ACS Practice Test 1

Acids & Bases:

1. All are examples of Lewis acid–base reactions ***except***

   (A) $Cu^{2+}_{(aq)} + 4NH_{3(aq)} \rightleftarrows [Cu(NH_3)_4]^{2+}_{(aq)}$

   (B) $HCl_{(g)} + NH_{3(g)} \rightarrow NH_4Cl_{(s)}$

   (C) $H^{+}_{(aq)} + OH^{-}_{(aq)} \rightleftarrows H_2O_{(l)}$

   (D) $2Na_{(s)} + Cl_{2(g)} \rightarrow 2NaCl_{(s)}$

2. According to the Lewis definition, an acid is a species
   (A) having a hydrogen ion. (B) donating a pair of electrons.
   (C) accepting a pair of electrons. (D) accepting a hydrogen ion.

3. All are potential Lewis bases ***except***
   (A) NH_3 (B) H_2O (C) CH_4 (D) CN^-

4. Which hydrated metal ion is most acidic under conditions of equal molar concentration in water?
   (A) Al^{3+} (B) Ba^{2+} (C) K^+ (D) Zn^{2+} (E) Ag^+

5. Which element in Group 5A forms the most basic oxide?
   (A) N (B) P (C) As (D) Sb (E) Bi

Atomic Structure:

6. In what respect does an atom of magnesium differ from a magnesium ion (Mg^{2+})?
(A)The ion has a more stable electronic arrangement than the atom.
(B)The positive charge on the nucleus of the ion is two units greater than the nuclear charge on the atom.
(C)The ion has two more protons than the atom.
(D)The ion will react more readily with free Cl_2.
(E)The ion has two more planetary electrons than the atom.

7. A certain atom has the symbol $^{148}_{73}\mathbf{Px}$. What does this symbol tell about an atom of the element?
   (A) It has 148 electrons. (B) It has a valence of 4.
   (C) It has 221 protons in the nucleus. (D) It has 75 neutrons in the nucleus.
   (E) Its atomic mass is 73 u.

8. The atomic mass of an element is 32.07 u and its atomic number is 16. The number of protons contained in the nucleus of an atom of this element is
   (A) 16 (B) 31 (C) 32 (D) 48

9. The atomic mass of an element is 32.07 u and its atomic number is 16. The element forms a simple ion. The ion will most likely have a charge of
   (A) 1– (B) 2– (C) 3+ (D) 1+

10. The nucleus of which atom contains seven neutrons?

Atom **A**	*n* = 1	*n* = 2	*n* = 3
M = 24, *Z* = 12	2*e*	8*e*	2*e*

Atom **B**	*n* = 1	*n* = 2	*n* = 3
M = 15, *Z* = 7	2*e*	5*e*	

Atom **C**	*n* = 1	*n* = 2	*n* = 3
M = 17, *Z* = 10	2*e*	8*e*	

Atom **D**	*n* = 1	*n* = 2	*n* = 3
M = 7, *Z* = 3	2*e*	1*e*	

Atom **E**	*n* = 1	*n* = 2	*n* = 3
M = 34, *Z* = 17	2*e*	8*e*	7*e*

(A) **A** (B) **B** (C) **C** (D) **D** (E) **E**

Bonding:

11. In which pair of compounds should the first member be more covalent than the second member?
(A) TlCl, $TlCl_3$ (B) SnI_4, SnF_4 (C) LiF, BF_3 (D) SnF_4, CF_4

12. Which is the most complete and best description of a covalent bond?
(A)a system of two nuclei with a pair of electrons located exactly midway between both nuclei
(B)the attractive force between two atoms of opposite charge
(C)a donor bond in which one atom donates an unshared pair to the other
(D)a system of two nuclei where each atom donates one electron to the other atom, thus forming a bond

13. Which pair of elements is most likely to react to form a covalently bonded species?
(A) P and O (B) Ca and O (C) K and S (D) Zn and C

14. Which chloride should exhibit the most covalent type of bond?
(A) NaCl (B) KCl (C) $CaCl_2$ (D) $BaCl_2$ (E) $BeCl_2$

15. The compound of which two elements is most likely to involve covalent bonding?

Electronegativities of Unknown Elements	
Q 0.9	**X** 3.0
R 1.0	**Z** 4.0
T 2.8	

(A)**Q** and **Z** (B)**R** and **T** (C)**T** and **X** (D)**R** and **X** (E)**R** and **Z**

Electrochemistry:

16. Chromium metal can be plated from an acidic solution of CrO_3.

$$CrO_{3(aq)} + 6H^+_{(aq)} + 6e^- \rightarrow Cr_{(s)} + 3H_2O$$

How many grams of chromium will be plated by the passage of 19,300 C (coulombs)?
(A) 10.4 (B) 5.19 (C) 1.73 (D) 0.20

17. What time is required to plate 2.08 g of copper at a constant current flow of 1.26 A?

Atomic Molar Mass	
Cu	63.5 g·mol^{-1}

$$Cu^{2+}_{(aq)} + 2e^- \rightleftarrows Cu_{(s)}$$

(A) 41.8 min (B) 83.6 min (C) 128 min (D) 4820 min

18. Nickel is a transition element and has a variable valence. Using a nickel salt, 2 *F* (faradays) plate out 39.2 g of nickel. What ions are in the solution of this salt?

