

General Chemistry
Mr. MacGillivray
Quiz #42:
Nuclear Processes and Calculations

1. Complete the nuclear reactions shown below. Identify the type of nuclear reaction also.



2. The radioisotope radon-222 has a half-life of 3.8 days. How much of 10.0-gram sample of radon-222 would be left after approximately 19 days? Show work for credit.

3. Rank each of the following forms of radiation from least penetrating to most penetrating:

gamma decay

beta decay

alpha decay

LEAST penetrating: 1.

2.

MOST penetrating: 3.

4. Match each type of radiation with its description at right. Write the correct letter in the blank.

_____ gamma decay

a) emission of a helium nucleus ($2 p^+$ & $2 n^0$)

_____ beta decay

b) emission of an electron from the nucleus

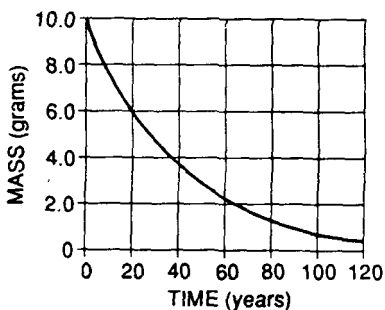
_____ alpha decay

c) emission of very high-energy radiation from the nucleus

1. Which nuclear emission has the greatest mass?

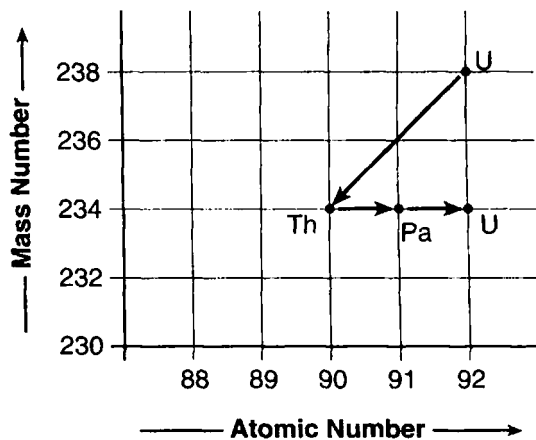
- (A) α (C) β^-
 (B) γ (D) β^+

2. The graph below represents the decay curve of a radioactive isotope. The half-life of this isotope is



- (A) 8 years (C) 45 years
 (B) 30 years (D) 60 years

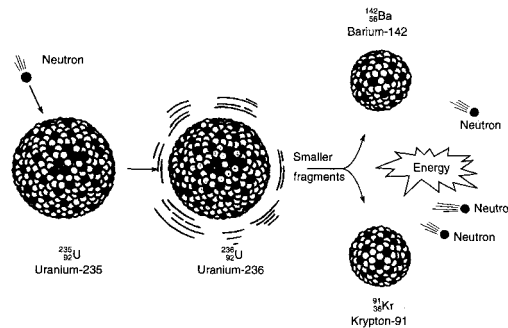
3. The chart below shows the spontaneous nuclear decay of U-238 to Th-234 to Pa-234 to U-234.



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

- (A) β^- decay, decay, β^- decay
 (B) β^- decay, β^- decay, α decay
 (C) α decay, α decay, β^- decay
 (D) α decay, β^- decay, β^- decay

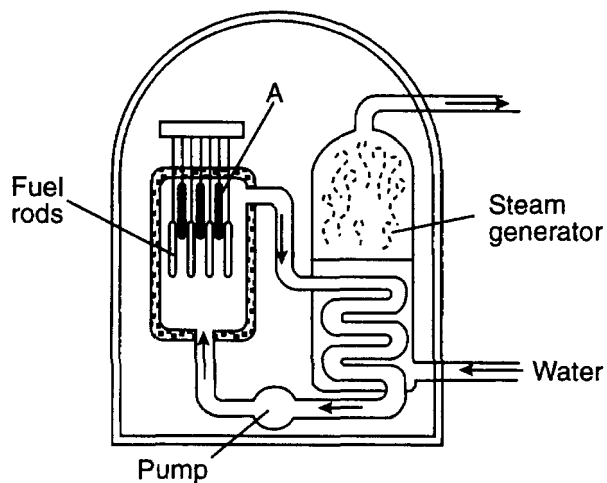
4. The diagram below represents a nuclear reaction in which a neutron bombards a heavy nucleus.



Which type of reaction does the diagram illustrate?

- (A) fission (C) alpha decay
 (B) fusion (D) beta decay

5. The diagram below represents a nuclear reactor. The arrows indicate the direction of the flow of water.



Which structure is indicated by letter A?

- (A) turbine (C) control rod
 (B) moderator (D) internal shield