Answer to Question #50632, Chemistry, Other

Which of the following three sets consist of atoms or ions with the same electron configuration in the ground state?
(I) O$^2^-$, Ne, and Mg$^{2+}$
(II) Ni, Cu$^+$, and Zn$^{2+}$
(III) Hg, Tl$^+$, and Pb$^{2+}$

Solution:
(I) O$^2^-$ [He] 2s$^2$ 2p$^6$
Ne [He] 2s$^2$ 2p$^6$
Mg$^{2+}$ [Ne] 3s$^0$ or [He] 2s$^2$ 2p$^6$

(II) Ni [Ar] 3d$^8$ 4s$^2$
Cu$^+$ [Ar] 3d$^{10}$ 4s$^0$
Zn$^{2+}$ [Ar] 3d$^{10}$ 4s$^0$

(III) Hg [Xe] 4f$^{14}$ 5d$^{10}$ 6s$^2$
Tl$^+$ [Xe] 4f$^{14}$ 5d$^{10}$ 6s$^2$ 6p$^0$
Pb$^{2+}$ [Xe] 4f$^{14}$ 5d$^{10}$ 6s$^2$ 6p$^0$

Answer:
The same electron configuration in the ground state has (I) O$^2^-$, Ne, and Mg$^{2+}$ and (III) Hg, Tl$^+$, and Pb$^{2+}$.

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