

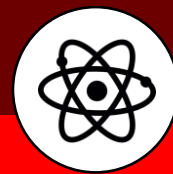
Atomic Structure

 2015

22 Which of the following have the same electron arrangement?



- A** ${}_{19}^{39}\text{K}^+$, ${}_{19}^{41}\text{K}^-$ and ${}_{18}^{40}\text{Ar}$ only
B ${}_{17}^{35}\text{Cl}^-$, ${}_{17}^{36}\text{Cl}^+$ and ${}_{20}^{40}\text{Ca}^+$ only
C ${}_{17}^{35}\text{Cl}^-$, ${}_{18}^{40}\text{Ar}$ and ${}_{19}^{39}\text{K}^+$ only
D ${}_{17}^{36}\text{Cl}^+$, ${}_{18}^{40}\text{Ar}$ and ${}_{19}^{41}\text{K}^-$ only
E ${}_{20}^{40}\text{Ca}^+$, ${}_{18}^{40}\text{Ar}$ and ${}_{19}^{41}\text{K}^-$ only



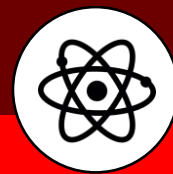
Atomic Structure

2016

- 2 Element X has the electronic structure 2, 8, 3.

Which of the following statements about this element are correct?

- 1 The element is in Group 12, Period 3 of the Periodic Table.
 - 2 The element reacts with oxygen to form a compound with the formula X_2O_3 .
 - 3 The element reacts with bromine to form a compound with the formula XBr_3 .
 - 4 The atomic number of the element is 13.
 - 5 The element is an alkali metal.
- A 1 and 5 only
- B 2 and 3 only
- C 2 and 5 only
- D 3 and 4 only
- E 1, 4 and 5 only
- F 2, 3 and 4 only



Atomic Structure

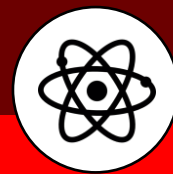
- 7 Nickel has an atomic number of 28. The mass numbers of four of its isotopes are 58, 60, 61 and 62.

Below are three statements about these isotopes of nickel.

- 1 All of them have the same chemical properties.
- 2 All of them have nuclei containing 28 protons.
- 3 One of them has a nucleus that contains 62 neutrons.

Which statement(s) is/are correct?

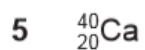
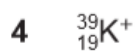
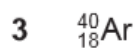
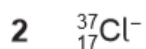
- A 1 only
- B 2 only
- C 3 only
- D 1 and 2 only
- E 1 and 3 only
- F 2 and 3 only
- G 1, 2 and 3
- H none of them



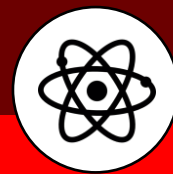
Atomic Structure

2017

6 Which of the following atoms and ions contain(s) 20 neutrons and 18 electrons?



- A 3 only
B 1 and 2 only
C 1 and 3 only
D 2 and 4 only
E 2 and 5 only
F 4 and 5 only
G 2, 4 and 5 only
H 1, 2, 3 and 4 only



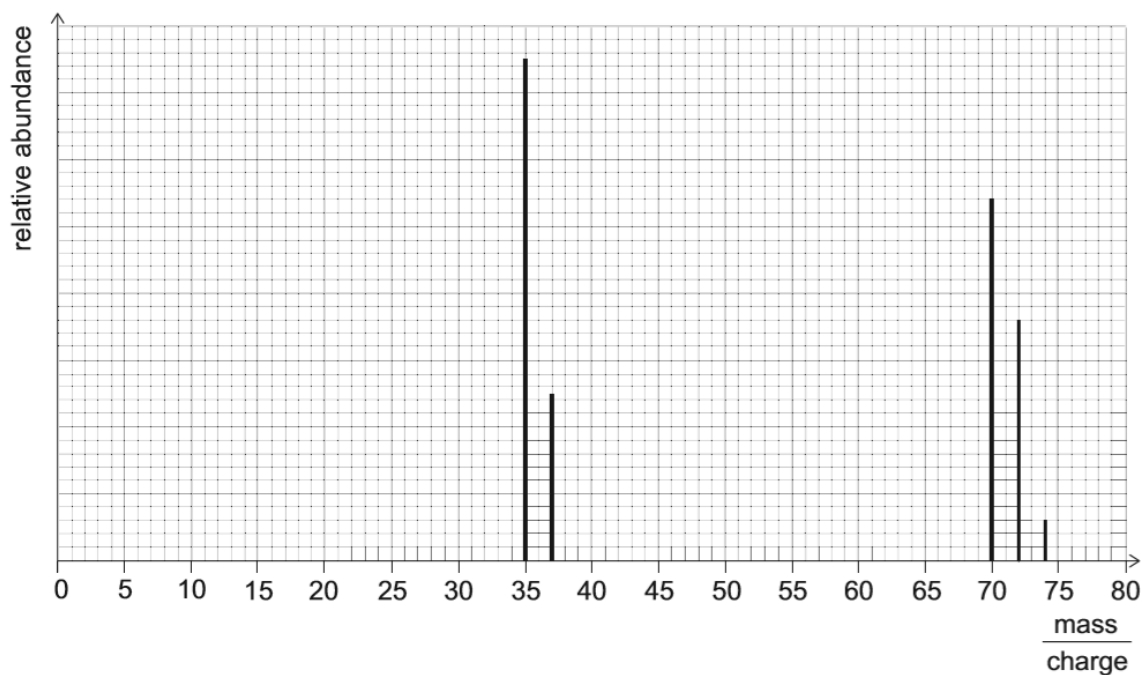
Atomic Structure

2018

- 14 The masses of atoms and molecules can be determined using a mass spectrometer. The masses can be shown as a series of peaks.

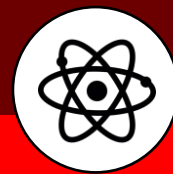
Element X exists as a diatomic molecule. The mass spectrum will show the mass of ions from individual atoms of X **and** from X_2 molecules.

The mass spectrum for element X is shown below:



How many different isotopes of X can be determined from this spectrum?

- A 1
- B 2
- C 3
- D 4
- E 5



Atomic Structure

2019

26 Diborane has the formula B_2H_6 .

Assume that boron consists of two isotopes, containing 20% $^{10}_5B$ atoms and 80% $^{11}_5B$ atoms, and that all hydrogen atoms are 1_1H .

Molecules of diborane will therefore have relative masses of 26, 27 or 28.

In what relative proportion will molecules of diborane with masses of 26, 27 and 28 occur?

- A 1:2:8
- B 1:2:16
- C 1:4:8
- D 1:4:16
- E 1:8:16
- F 1:8:64
- G 1:16:64