



Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

1

How much energy would be generated if a  $1.0 \times 10^{-3}$ -kilogram mass were completely converted to energy?

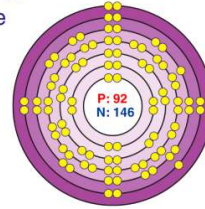
- A  $9.3 \times 10^{-1}$  MeV
- B  $9.3 \times 10^2$  MeV
- C  $9.0 \times 10^{13}$  J
- D  $9.0 \times 10^{16}$  J



2

One **isotope** of uranium is  $^{238}_{92}\text{U}$ . 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  $^{24}_{11}\text{Na} \rightarrow ^{24}_{12}\text{Mg} + X$ , **particle X** is a

- A 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  $^{218}_{84}\text{Po}$  decays to  $^{206}_{82}\text{Pb}$ ?

- 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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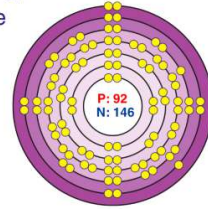
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(C)

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(A)

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(D)

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(B)

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(A)

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(A)