Step 3. What is the half-life of the isotope?

Substitute/Solve: Make a CHART and find your answer!

| Half Lives <br> Passed | Fraction Remaining | Amount Remaining | Time Passed |
| :--- | :--- | :--- | :--- |
| 0 | 1 |  |  |
| 1 | $1 / 2$ |  |  |
| 2 | $1 / 4$ |  |  |
| 3 | $1 / 16$ |  |  |
| 4 | $1 / 32$ |  |  |
| 5 |  |  |  |

Example 2: Sodium-24 has a half-life of 15 hours. How much sodium- 24 will remain in an 18.0 g sample after 60 hours? Given = Step 1. Write the given (include units!).

Unknown = Step 2. What are we looking for (include units!)

Equation = Step 3. What is the half-life of the isotope?

Substitute/Solve: Make a CHART and find your answer!

| Half Lives <br> Passed | Fraction Remaining | Amount Remaining | Time Passed |
| :--- | :--- | :--- | :--- |
| 0 | 1 |  |  |
| 1 | $1 / 2$ |  |  |
| 2 | $1 / 4$ |  |  |
| 3 | $1 / 8$ |  |  |
| 4 | $1 / 16$ |  |  |

Your Turn... Example 3: Manganese-56 is a beta emitter with a half-life of 2.6 h . What is the mass of manganese-56 in a $1.0-\mathrm{mg}$ sample of the isotope at the end of 10.4 h ?
Given $=$ Step 1.

Unknown = Step 2.

Equation $=$ Step 3. What is the half-life of the isotope?

Substitute/Solve: Make a CHART and find your answer!

| Half Lives <br> Passed | Fraction Remaining | Amount Remaining | Time Passed |
| :--- | :--- | :--- | :--- |
|  |  |  |  |
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|  |  |  |  |
|  |  |  |  |

Complete these on your loose leaf:
Problem \#4: Carbon- 14 emits beta radiation and decays with a half-life ( $t_{1 / 2}$ ) of 5730 years. Assume you start with a mass of $2.00 \times 10^{-12} \mathrm{~g}$ of Carbon-14. How long is three half-lives?

Problem \#5: A patient is administered 20 mg of iodine-131. How much of this isotope will remain in the body after 40 days if the half-life for iodine-131 is 8 days?

Problem \#6: The half-life of radium-226 is 1600 years. How many grams of a 0.25 g sample will remain after 4800 years?

