

NUCLEAR DECAY & HALF-LIFE

INSTRUCTIONS:

1. Be careful of your spelling. Answer in ALL CAPS (CAPSLOCK)!

2. Isotopes must be in "ELEMENT-NUMBER" format.

3. Numbers **MUST** be in numerical form e.g., 1, 40... not one, forty

Ps. There is a periodic table attached for your perusal.



I. Multiple Choice.

1. What is Half-life?

The amount of time it takes for some of the nuclei in a sample of the isotope to decay

The amount of time it takes for half the electrons in a sample of the isotope to decay

The amount of time it takes for half the nuclei in a sample of the isotope to decay

the amount of time it takes to double the nuclei in a sample of the isotope to decay

2. Which best describes an isotope?

atoms of the same element with the same mass

atoms of different elements with the same mass

atoms of the same element with a different number of neutrons

atoms of different elements with different number of neutrons

3. What is emitted during Beta Radiation?

a high-energy electron

a high-energy proton

a high-energy neutron

2 protons & 2 Neutrons

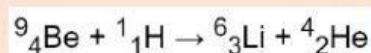
4. What type of decay is evident in the nuclear reaction shown?

Alpha

Beta

Delta

Gamma



5. An alpha particle is a

Be-4 nucleus

He-4 nucleus

C-12 nucleus

C-4 nucleus

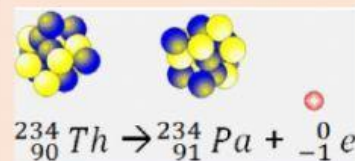
II. Fill in the blanks.

1. How many protons are present in one atom of carbon?

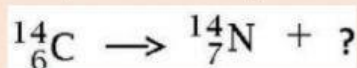
2. What does the "12" in carbon-12 represent?

3. Of the 3 types of radioactive decay, which is the most dangerous?

4. Which type of nuclear radiation is being emitted here?



5. What particle completes this reaction?



III. Complete the equation.

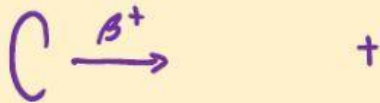
1. If Chromium-50 undergoes alpha decay, what isotope will result?



2. When Caesium-137 undergoes radioactive decay, it emits a beta particle. What isotope will result?



3. When Carbon-14 undergoes positron emission, what isotope will result?



IV. Problem Solving. Write the solution in your notebook. Attach photo in Google Classroom.

1. Barium-122 has a half-life of 3 minutes. A fresh sample weighing 500-g was obtained. If it takes 30-minutes to set up an experiment using Barium-122, how much will be left when the experiment begins?

2. Sodium-24 has a half-life of 15-hours. A 1-kg sample was left sitting in the laboratory reducing the amount to 244-mg. How long was it left for?

