

■ KEY ■

First Name: _____

Last Name: _____

L'OS - Formative Quiz - Radioactive Decay

Use the following information to answer Q1 and Q2:

<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">19</td> <td style="padding: 5px;">K</td> </tr> <tr> <td style="padding: 5px;">39.10</td> <td style="padding: 5px;">12.01</td> </tr> <tr> <td style="padding: 5px;">potassium</td> <td style="padding: 5px;">carbon</td> </tr> </table>	19	K	39.10	12.01	potassium	carbon	<table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">6</td> <td style="padding: 5px;">C</td> </tr> <tr> <td style="padding: 5px;">12.01</td> <td style="padding: 5px;">12.01</td> </tr> <tr> <td style="padding: 5px;">carbon</td> <td style="padding: 5px;">carbon</td> </tr> </table>	6	C	12.01	12.01	carbon	carbon
19	K												
39.10	12.01												
potassium	carbon												
6	C												
12.01	12.01												
carbon	carbon												

Q1: Potassium-39 has *ab* protons and *cd* neutrons, where the values of *a*, *b*, *c*, and *d* are __, __, __, and __.

19 *39-19 = 20*

(Record your four digit answer in the Numerical Response boxes below)

1	9	2	0
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Q2: Carbon-14 has *a* protons, *b* neutrons, and *cd* nucleons, where the values of *a*, *b*, *c*, and *d* are __, __, __, and __.

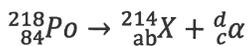
6 *14-6 = 8* *14*

(Record your four digit answer in the Numerical Response boxes below)

6	8	1	4
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6	C
14	Carbon

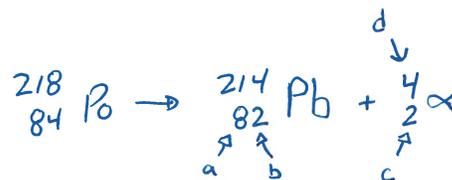
Q3: Polonium-218 undergoes alpha decay as follows:



The values of *a*, *b*, *c*, and *d* are __, __, __, and __.

(Record your four digit answer in the Numerical Response boxes below)

8	2	2	4
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$218 = 214 + 4$ ← Conservation of Nucleons

$84 = 82 + 2$ ← Conservation of Charge.

Q4: Long Answer – Write the beta-negative decay of Bismuth-214.



Q5: Which two **Physics Principles** are required to determine the daughter products of a radioactive decay?

(Record your two digit answer in the Numerical Response boxes below)

7	8		
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or
8 7

8- Conservation of Nucleons

$$214 \rightarrow 0 + 0 + 214$$

7- Conservation of Charge

$$83 \rightarrow -1 + 0 + 84$$

Use the following information to answer Q6:

Radiation Source Experiencing a Magnetic Field

Deflecting Direction

- 1 – Upward
- 2 – Downward
- 3 – No deflection

Q6: A magnetic field is directed into the page. Alpha radiation, beta-negative radiation, beta-positive radiation, and gamma radiation are emitted into the magnetic field. Using the Numerical Response numbers above, which deflection direction will each experience?

1
Alpha Radiation
Deflection
Direction
+2 charge

2
Beta-Negative
Deflection
Direction
-1 charge

1
Beta-Positive
Deflection
Direction
+1 charge

3
Gamma Radiation
Deflection
Direction
No charge

(Record your four digit answer in the Numerical Response boxes below)

1	2	1	3
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Q7: Both protons and neutrons are made up of Up quarks and Down quarks.

2
Number of
Up-Quarks
in a Proton

1
Number of
Down-Quarks
in a Proton

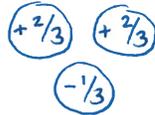
1
Number of
Up-Quarks
in a Neutron

2
Number of
Down-Quarks
in a Neutron

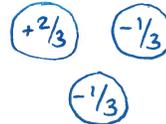
(Record your four digit answer in the Numerical Response boxes below)

2	1	1	2
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PROTON

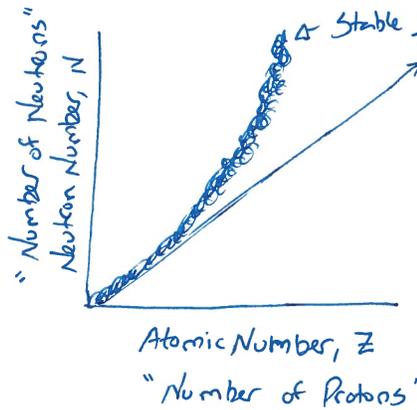


NEUTRON



Q8: Which of the following statements is true about stable isotopes?

- a. $N \leq Z$
- b. $N \geq Z$
- c. $N = Z$
- d. $N \neq Z$



For example, Silver.

47	Ag
107.87	
Silver	

On average has 60.87 neutrons but only has 47 protons.

MARKING

Beginning	0.0 – 3.5
Progressing	4.0 – 5.5
Competent	6.0 – 7.5
Exemplary	8.0