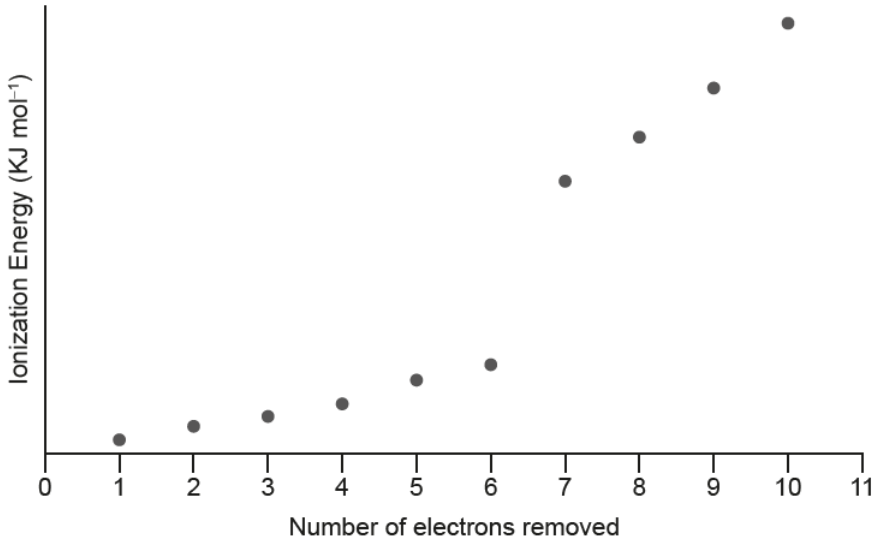
the electron cloud [6 marks]

1. [Maximum mark: 1]

The graph represents the first ten ionization energies (IE) of an element.



What is the element?

A. Cl

B. Ne

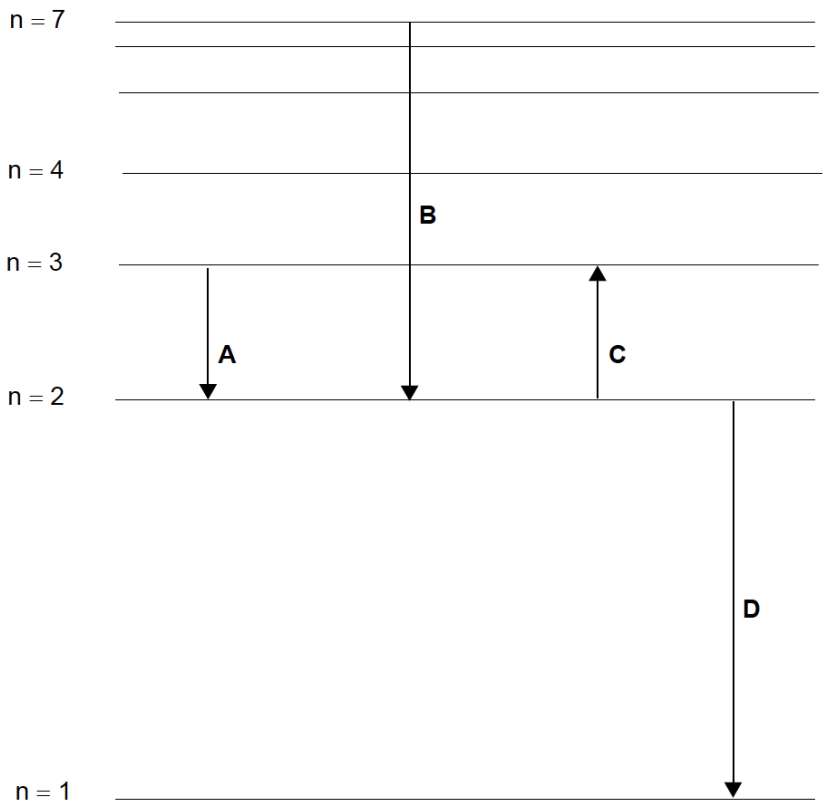
C. O

D. S [1]

2. [Maximum mark: 1]

Which electron transition corresponds to the red line in the hydrogen line emission spectrum?

diagram not to scale



[1]

3. [Maximum mark: 1]

What is the maximum number of electrons that can occupy the fourth shell in the atom ($n = 4$)?

A. 8

B. 18

C. 32

D. 36

[1]

4. [Maximum mark: 1]
How are the lines in the emission spectrum of hydrogen produced?

A. Electrons move to higher energy levels absorbing photons.

B. Electrons move to lower energy levels releasing photons.

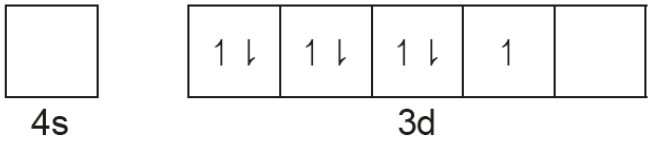
C. Electrons move to higher energy levels releasing photons.

D. Electrons move to lower energy levels absorbing photons. [1]

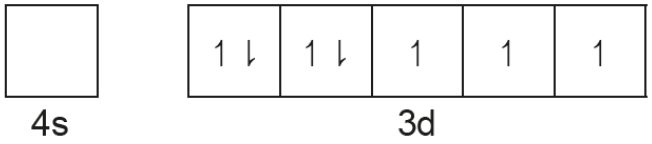
5. [Maximum mark: 1]
In which diagram are the 4s and 3d orbitals of the Co^{2+} ion correctly filled with electrons?

[1]

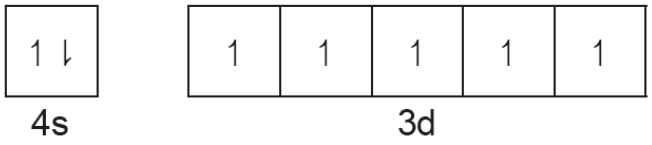
A.



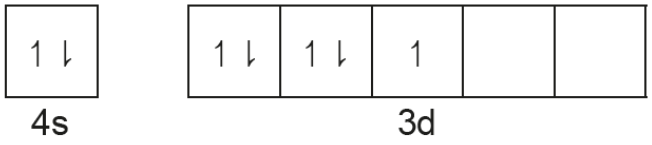
B.



C.



D.



6. [Maximum mark: 1]

The first three ionization energies for two elements, X and Y, are:

	Ionization energies ($kJ\,mol^{-1}$)		
	First	**Second**	**Third**
X	900	1757	14849
Y	1086	2350	4620

Which pair of elements represent X and Y, respectively?

A. Lithium and beryllium

B. Lithium and carbon

C. Beryllium and carbon

D. Helium and beryllium [1]