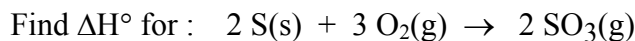
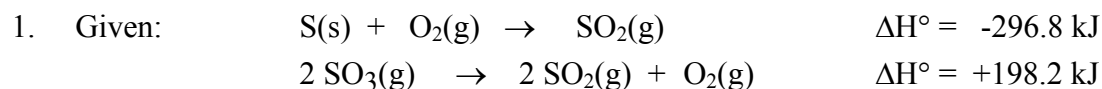


CHE 120 Test 3 November 5, 2004

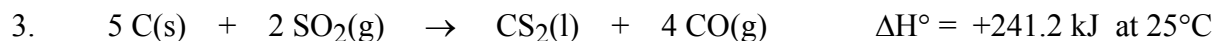
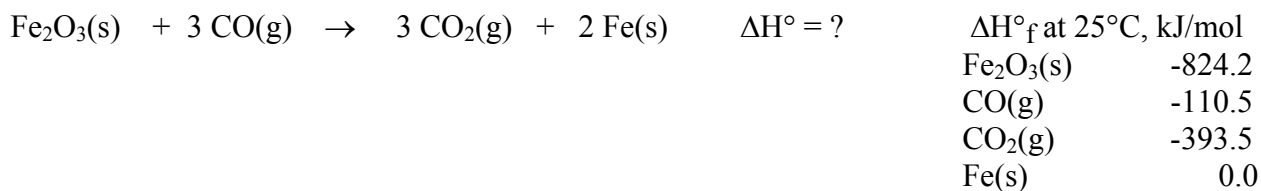
I. Short Answer

- _____ 1. Which of the following elements have their outer electrons in the same shell?
A. Rb, Ag, I, Xe B. Na, Mg, Ca, K C. O, S, Se, Te D. He, F, S, As
- _____ 2. Which of the following elements have the same electron configuration in their outer shell?
A. Rb, Ag, I, Xe B. Na, Mg, Ca, K C. O, S, Se, Te D. He, F, S, As
- _____ 3. The formation of chemical bonds A. requires energy B. releases energy
- _____ 4. Electrons move around the nucleus in orbits just as planets move around the sun. T(true)/F(false)
- _____ 5. At 25°C ΔH°_f is zero for
A. N(g) B. N₂(g) C. NaNO₃(s) D. all three E. none of the three
- _____ 6. The process H₂O(g) → H₂O(l) is A. endothermic B. exothermic
- _____ 7. An electron in a hydrogen atom could go from the third energy level to the fifth energy level by
A. absorbing a photon B. emitting a photon
- _____ 8. The energy of the photon in #7 would be equal to
A. the energy of an electron in the third energy level.
B. the energy of an electron in the fifth energy level.
C. the difference in energy between the third and the fifth energy level.
D. the sum of the energies in the third and the fifth energy level.
- _____ 9. Which orbitals have a dumbbell shape? A. s B. p C. d D. f E. g F. s, p, d, and f
- _____ 10. A single orbital can hold at most _____ electrons.
A. 1 B. 2 C. 6 D. 8 E. 18 F. unlimited
- _____ 11. When ammonium chloride is dissolved in water, the temperature of the solution drops. Therefore the process of dissolving ammonium chloride in water is A. endothermic B. exothermic
- _____ 12. In a given atom, electrons are further from the nucleus on the average in the _____ orbital.
A. 2s B. 5p C. 3d D. 4f
- _____ 13. An atom with unpaired electrons is A. diamagnetic B. paramagnetic C. ferromagnetic
14. Which member of each series has the largest radius?
(a) Li, Na, K _____ (b) Li, N, F _____ (c) Cu, Cu²⁺ _____
15. Which member of each series has the largest ionization energy?
(a) Li, Na, K _____ (b) Li, N, F _____
16. Consider B, Al, F, Cl
(a) Which has the largest radius? _____ (b) Which has the smallest ionization energy? _____
17. The outer-shell configuration for elements in Group 16 (VIA) is _____.
18. The lanthanides (elements 58-71) generally differ in the number of electrons in the _____ (4f, 4d, 5f, 5p, 5s, 6s, 6p) orbitals but their outer electrons are in the _____ (4f, 4d, 5f, 5p, 5s, 6s, 6p) orbitals.
- _____ 19. Which has the most energy per photon? A. red light B. blue light

II. Numerical problems. Show your work to receive full credit.

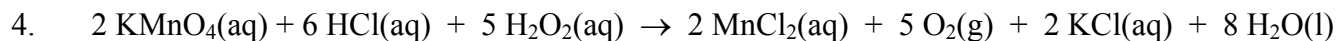


2. Calculate ΔH° for the following reaction at 25°C , given the data at the right.

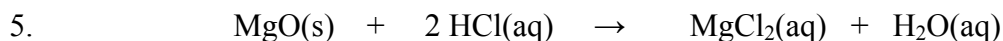


(a) The reaction is _____ (endothermic, exothermic)

(b) When 35.0 g of carbon reacts with excess $\text{SO}_2(\text{g})$ at 25°C and a constant pressure of 1.00 atm, _____ kJ should be _____ (released, absorbed).



It takes 15.50 mL of 0.1020 M KMnO_4 to titrate 25.00 mL of a sample of $\text{H}_2\text{O}_2(\text{aq})$ in accordance with the equation given above. What is the molarity of the H_2O_2 solution?



It takes 14.20 mL of 0.1200 M HCl to completely react with the MgO in a sample of an antacid in accordance with the equation given above. What is the mass of the MgO in the sample?

IV. Electron Configurations

1. Write the ground-state electron configuration, the number of unpaired electrons and the number of electrons in the outer shell for each of the following. Noble gas abbreviations may be used for all but the first.

(a) nickel, Ni

electron configuration: _____

unpaired electrons: _____ # electrons in the outer shell: _____

(b) nickel(II) ion, Ni^{2+}

electron configuration: _____

unpaired electrons: _____ # electrons in the outer shell: _____

(c) germanium, Ge

electron configuration: _____

unpaired electrons: _____ # electrons in the outer shell: _____

Scratch Page