

AP Chemistry: Unit - 2 - Atomic Structure and Properties Practice Test

Question 1

What is the atomic number?

- A. the number of protons
- B. the number of protons and neutrons
- C. the number of neutrons
- D. the number of protons and electrons

Question 2

Most of the mass in an atom is made up of _____.

- A. protons and electrons
- B. protons and neutrons
- C. neutrons and electrons
- D. electrons and quarks

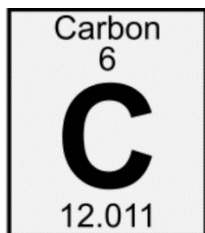
Question 3

In order for an atom to be neutral what has to be true?

- A. The atom has more protons than neutrons
- B. The atom has more neutrons than protons
- C. The atom has the same number of protons and neutrons
- D. The atom has the same number of protons and electrons

Question 4

What does the 6 represent?



- A. Atomic mass
- B. atomic number
- C. chemical symbol
- D. element name

Question 5

How is the number of neutrons in the nucleus of an atom calculated?

- A. Add the number of e⁻ and p⁺ together
- B. Subtract the number of e⁻ from p⁺
- C. Subtract the number of p⁺ from the mass number
- D. Add the mass number to the number of e⁻

Question 6

The smallest particle of an element that retains the properties of that element is a(n)

- A. atom
- B. electron
- C. proton
- D. neutron

Question 7

Group 18 elements are known as the _____ and have full valence shells.

- A. royal gases
- B. supreme solids
- C. noble gases
- D. legit liquids

Question 8

Why does group number 18 have the least reactive elements?

- A. They all have an odd number of protons.
- B. They all have an even number of protons.
- C. They have the largest masses.
- D. Their electron shells are the most filled and do not need to be very reactive.

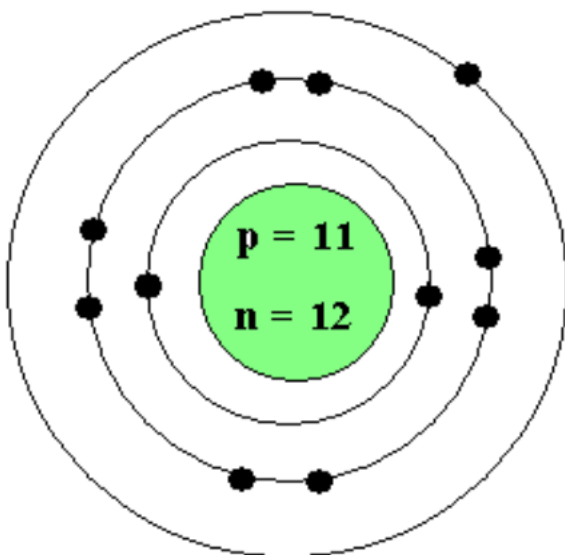
Question 9

Elements which are shiny, conduct electricity and heat are called

- A. metal
- B. non-metal
- C. metalloid
- D. non-existent

Question 10

What element does the Bohr Model represent?



- A. Nitrogen
- B. Potassium
- C. Sodium
- D. Phosphorous

Question 11

The electron configurations of four different elements are shown below.

Element 1: $1s^2 2s^2 2p^4$

Element 2: $1s^2 2s^2 2p^5$

Element 3: $[\text{Ne}]3s^2 3p^1$

Element 4: $[\text{Kr}]5s^1$

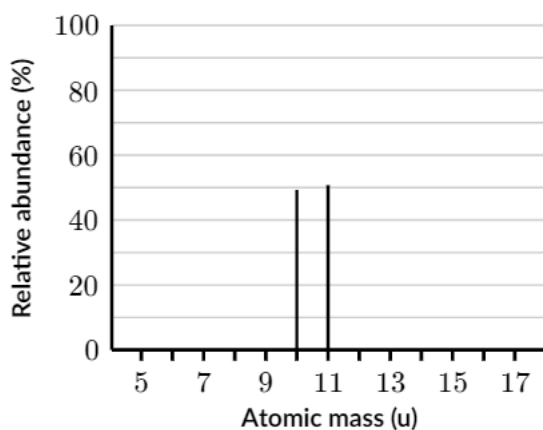
Based on their electron configurations, which of the following two elements are most likely to form an ionic compound with the empirical formula X_2Y ?

