



Name _____ Class _____ Date _____

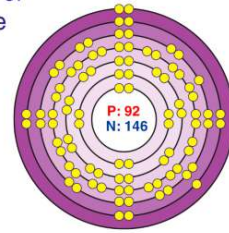
1 How much energy would be generated if a 1.0×10^{-3} -kilogram mass were completely converted to energy?

- 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 $^{238}_{92}\text{U}$. 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 $^{24}_{11}\text{Na} \rightarrow ^{24}_{12}\text{Mg} + \text{X}$, 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





ANSWER KEY

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

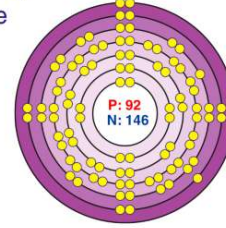
- A 9.3×10^{-1} MeV
- B 9.3×10^2 MeV
- C 9.0×10^{13} J
- D 9.0×10^{16} J



(c)

One **isotope** of uranium is $^{238}_{92}\text{U}$. Any **other** isotope of uranium must have

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(a)

A **cyclotron** is used in medical research to make **radioisotopes**. The **primary function of a cyclotron** is to

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(d)

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



(b)

In the reaction $^{24}_{11}\text{Na} \rightarrow ^{24}_{12}\text{Mg} + \text{X}$, **particle X** is a

- A positive electron
- B negative electron
- C proton
- D neutron

(b)

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

(a)

A fusion reactor for commercial production of energy has **not** yet been developed. The **best explanation for this situation** is that **fusion reactions**

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- D need fuels unavailable on Earth

(c)

According to the **Uranium Disintegration Series**, how many **beta particles** are emitted when an atom of $^{218}_{84}\text{Po}$ decays to $^{206}_{82}\text{Pb}$?

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- B 6
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- D 4

(d)

Which statement best describes what occurs when the **control rods** are inserted into a **nuclear reactor**?

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(a)

The phenomenon by which an **incandescent object gives off electrons** is known as

- A thermionic emission
- B laser emission
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(a)