



# Chemistry

Name: \_\_\_\_\_

Section \_\_\_\_\_

RADIOISOTOPES WS

Date: \_\_\_\_\_

*Directions (1-11):* For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question.

- Which radioisotope emits alpha particles?  
(1) Fe-53                      (3) Au-198  
(2) Sr-90                      (4) Pu-239
- Which radioisotope is used for diagnosing thyroid disorders?  
(1) U-238                      (3) I-131  
(2) Pb-206                    (4) Co-60
- Which isotope is used to treat cancer?  
(1) C-14                        (3) Co-60  
(2) U-238                      (4) Pb-206
- Which particle is emitted from a hydrogen-3 nucleus when it undergoes radioactive decay?  
(1)  $\alpha$                         (3)  $\beta^+$   
(2)  $\beta^-$                         (4)  $\gamma$
- Which nuclide is paired with a specific use of that nuclide?  
(1) carbon-14, treatment of cancer  
(2) cobalt-60, dating of rock formations  
(3) iodine-131, treatment of thyroid disorders  
(4) uranium-238, dating once-living organisms
- The stability of an isotope is based on its  
(1) number of neutrons, only  
(2) number of protons, only  
(3) ratio of neutrons to protons  
(4) ratio of electrons to protons
- Which nuclides are used to date the remains of a once-living organism?  
(1) C-14 and C-12      (3) I-131 and Xe-131  
(2) Co-60 and Co-59    (4) U-238 and Pb-206
- Which nuclear emission has the greatest mass and the least penetrating power?  
(1) an alpha particle    (3) a neutron  
(2) a beta particle      (4) a positron
- Which nuclide is used to investigate human thyroid gland disorders?  
(1) carbon-14              (3) cobalt-60  
(2) potassium-37        (4) iodine-131
- In which type of reaction do two lighter nuclei combine to form one heavier nucleus?  
(1) combustion            (3) nuclear fission  
(2) reduction              (4) nuclear fusion
- Which notation of a radioisotope is correctly paired with the notation of its emission particle?  
(1)  $^{37}\text{Ca}$  and  $^4_2\text{He}$       (3)  $^{16}\text{N}$  and  $^1_1\text{p}$   
(2)  $^{235}\text{U}$  and  $^0_{+1}\text{e}$       (4)  $^3\text{H}$  and  $^0_{-1}\text{e}$

Directions (12-15): Answer the following questions based on your knowledge of chemistry.

- 12 Identify the type of nuclear reaction that causes the amount of C-14 in an organism to decrease after the organism dies.

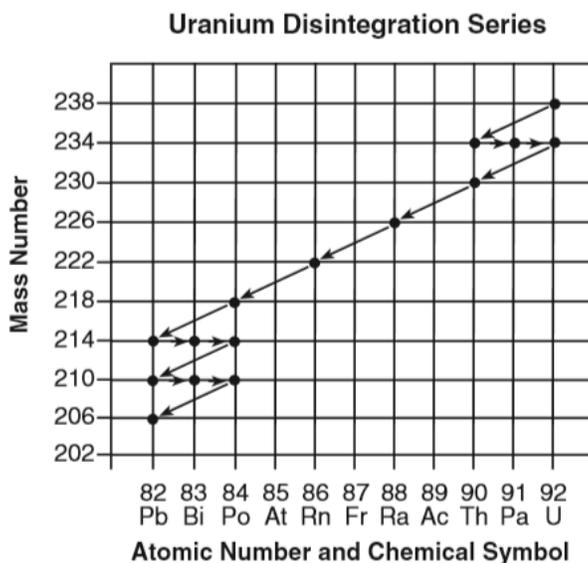
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- 13 State, in terms of subatomic particles, how an atom of C-13 is different from an atom of C-12.

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Base your answers to questions 13 and 14 on the information below.

A U-238 atom decays to a Pb-206 atom through a series of steps. Each point on the graph below represents a nuclide and each arrow represents a nuclear decay mode.



- 14 Based on this graph, what particle is emitted in the nuclear decay of a Po-218 atom? \_\_\_\_\_

- 15 Explain why the U-238 disintegration series ends with the nuclide Pb-206.

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