

SMART EXAM RESOURCES
9701 AS CHEMISTRY TOPIC QUESTIONS
TOPIC: ATOMIC STRUCTURE
SUB-TOPIC: CALCULATE SUB-ATOMIC PARTICLES
SET-1

1.1.3-Calculations-of-Sub-Atomic-Particles-Set-1

1.

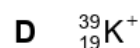
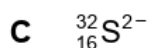
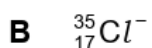
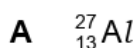
Element X has six more protons than element Y.

Which statement **must** be correct?

- A** Atoms of element Y are smaller than atoms of element X.
- B** Element X has a full shell of electrons.
- C** Element X and element Y are in the same group.
- D** Element X and element Y are in the same period.

2.

In which species are the numbers of protons, neutrons and electrons all different?



3.

L, M and N are three different elements from Period 3 of the Periodic Table.

L is the element whose atoms have three unpaired electrons in its 3p sub-shell.

M is the element with the highest electrical conductivity in the period.

N is the element with the highest melting point in the period.

Which statement about element L is correct?

A L has a higher atomic number than M and a lower atomic number than N.

B L has a lower atomic number than M and a higher atomic number than N.

C L has a lower atomic number than both M and N.

D L has a higher atomic number than both M and N.

4.

The technetium-99 isotope, ^{99}Tc , is radioactive and has been found in lobsters and seaweed near to nuclear fuel reprocessing plants.

Which statements about an atom of ^{99}Tc are correct?

1 It has 13 fewer protons than neutrons.

2 It forms $^{99}\text{Tc}^{2+}$ which has 45 electrons.

3 It has 56 nucleons.

The responses **A** to **D** should be selected on the basis of

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

No other combination of statements is used as a correct response.

5.

Use of the Data Booklet is relevant to this question.

Which statements about the phosphide ion, $^{31}\text{P}^{3-}$, and the chloride ion, $^{35}\text{Cl}^-$, are correct?

- 1 They have the same number of electrons.
- 2 They have the same number of neutrons.
- 3 They have the same number of protons.

The responses **A** to **D** should be selected on the basis of

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

No other combination of statements is used as a correct response.

6.

In 2011 an international group of scientists agreed to add two new elements to the Periodic Table. Both elements had been made artificially and are called flerovium, Fl, and livermorium, Lv.

	Fl	Lv
proton number	114	116
nucleon number	289	292

From the information about atoms in the table, which statements are correct?

- 1 One atom of Lv has one more neutron than one atom of Fl.
- 2 One Fl^{2-} ion has the same number of electrons as one atom of Lv.
- 3 One Lv^+ ion has the same number of electrons as one Fl^- ion.

The responses **A** to **D** should be selected on the basis of

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

No other combination of statements is used as a correct response.

7.

One of the most important chemical species responsible for the removal of ozone from the stratosphere is a free radical of chlorine, $^{35}\text{Cl}^{\bullet}$.

What does $^{35}\text{Cl}^{\bullet}$ contain?

	protons	neutrons	electrons
A	17	18	16
B	17	18	17
C	18	17	17
D	18	17	18

8.

The isotope cobalt-60 ($^{60}_{27}\text{Co}$) is used to destroy cancer cells in the human body.

Which statements about an atom of cobalt-60 are correct?

- 1 It contains 33 neutrons.
- 2 Its nucleus has a relative charge of 27+.
- 3 It has a different number of neutrons from the atoms of other isotopes of cobalt.

The responses **A** to **D** should be selected on the basis of

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

No other combination of statements is used as a correct response.

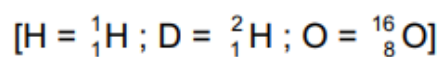
9.

In which species are the numbers of electrons and neutrons equal?

- A** ^9_4Be **B** $^{19}_9\text{F}$ **C** $^{23}_{11}\text{Na}^+$ **D** $^{18}_8\text{O}^{2-}$

10.

Which ion has more electrons than protons and more protons than neutrons?



A D^-

B H_3O^+

C OD^-

D OH^-

11.

The technetium-99 isotope (${}^{99}\text{Tc}$) is radioactive and has been found in lobsters and seaweed adjacent to nuclear fuel reprocessing plants.

Which statements are correct about an atom of ${}^{99}\text{Tc}$?

- 1 It has 13 more neutrons than protons.
- 2 It has 43 protons.
- 3 It has 99 nucleons.

The responses **A** to **D** should be selected on the basis of

A	B	C	D
1, 2 and 3 are correct	1 and 2 only are correct	2 and 3 only are correct	1 only is correct

No other combination of statements is used as a correct response.