- A. Element 1 and Element 3
- B. Element 1 and Element 4
- C. Element 2 and Element 3
- D. Element 2 and Element 4

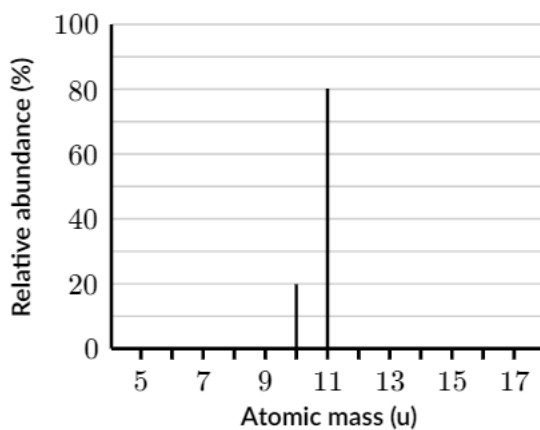
Question 12

The average atomic mass of boron (B) is 10.81 u.

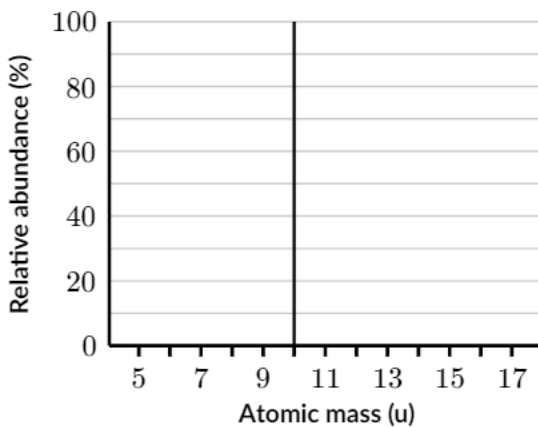
Which of the following mass spectra could correspond to an average sample of B?



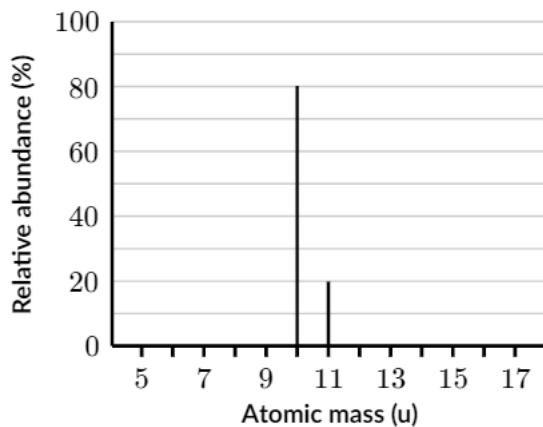
A.



B.



C.



Question 13

A pure sample of a compound contains 80% carbon and 20% hydrogen by mass.

Which of the following is the empirical formula of the compound?

- A. CH_3
- B. CH_4
- C. C_2H_6
- D. C_2H_8

Question 14

The first six ionization energies for elements Y and Z are shown below. The units are in kJ/mol.

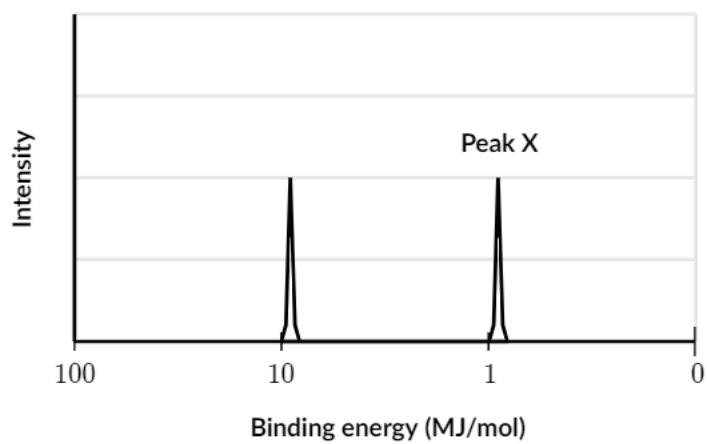
	Element Y	Element Z
First	1086	787
Second	2353	1577
Third	4620	3232
Fourth	6223	4356
Fifth	37831	16091
Sixth	47277	19806

Based on the data in the table, which of the following correctly identifies elements Y and Z, respectively?

- A. C and Si
- B. Si and C
- C. O and S
- D. S and O

Question 15

The photoelectron spectra of the 2s electrons of Be and Mg are shown below.



Which of the following correctly identifies the element associated with Peak X and provides the best justification?

- A. Be, because the 2s electrons in Be are, on average, closer to the nucleus than the 2s electrons in Mg are
- B. Be, because the 2s electrons in Be experience a smaller nuclear charge than the 2s electrons in Mg do
- C. Mg, because the 2s electrons in Mg experience greater electron-electron repulsions than the 2s electrons in Be do
- D. Mg, because the 2s electrons in Mg are more shielded than the 2s electrons in Be are

Answer Key

1. A
2. B
3. D
4. B
5. C
6. A
7. C
8. D
9. A
10. C
11. B
12. B
13. A
14. A
15. B