



CHEMISTRY ONLINE  
— TUITION —

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# CHEMISTRY

**MULTIPLE CHOICE - 5**

**ATOMIC STRUCTURE**

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## **Atomic Structure - 5**

### **1) Helping Concept**

No, of neutron in Po =  $210 - 84 = 126$

No, of proton in X =  $84 - 2 = 82$

No, of neutron in X =  $206 - 82 = 124$

### **2) Helping Concept**

As electrons are progressively removed from an atom, the removal becomes more difficult due to the contraction in size and also increase in the positive charge of the species. Therefore, there is an increase in the ionisation energies. However, being a Group III element, a sudden increase in the 4th ionisation energy is expected because an electron is removed from the inner shell of the species that has an octet configuration.

### **3) Helping Concept**

The graph shows a Group 1 element since there is a large jump between the first ionisation energy and the second ionisation energy, signifying that the first electron removed is not in the same principal quantum shell as the subsequent electron, i. e. it is in the outermost shell.

#### 4) Helping Concept

There is a large difference between the  $IE_2$  and  $IE_3$ , followed by  $IE_{10}$   $IE_{11}$ .

This shows that the 2nd and 3rd electrons are in different quantum shell.

Hence, we can deduce that the element has 2 valence electrons.

#### Section B

For each of the questions in this section, one or more of the three numbered statements 1 to 3 may be correct.

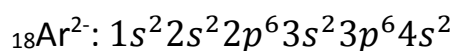
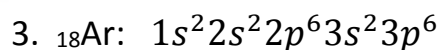
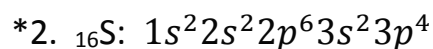
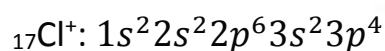
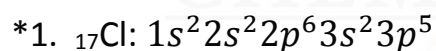
Decide whether each of the statements is or is not correct (you may find it helpful to put a tick against the statements that you consider to be correct)

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) Helping Concept



*Note:  $\text{Ar}^{2+}$  would be an answer.*

## 6) Helping Concept

1 The nucleon number, or mass number, is the number of protons and neutrons in the nucleus. The neutron number is the number of neutrons in the nucleus.

\*2. The proton number, or atomic number, is the number of protons in the nucleus.

\*3 For a neutral atom, the number of electrons is equal to the number of protons.

## 7) Helping Concept

\*1. Number of neutrons =  $60 - 27 = 33$

\*2. Number of protons = 27

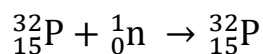
\*3. Isotopes have the same number of proton but different number of neutrons.

## 8) Helping Concept

\*1. Number of neutrons in  $^{32}_{15}\text{P} = 32 - 15 = 17$

Number of neutrons in  $^{32}_{16}\text{S} = 32 - 16 = 16$

2. Adding a neutron to  $^{32}_{15}\text{P}$  still gives a phosphorus isotope because the number of protons (which gives the identity of an element) is still the same.



3.  $^{32}_{15}\text{P}$  contains 15 electrons and  $^{32}_{16}\text{S}$  contains 16 electrons. The number of electrons in a neutral atom is equal to the atomic number.

## 9) Helping Concept

- \*1. Every orbital (not only the s orbital) can accommodate a maximum of 2 electrons with opposite spins.
- \*2. Transition elements arise from the filling of d orbitals.
- \*3. In the same principal quantum number, the energy of the orbitals increases from  $s < p < d$ .

## 10) Helping Concept

- \*1. S has a  $p^4$  configuration so that its first I. E. is lower than that of P due to electronic repulsion between the two 3p electrons in the same orbital.
- 2. Both P and S have the same number of inner electrons.
- 3. Both P and S have the same principal quantum number ( $n = 3$ ).

## 11) Helping Concept

*Let X be  ${}_nM^+$  (it has  $(n - 1)$  number of electrons). Then Y will be  ${}_{n+1}N^{2+}$  so that it also has a  $(n - 1)$  number of electrons.*

- \*1. *Since X has a lower nuclear charge, the electrons are more loosely bound and hence it has a larger radius.*
- 2 *X requires less energy because it is larger and it has a lower positive cationic charge.*
- 3 *Y releases more energy because it has a stronger attraction for electron than does x due to its smaller radius and higher cationic charge.*



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
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