

1. Write the electron configurations for the following.

a) P (15)	$1s^2 2s^2 2p^6 3s^2 3p^3$
b) Ti (22)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$
c) Co (27)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$
d) Br (35)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$
e) Sr (38)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2$
f) Ar (18)	$1s^2 2s^2 2p^6 3s^2 3p^6$
g) K (19)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
h) Cd (48)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10}$
i) Ca (20)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
j) Xe (54)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$
k) Cs (55)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1$
l) Pb (82)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^2$
m) Ga (31)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^1$
n) Mn (25)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$
o) Zr (40)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^2$

2. Write the electron configurations for the following using core notation.

a) P	$[\text{Ne}] 3s^2 3p^3$
b) Ti	$[\text{Ar}] 4s^2 3d^2$
c) Co	$[\text{Ar}] 4s^2 3d^7$
d) Br	$[\text{Ar}] 4s^2 3d^{10} 4p^5$
e) Sr	$[\text{Kr}] 5s^2$
f) Ar	$[\text{Ne}] 3s^2 3p^6$

g) K	$[\text{Ar}] 4s^1$
h) Cd	$[\text{Kr}] 5s^2 4d^{10}$
i) Ca	$[\text{Ar}] 4s^2$
j) Xe	$[\text{Kr}] 5s^2 4d^{10} 5p^6$
k) Cs	$[\text{Xe}] 6s^1$
l) Pb	$[\text{Xe}] 6s^2 4f^{14} 5d^{10} 6p^2$
m) Ga	$[\text{Ar}] 4s^2 3d^{10} 4p^1$
n) Mn	$[\text{Ar}] 4s^2 3d^5$
o) Zr	$[\text{Kr}] 5s^2 4d^2$

3. Write the electron configurations for the following ions, using core notation.

a) H^-	$1s^1 + 1e^- = 1s^2$
b) Sr^{2+}	$[\text{Kr}] 5s^2 = 2e^- + [\text{Kr}]$ or $[\text{Ar}] 4s^2 3d^{10} 4p^6$
c) Br^-	$[\text{Ar}] 4s^2 3d^{10} 4p^5 + 1e^- = [\text{Ar}] 4s^2 3d^{10} 4p^6$
d) N^{3+}	$[\text{He}] 2s^2 2p^3 = 3e^- + [\text{He}] 2s^2$
e) Ti^{2+}	$[\text{Ar}] 4s^2 3d^2 = 2e^+ + [\text{Ar}] 3d^2$
f) N^{2-}	$[\text{He}] 2s^2 2p^3 + 2e^- = [\text{He}] 2s^2 2p^5$
g) Mn^{2+}	$[\text{Ar}] 4s^2 3d^5 = 2e^- + [\text{Ar}] 3d^5$
h) Ge^{4+}	$[\text{Ar}] 4s^2 3d^{10} 4p^2 = 4e^- + [\text{Ar}] 3d^{10}$
i) Fe^{3+}	$[\text{Ar}] 4s^2 3d^6 = 3e^- + [\text{Ar}] 3d^5$
j) Ge^{2+}	$[\text{Ar}] 4s^2 3d^{10} 4p^2 = 2e^- + [\text{Ar}] 4s^2 3d^{10}$
k) Ru^{3+}	$[\text{Kr}] 5s^2 4d^6 = 3e^{\#-} + [\text{Kr}] 4d^5$
l) Sb^{3+}	$[\text{Kr}] 5s^2 4d^{10} 5p^3 = 3e^- + [\text{Kr}] 5s^2 4d^{10}$

4. Write the electron configurations for the following. How many valence electrons does each one contain?

a) O	$1s^2 2s^2 2p^4 = [\text{He}] 2s^2 2p^4$	6
b) P	$1s^2 2s^2 2p^6 3s^2 3p^3 = [\text{Ne}] 3s^2 3p^3$	5
c) V	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3 = [\text{Ar}] 4s^2 3d^3$	5
d) Ca	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 = [\text{Ar}] 4s^2$	2
e) Xe	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$	0
f) Hg	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 (6s^2 4f^{14} 5d^{10}) [\text{Xe}]^+$	2
g) Te	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^4 = [\text{Kr}] 5s^2 4d^{10} 5p^4$	6
h) Cl ⁻	$[\text{Ne}] 3s^2 3p^5 + 1e^- = [\text{Ne}] 3s^2 3p^6$	0
i) I ⁵⁺	$[\text{Kr}] 5s^2 4d^{10} 5p^5 - 5e^- = [\text{Kr}] 5s^2 4d^{10}$	2
j) Xe ²⁺	$[\text{Kr}] 5s^2 4d^{10} 5p^6 - 2e^- = [\text{Kr}] 5s^2 4d^{10} 5p^4$	6
k) Zn ²⁺	$[\text{Ar}] 4s^2 3d^{10} - 2e^- = [\text{Ar}] 3d^{10}$	0
l) Ge ⁴⁺	$[\text{Ar}] 4s^2 3d^{10} 4p^2 - 4e^- = [\text{Ar}] 3d^{10}$	0
m) Tc ⁴⁺	$[\text{Kr}] 5s^2 4d^5 - 4e^- = [\text{Kr}] 4d^3$	3
n) Sb ³⁺	$[\text{Kr}] 5s^2 4d^{10} 5p^3 - 3e^- = [\text{Kr}] 5s^2 4d^{10}$	2
o) O ⁻	$[\text{He}] 2s^2 2p^4 + 1e^- = [\text{He}] 2s^2 2p^5$	7
p) Nb ³⁺	$[\text{Kr}] 5s^2 4d^3 - 3e^- = [\text{Kr}] 4d^2$	2