3. A container of element X-131 weighs 3000-g, in 30 days only 2.93-g was left. Determine the half-life of this element.

1 IA 1 H Hydrogen 1.008	2 IIA 4 Be Beryllium 9.012	3 Li Lithium 6.941	4 B Boron 10.811	5 C Carbon 12.011	6 N Nitrogen 14.007	7 O Oxygen 15.999	8 F Fluorine 18.998	9 Ne Neon 20.180	10 Na Sodium 22.990	11 Mg Magnesium 24.305	12 Al Aluminum 26.982	13 Si Silicon 28.086	14 P Phosphorus 30.974	15 S Sulfur 32.06	16 Cl Chlorine 35.45	17 Ar Argon 39.948	18 K Potassium 39.098	19 Ca Calcium 40.078	20 Sc Scandium 44.956	21 Ti Titanium 47.88	22 V Vanadium 50.942	23 Cr Chromium 51.996	24 Mn Manganese 54.938	25 Fe Iron 55.845	26 Co Cobalt 58.933	27 Ni Nickel 58.693	28 Cu Copper 63.546	29 Zn Zinc 65.38	30 Ga Gallium 69.723	31 Ge Germanium 72.63	32 As Arsenic 74.922	33 Se Selenium 78.96	34 Br Bromine 79.904	35 Kr Krypton 83.8	36 Rb Rubidium 85.468	37 Sr Strontium 87.62	38 Y Yttrium 88.906	39 Zr Zirconium 91.224	40 Nb Niobium 92.906	41 Mo Molybdenum 95.94	42 Tc Technetium 98	43 Ru Ruthenium 101.07	44 Rh Rhodium 102.91	45 Pd Palladium 106.42	46 Ag Silver 107.87	47 Cd Cadmium 112.41	48 In Indium 114.82	49 Sn Tin 118.71	50 Sb Antimony 121.76	51 Te Tellurium 127.6	52 I Iodine 126.91	53 Xe Xenon 131.3	54 Cs Cesium 132.91	55 Ba Barium 137.33	56 La Lanthanum 138.91	57 Ce Cerium 140.12	58 Pr Praseodymium 140.91	59 Nd Neodymium 144.24	60 Pm Promethium 145	61 Sm Samarium 150.36	62 Eu Europium 151.96	63 Gd Gadolinium 157.25	64 Tb Terbium 158.93	65 Dy Dysprosium 162.50	66 Ho Holmium 164.93	67 Er Erbium 167.26	68 Tm Thulium 168.93	69 Yb Ytterbium 173.05	70 Lu Lutetium 174.96	71 Ac Actinium 227	72 Th Thorium 232.04	73 Pa Protactinium 231.04	74 U Uranium 238.03	75 Np Neptunium 237	76 Pu Plutonium 244	77 Am Americium 243	78 Cm Curium 247	79 Bk Berkelium 247	80 Cf Californium 251	81 Es Einsteinium 252	82 Fm Fermium 257	83 Md Mendelevium 258	84 No Nobelium 259	85 Lr Lawrencium 262	86 Rf Rutherfordium 261	87 Db Dubnium 262	88 Sg Seaborgium 266	89 Bh Bohrium 264	90 Hs Hassium 277	91 Mt Meitnerium 268	92 Ds Darmstadtium 271	93 Rg Roentgenium 272	94 Cn Copernicium 285	95 Nh Nihonium 286	96 Fl Flerovium 289	97 Mc Moscovium 288	98 Lv Livermorium 293	99 Ts Tennessine 294	100 Og Oganesson 294	101 La Lanthanum 138.91	102 Ce Cerium 140.12	103 Pr Praseodymium 140.91	104 Nd Neodymium 144.24	105 Pm Promethium 145	106 Sm Samarium 150.36	107 Eu Europium 151.96	108 Gd Gadolinium 157.25	109 Tb Terbium 158.93	110 Dy Dysprosium 162.50	111 Ho Holmium 164.93	112 Er Erbium 167.26	113 Tm Thulium 168.93	114 Yb Ytterbium 173.05	115 Lu Lutetium 174.96	116 Ac Actinium 227	117 Th Thorium 232.04	118 Pa Protactinium 231.04	119 U Uranium 238.03	120 Np Neptunium 237	121 Pu Plutonium 244	122 Am Americium 243	123 Cm Curium 247	124 Bk Berkelium 247	125 Cf Californium 251	126 Es Einsteinium 252	127 Fm Fermium 257	128 Md Mendelevium 258	129 No Nobelium 259	130 Lr Lawrencium 262	131 Rf Rutherfordium 261	132 Db Dubnium 262	133 Sg Seaborgium 266	134 Bh Bohrium 264	135 Hs Hassium 277	136 Mt Meitnerium 268	137 Ds Darmstadtium 271	138 Rg Roentgenium 272	139 Cn Copernicium 285	140 Nh Nihonium 286	141 Fl Flerovium 289	142 Mc Moscovium 288	143 Lv Livermorium 293	144 Ts Tennessine 294	145 Og Oganesson 294
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