

Name: _____ Date: _____

Chemistry ~ Ms. Hart Class: _____ Anions or Cations



10.4 HW – Writing Nuclear Equations

- 1) Given the reaction: $^{131}_{53}\text{I} \rightarrow ^{131}_{54}\text{Xe} + X$
Which particle is represented by X?
1. alpha 3. neutron
2. beta 4. proton
- 2) In the equation: $^{234}_{90}\text{Th} \rightarrow ^{234}_{91}\text{Pa} + X$, which particle is represented by X?
1. $^0_{-1}\text{e}$ 2. ^4_2He 3. ^1_1H 4. $^0_{+1}\text{e}$
- 3) In the equation: $^{234}_{90}\text{Th} \rightarrow ^{234}_{91}\text{Pa} + X$, the symbol X represents
1. $^0_{+1}\text{e}$ 2. $^0_{-1}\text{e}$ 3. ^1_0n 4. ^1_1H
- 4) Given the equation: $^{14}_6\text{C} \rightarrow ^{14}_7\text{N} + X$
Which particle is represented by the letter X?
1. an alpha particle 2. a neutron 3. a beta particle 4. a proton
- 5) Given the nuclear equation: $^{19}_{10}\text{Ne} \rightarrow X + ^{19}_9\text{F}$
Which particle is represented by X?
1. alpha 2. Neutron 3. beta 4. positron
- 6) Base your answer to the question on the information, the *Reference Tables for Physical Setting/Chemistry*, and your knowledge of chemistry.

Radioactivity and radioactive isotopes have the potential for both benefiting and harming living organisms. One use of radioactive isotopes is in radiation therapy as a treatment for cancer. Cesium-137 is sometimes used in radiation therapy.

A sample of cesium-137 was left in an abandoned clinic in Brazil in 1987. Cesium-137 gives off a blue glow because of its radioactivity. The people who discovered the sample were attracted by the blue glow and had no idea of any danger. Hundreds of people were treated for overexposure to radiation, and four people died.

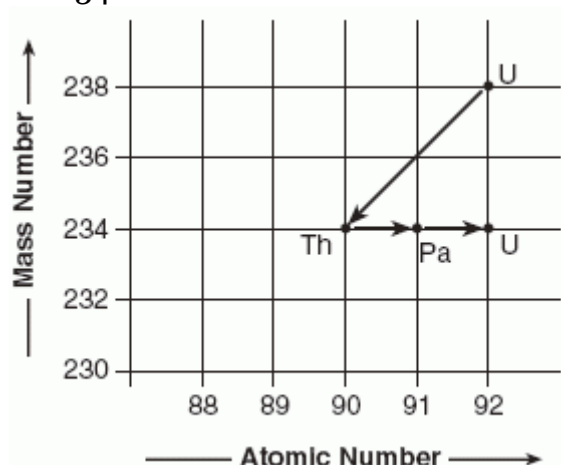
Which of the following correctly represents the radioactive decay of cesium-137?

1. $^{137}_{55}\text{Cs} \rightarrow ^0_{-1}\text{e} + ^{137}_{56}\text{Ba}$
 2. $^{137}_{55}\text{Cs} + ^0_{-1}\text{e} \rightarrow ^{137}_{56}\text{Ba}$
 3. $^{137}_{55}\text{Cs} \rightarrow ^4_2\text{He} + ^{133}_{53}\text{I}$
 4. $^{137}_{55}\text{Cs} \rightarrow ^1_0\text{n} + ^{137}_{54}\text{Xe}$
- 7) What is dangerous about being exposed to Cesium? _____

8) Which equation represents the radioactive decay of $^{226}_{88}\text{Ra}$?

1. $^{226}_{88}\text{Ra} \rightarrow ^{222}_{86}\text{Rn} + ^4_2\text{He}$
2. $^{226}_{88}\text{Ra} \rightarrow ^{226}_{89}\text{Ac} + ^0_{-1}\text{e}$
3. $^{226}_{88}\text{Ra} \rightarrow ^{226}_{87}\text{Fr} + ^0_{+1}\text{e}$
4. $^{226}_{88}\text{Ra} \rightarrow ^{225}_{88}\text{Rn} + ^1_0\text{n}$

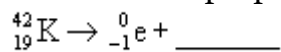
9) The chart below shows the spontaneous nuclear decay of U-238 to Th-234 to Pa-234 to U-234.



What is the correct order of nuclear decay modes for the change from U-238 to U-234?

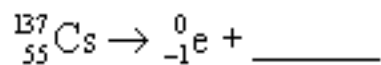
1. β^- decay, γ decay, β^- decay
2. β^- decay, β^- decay, α decay
3. α decay, α decay, β^- decay
4. α decay, β^- decay, β^- decay

10) Which choice properly completes the nuclear equation below?



1. $^{42}_{18}\text{K}$
2. $^{42}_{18}\text{Ar}$
3. $^{40}_{20}\text{Mo}$
4. $^{42}_{20}\text{Ca}$

11) Fill in the blank to complete the nuclear equation for the decay of cesium-137.



For 11-14 below: Write the full nuclear reaction for the following:

12) Beta decay of potassium-42

13) Electron capture by argon-38

14) Alpha decay of $^{144}_{60}\text{Nd}$

15) Np-239 ejects a beta particle