

Atomic and Nuclear Physics



Name_		Class	Date
1	How much energy would be generated if a 1.0×10^{-3} -kilogram mass were completely converted to energy? A 9.3×10^{-1} MeV B 9.3×10^{2} MeV C 9.0×10^{13} J D 9.0×10^{16} J	2	One isotope of uranium is ²³⁸ ₉₂ U. Any other isotope of uranium must have A 92 protons B 146 protons C 92 neutrons D 146 neutrons
3	A cyclotron is used in medical research to make radioisotopes. The primary function of a cyclotron is to A determine the mass of an atom B determine the half-life of a nuclide C accelerate neutrons D accelerate charged particles	4	As the nucleus of an unstable atom emits only gamma radiation, the nucleus must A gain energy B lose energy C lose protons D gain protons
5	In the reaction particle X is a 24 Na $\rightarrow ^{24}_{12}$ Mg + X , positive electron B negative electron C proton D neutron	6	A 24-gram sample of a radioactive nuclide decayed to 3.0 grams of the nuclide in 36 minutes. How much of the original nuclide sample remained after the first 12 minutes? A 12 g B 2.0 g C 6.0 g D 8.0 g
7	A fusion reactor for commercial production of energy has not yet been developed. The best explanation for this situation is that fusion reactions A occur at extremely low temperatures B form highly radioactive products C require very high energies D need fuels unavailable on Earth	8	According to the Uranium Disintegration Series, how many beta particles are emitted when an atom of 218 Po decays to 206 Pb? A 7 B 6 C 3 D 4
9	Which statement best describes what occurs when the control rods are inserted into a nuclear reactor? A The number of fission reactions decreases because the control rods absorb neutrons. B The number of fission reactions decreases because the control rods absorb electrons. C The number of fission reactions increases because the control rods release neutrons. D The number of fission reactions increases because the control rods release electrons	10	The phenomenon by which an incandescent object gives off electrons is known as A thermionic emission B laser emission C induction D spectroscopy



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Class Name Date One isotope of uranium is ²³⁸₉₂ U. How much energy would be generated if a 1.0 × 10-3-kilogram mass were completely Any other isotope of converted to energy? uranium must have A 9.3 × 10⁻¹ MeV A 92 protons **B** $9.3 \times 10^{2} \text{ MeV}$ B 146 protons $C 9.0 \times 10^{13} J$ C 92 neutrons **D** $9.0 \times 10^{16} \, \text{J}$ D 146 neutrons 3 A cyclotron is used in medical research As the nucleus of an unstable atom emits to make radioisotopes. The primary only gamma radiation, the nucleus must function of a cyclotron is to A gain energy A determine the mass of an atom **B** lose energy B B determine the half-life of a nuclide C lose protons C accelerate neutrons **D** gain protons D accelerate charged particles 5 6 A 24-gram sample of a radioactive nuclide In the reaction $^{24}_{11}Na \rightarrow ^{24}_{12}Mg + X$, decayed to 3.0 grams of the nuclide in particle X is a 36 minutes. How much of the original nuclide sample remained after the first 12 minutes? A positive electron B negative electron A 12 g C proton B 2.0 g **D** neutron C 6.0 g **D** 8.0 g 8 A fusion reactor for commercial production According to the Uranium Disintegration of energy has not yet been developed. Series, how many beta particles are emitted when an atom of ²¹⁸₈₄ Po decays to The best explanation for this situation is that fusion reactions A occur at extremely low temperatures A 7 B form highly radioactive products **B** 6 C require very high energies **C** 3 D need fuels unavailable on Earth D 4 Which statement best describes what occurs 9 10 The phenomenon by which an when the control rods are inserted into a incandescent object gives off electrons is known as The number of fission reactions decreases because the control rods absorb neutrons. A thermionic emission The number of fission reactions decreases **B** laser emission because the control rods absorb electrons. **C** induction The number of fission reactions increases because the control rods release neutrons. **D** spectroscopy The number of fission reactions increases because the control rods release electrons