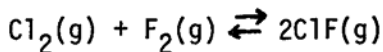


- Which atom has the largest first ionization energy?
(1) Ne (2) Ar (3) Cl (4) S
- Which set of quantum numbers is correct and consistent with $n = 4$?
(1) $\ell = 3, m_\ell = -3, m_s = +1/2$
(2) $\ell = 4, m_\ell = 2, m_s = -1/2$
(3) $\ell = 2, m_\ell = 3, m_s = +1/2$
(4) $\ell = 3, m_\ell = -2, m_s = +1$
- The ground-state electronic configuration of the manganese (Mn) atom is
(1) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^5$
(2) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7$
(3) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^5$
(4) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$
- The shape which most closely describes the NF_3 molecule is
(1) octahedral. (3) trigonal pyramidal
(2) trigonal planar. (4) tetrahedral.
- Given the reaction,
$$4\text{H}_2\text{O} + 3\text{Fe} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$$
how many moles of Fe is needed to produce 10.0 moles of H_2 ?
(1) 7.50 moles (3) 15.0 moles
(2) 13.3 moles (4) 30.0 moles

6. The pH of a 0.03 M HCl(aq) solution is
 (1) 1.5 (2) 2.5 (3) 3.5 (4) 12.5

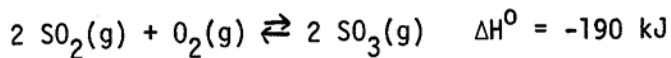
7. Which substance dissolves in water to form an acidic solution?
 (1) KCl (2) Na₃PO₄ (3) NH₄Cl (4) Na₂CO₃

8. A mixture of 0.60 mol Cl₂(g) and 0.40 mol F₂(g) was allowed to come to equilibrium in a 1000-mL flask. If 2x represents the molar concentration of ClF(g) at equilibrium, which expression represents the equilibrium constant?



- (1) $\frac{x^2}{(0.60 - x)(0.40 - x)}$
 (2) $\frac{(2x)^2}{(0.60 - x)(0.40 - x)}$
 (3) $\frac{2x}{(0.60 - x)(0.40 - x)}$
 (4) $\frac{2x^2}{(0.60 - x)(0.40 - x)}$

9. For the reaction



carried out at constant volume, the concentration of O₂ at equilibrium will increase if

- (1) SO₂ is added to the system.
 (2) SO₃ is added to the system.
 (3) the temperature of the system is lowered.
 (4) an inert gas is added to the system.

Answers: 1: (1) 2: (1) 3: (4) 4: (3) 5: (1) 6: (1) 7: (3) 8: (2) 9: (2)