



IONS

- 1) Complete the table below to show whether particles are atoms or ions, and for ions their charge.

Number and overall charge of protons	11+	11+	16+	4+	13+	18+	17+	15+	21+	1+	32+	35+
Number and overall charge of electrons	11-	10-	18-	2-	10-	18-	18-	18-	18-	0-	32-	36-
Atom or ion?	atom	ion	ion	ion	ion	atom	ion	ion	ion	ion	atom	ion
Overall charge		1+	2-	2+	3+		1-	3-	3+	1+		1-

- 2) Complete the table below to show the electronic structure of some common ions. The first one has been done for you. You will need to use the Periodic Table to help.

Ion	Cl^-	Li^+	F^-	Mg^{2+}
Protons	17	3	9	12
Electrons	18	2	10	10
Electron structure				
Electron structure	2,8,8	2	2,8	2,8

Ion	K^+	S^{2-}	H^+	P^{3-}
Protons	19	16	1	15
Electrons	18	18	0	18
Electron structure				
Electron structure	2,8,8	2,8,8	0	2,8,8

- 3) Complete the table to show the number of electrons and electron structure of the following ions and the noble gas atoms. **All the ions are from question 2.**

Ion or noble gas atom	He	Ne	Ar	Cl^-	Li^+	F^-	Mg^{2+}	K^+	S^{2-}	P^{3-}
Number of electrons	2	10	18	18	2	10	10	10	18	18
Electron structure	2	2,8	2,8,8	2,8,8	2	2,8	2,8	2,8,8	2,8,8	2,8,8

4) What is the link between the electron structure of ions and noble gas atoms?

Ions have the same electron structure as noble gas atoms (e.g. 2; 2,8; 2,8,8)

5) Complete the following table about some atoms and ions. The first row has been done for you.

Particle	Atom or ion	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons	Electron structure
${}_{11}^{23}\text{Na}^+$	ion	11	23	11	12	10	2,8
${}_{11}^{23}\text{Na}$	atom	11	23	11	12	11	2,8,1
${}_{20}^{40}\text{Ca}^{2+}$	ion	20	40	20	20	18	2,8,8
${}_{9}^{19}\text{F}$	atom	9	19	9	10	9	2,7
${}_{17}^{37}\text{Cl}^-$	ion	17	37	17	20	18	2,8,8
${}_{17}^{35}\text{Cl}^-$	ion	17	35	17	18	18	2,8,8
${}_{19}^{39}\text{K}^+$	ion	19	39	19	20	18	2,8,8
${}_{18}^{40}\text{Ar}$	atom	18	40	18	22	18	2,8,8
${}_{1}^1\text{H}^+$	ion	1	1	1	0	0	0
${}_{4}^9\text{Be}^{2+}$	ion	4	9	4	5	2	2