

## Classification of Nuclear Reactions, Practice Worksheet

### Types of Nuclear Reactions:

#### Natural decay

-A radionuclide emits radiation in the form of energy or small particles.  
(alpha, beta, beta+ (positron), and gamma emissions)

#### Electron capture

-A neutron poor radioisotope combines a proton with captured electron to produce a neutron.

#### Fission

-natural or artificial production of two smaller daughter nuclides from one large nuclide, often accompanied by energy and small particles.

#### Fusion:

-Combination of two or more nuclei to form a third, different nucleus.

### NUCLEAR CHEMISTRY

#### BALANCING NUCLEAR REACTIONS WORKSHEET

Predict the missing product or reactant in the following nuclear reactions. Determine the type of nuclear reaction ( $\alpha$  emission,  $\beta$  emission,  $\gamma$  emission, positron emission, artificial transmutation, fission, or fusion) described.

Type of Nuclear Reaction:

- |   |      |
|---|------|
| 1.) $^{42}_{19}\text{K} \rightarrow ^0_{-1}\text{e} + \underline{\hspace{2cm}}$                                       | 1.)  |
| 2.) $^{239}_{94}\text{Pu} \rightarrow ^4_2\text{He} + \underline{\hspace{2cm}}$                                       | 2.)  |
| 3.) $^{235}_{92}\text{U} \rightarrow \underline{\hspace{2cm}} + ^{231}_{90}\text{Th}$                                 | 3.)  |
| 4.) $^1_1\text{H} + ^3_1\text{H} \rightarrow \underline{\hspace{2cm}}$  | 4.)  |
| 5.) $^6_3\text{Li} + ^1_0\text{n} \rightarrow ^4_2\text{He} + \underline{\hspace{2cm}}$                               | 5.)  |
| 6.) $^{27}_{13}\text{Al} + ^4_2\text{He} \rightarrow ^{30}_{15}\text{P} + \underline{\hspace{2cm}}$                   | 6.)  |
| 7.) $^9_4\text{Be} + ^1_1\text{H} \rightarrow \underline{\hspace{2cm}} + ^4_2\text{He}$                               | 7.)  |
| 8.) $^{37}_{19}\text{K} \rightarrow ^0_{+1}\text{e} + \underline{\hspace{2cm}}$                                       | 8.)  |
| 9.) $\underline{\hspace{2cm}} + ^1_0\text{n} \rightarrow ^{142}_{56}\text{Ba} + ^{91}_{36}\text{Kr} + 3 ^1_0\text{n}$ | 9.)  |
| 10.) $^{238}_{92}\text{U} + ^4_2\text{He} \rightarrow \underline{\hspace{2cm}} + ^1_0\text{n}$                        | 10.) |
| 11.) $^{14}_6\text{C} \rightarrow ^{14}_7\text{N} + \underline{\hspace{2cm}}$   | 11.) |
| 12.) $^{187}_{75}\text{Re} + \underline{\hspace{2cm}} \rightarrow ^{188}_{75}\text{Re} + ^1_1\text{H}$                | 12.) |
| 13.) $^{22}_{11}\text{Na} + \underline{\hspace{2cm}} \rightarrow ^{22}_{10}\text{Ne}$                                 | 13.) |
| 14.) $^{218}_{84}\text{Po} \rightarrow \underline{\hspace{2cm}} + ^4_2\text{He}$                                      | 14.) |
| 15.) $^{253}_{99}\text{Es} + ^4_2\text{He} \rightarrow ^1_0\text{n} + \underline{\hspace{2cm}}$                       | 15.) |

Write the Balanced nuclear equations for the alpha decay of:

- Plutonium-234
- Strontium-90

Write the balanced nuclear equations for the alpha, beta and gamma decay of Radium-226