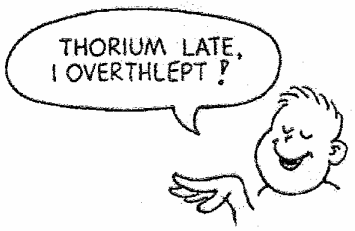
Chapter 33 Atomic Nucleus and Radioactivity

Nuclear Reactions

Complete these nuclear reactions:

1. $^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{4}_{2}\_\_\_\_$



2. $^{234}_{90}Th \rightarrow {}^{234}_{91}Pa + {}^{0}_{-1}\_\_\_\_$

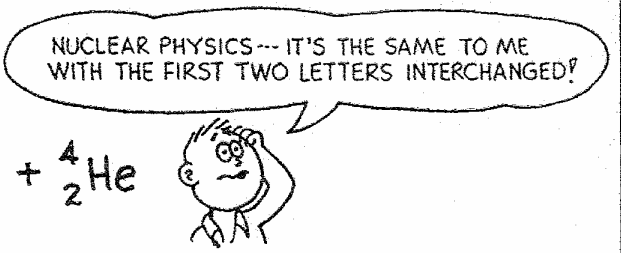
3. $^{234}_{91}Pa \rightarrow \_\_\_\_ + {}^{4}_{2}He$

4. $^{220}_{86}Rn \rightarrow \_\_\_\_ + {}^{4}_{2}He$

5. $^{216}_{84}Po \rightarrow \_\_\_\_ + {}^{0}_{-1}e$

6. $^{216}_{84}Po \rightarrow \_\_\_\_ + {}^{4}_{2}He$

7. $^{210}_{83}Bi \rightarrow \_\_\_\_ + {}^{0}_{-1}e$



8. $^{1}_{0}n + {}^{10}_{5}B \rightarrow \_\_\_\_ + {}^{4}_{2}He$

Hewitt Drew It!

Name _____ Date _____

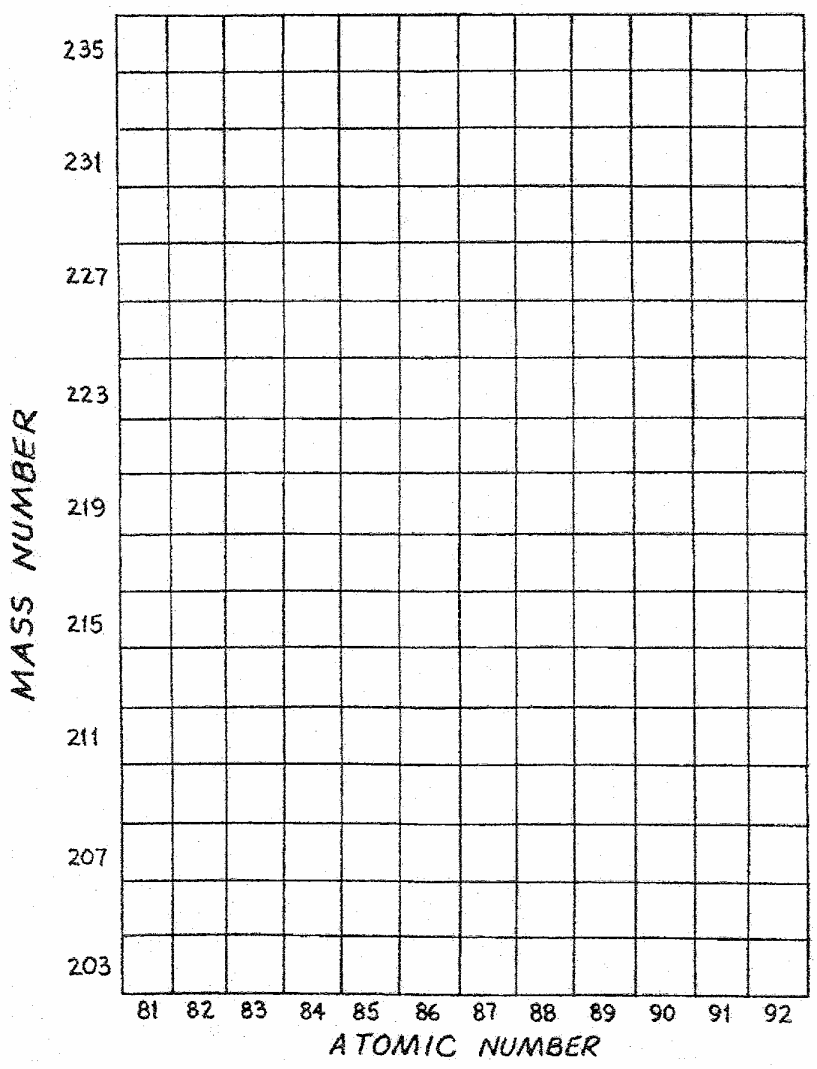
CONCEPTUAL Physics PRACTICE PAGE

Chapter 33 Atomic Nucleus and Radioactivity

Natural Transmutation

Fill in the decay-scheme diagram below, similar to that shown in Figure 33.14 in your textbook, but beginning with U-235 and ending with an isotope of lead. Use the table at the left, and identify each element in the series with its chemical symbol.

Step	Particle emitted
1	Alpha
2	Beta
3	Alpha
4	Alpha
5	Beta
6	Alpha
7	Alpha
8	Alpha
9	Beta
10	Alpha
11	Beta
12	Stable



What is the final-product isotope?

_____

Name _____ Date _____

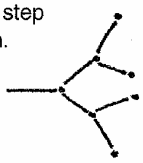
CONCEPTUAL Physics PRACTICE PAGE

Chapter 34 Nuclear Fission and Fusion

Nuclear Reactions

1. Complete the table for a chain reaction in which two neutrons from each step individually cause a new reaction.

EVENT	1	2	3	4	5	6	7
NO. OF REACTIONS	1	2	4				



2. Complete the table for a chain reaction where three neutrons from each reaction cause a new reaction.

EVENT	1	2	3	4	5	6	7
NO. OF REACTIONS	1	3	9				

3. Complete these beta reactions, which occur in a breeder reactor.

$^{239}_{92}U \rightarrow$ _____ $+ \, ^{0}_{-1}e$

$^{239}_{93}Np \rightarrow$ _____ $+ \, ^{0}_{-1}e$

4. Complete the following fission reactions.

$^{1}_{0}n + \, ^{235}_{92}U \rightarrow \, ^{143}_{54}Xe + \, ^{90}_{38}Sr +$ ___ $(^{1}_{0}n)$

$^{1}_{0}n + \, ^{235}_{92}U \rightarrow \, ^{152}_{60}Nd +$ _____ $+ \, 4(^{1}_{0}n)$

$^{1}_{0}n + \, ^{239}_{94}Pu \rightarrow$ _____ $+ \, ^{97}_{40}Zr + 2(^{1}_{0}n)$

5. Complete the following fusion reactions.

$^{2}_{1}H + \, ^{2}_{1}H \rightarrow \, ^{3}_{2}He +$ _____

$^{2}_{1}H + \, ^{3}_{1}H \rightarrow \, ^{4}_{2}He +$ _____