**Part C: Radioactive Decay**

When a nucleus decays, we draw the arrow with an arrow, like this:

$$^{14}_{6}\text{C} \rightarrow {}^{10}_{4}\text{Be} + {}^{4}_{2}\text{He}$$

| |
|---|
| **Conservation of Mass:**<br><br>The mass numbers of the reactants and products must add up.<br><br>In the example above: 14 = 10 + 4 |
| **Conservation of Charge:**<br><br>The atomic numbers (which represent charge) of the reactants and products must add up.<br><br>In the example above: 6 = 4 + 2 |

Using the **conservation of mass** and **conservation of charge**, find the missing nuclide:

C.1 $^{238}_{92}\text{U} \rightarrow {}^{??}_{??}?? + {}^{4}_{2}\text{He}$

C.2 $^{222}_{88}\text{Ra} \rightarrow {}^{??}_{??}?? + {}^{4}_{2}\text{He}$

C.3 $^{208}_{84}\text{Po} \rightarrow {}^{??}_{??}?? + {}^{4}_{2}\text{He}$

**Part D: Radioactive Decay**

| **Alpha Particle (α)** |
|---|
| A Helium-4 Nucleus<br>Represented by $^{4}_{2}\text{He}$ |
| **Beta Particle (β)** |
| An electron<br>Represented by $^{0}_{-1}\text{e}$ |
| **Gamma Ray (γ)** |
| A very high energy photon, or electromagnetic wave<br>Represented by γ, the Greek letter gamma. |

For **D.1** – **D.7** write whether this describes an alpha particle, a beta particle, or a gamma ray.

**D.1** γ

**D.2** α

**D.3** β

**D.4** $^{0}_{-1}\text{e}$

**D.5** $^{4}_{2}\text{He}$

**D.6** Helium-4

**D.7** Electron

| **Alpha Decay** |
|---|
| In alpha decay, a nucleus gives off an alpha particle (Helium-4). |
| **Beta Decay** |
| In beta decay, a nucleus gives off a beta particle (electron). |

Draw an alpha decay for each nuclide.

For full credit, you must write the entire reaction in the box. The entire reaction includes the initial nuclide, the products, and an arrow between them.
Do not write only the products.
Do not draw an arrow through the shaded space. Write the entire reaction in the proper box.

| | Nuclide | | Decay Reaction |
|---|---|---|---|
| D.8 | $^{256}_{103}Lr$ | | |
| D.9 | $^{231}_{91}Pa$ | | |
| D.10 | $^{225}_{89}Ac$ | | |
| D.11 | $^{211}_{87}Fr$ | | |
| D.12 | $^{185}_{79}Au$ | | |

Draw a beta decay of each nuclide

| | Nuclide | | Decay Reaction |
|---|---|---|---|
| D.13 | $^{6}_{2}He$ | | |
| D.14 | $^{24}_{11}Na$ | | |
| D.15 | $^{201}_{79}Au$ | | |
| D.16 | $^{52}_{26}Fe$ | | |
| D.17 | $^{42}_{19}K$ | | |