Atomic Molar Mass	
Ni	58.7 g·mol^{-1}

(A) Ni^+ (B) Ni^{2+} (C) Ni^{3+} (D) $Ni^{2/3+}$

19. A given amount of electric charge deposits 2.159 g of silver from an Ag^+ solution. What mass of copper from a Cu^{2+} solution will be deposited by the same quantity of electric charge?

Atomic Molar Masses	
Ag	107.9 g·mol^{-1}
Cu	63.5 g·mol^{-1}

(A) 0.635 g (B) 1.97 g (C) 2.54 g (D) 127 g

20. If each of these ions were reduced to metal with one coulomb, which would yield the greatest mass?

(A) $Cu^{2+}_{(aq)}$ (B) $Ag^{+}_{(aq)}$ (C) $Hg^{2+}_{(aq)}$ (D) $Cu^{+}_{(aq)}$

Equilibrium:

21. Which is a proper description of chemical equilibrium?
(A)The frequencies of reactant and of product collisions are identical.
(B)The concentrations of products and reactants are identical.
(C)The velocities of product and reactant molecules are identical.
(D)Reactant molecules are forming products as fast as product molecules are reacting to form reactants.
(E)The numbers of moles of reactants and products are equal.

22. When equilibrium has been reached in the reaction $\mathbf{AE} + \mathbf{CD} \rightleftarrows \mathbf{CE} + \mathbf{AD} + x$ kJ in which all substances are in solution,
(A) adding **AE** will increase the concentration of **CE** but not of **AD**.
(B) adding **CD** will increase the concentration of both **AE** and **AD**.
(C) heating will increase the concentration of both **AE** and **CE**.
(D) escape of some **AD** by volatilization will increase the concentration of **CE**.
(E) doubling the pressure will increase the concentration of **CE**.

23. Given the reaction $2\mathbf{X}_{(g)} + \mathbf{Y}_{(g)} \rightleftarrows 2\mathbf{Z}_{(g)}$ $\Delta H = -335$ kJ which combination of pressure and temperature gives the highest yield of **Z** at equilibrium?
(A) 1000 atm and 500 °C (B) 500 atm and 500 °C
(C) 1000 atm and 100 °C (D) 500 atm and 100 °C
(E) catalyst, 500 atm and 100 °C

24. The reaction for the formation of ammonia by direct combination is

$$N_2 + 3H_2 \rightleftarrows 2NH_3 \qquad \Delta H = -92 \text{ kJ}$$

Which operation will increase the yield of ammonia in the equilibrium mixture?

(A) doubling the concentration of hydrogen (B) reducing the total pressure
(C) raising the temperature (D) increasing the reaction time
(E) adding a catalyst

25. Chemical equilibrium is the ***result*** of

(A) a decrease in speed of reaction.
(B) the unavailability of one of the reactants.
(C) a stoppage of further reaction.
(D) opposing reactions attaining equal speeds.
(E) formation of products equal in mass to the reactants.

Formulas & Equations:

26. Complete and balance the equation for the combustion of ZnS in excess oxygen

$$\textbf{?}\ ZnS + \textbf{?}\ O_2 \rightarrow \textbf{?}\ ZnO + \textbf{?}$$

Use no fractional coefficients. The number of moles and the formula of the product containing S are

(A) 2S (B) S_8 (C) SO_2 (D) $2SO_2$ (E) SO_3

27. Balance the equation for the reaction, using no fractional coefficients.

$$\textbf{?}\ P + \textbf{?}\ HNO_3 + \textbf{?}\ H_2O \rightarrow \textbf{?}\ H_3PO_4 + \textbf{?}\ NO$$

The ratio of the moles of oxidizing agent to moles of reducing agent in the balanced equation is

(A) 5 to 2. (B) 5 to 3. (C) 3 to 5. (D) 2 to 5. (E) 1 to l.

28. Balance the equation for the reaction, using no fractional coefficients.

$$\textbf{?}\ Cr_2O_3 + \textbf{?}\ KOH + \textbf{?}\ O_2 \rightarrow \textbf{?}\ K_2CrO_4 + \textbf{?}\ H_2O$$

The coefficient of KOH in the balanced equation is

(A) 2 (B) 4 (C) 6 (D) 8 (E) 10

29. Why is the equation incorrect? $Mg_3 + N_2 \rightarrow Mg_3N_2$

(A) Some of the subscripts are incorrectly used.
(B) The equation is not balanced.
(C) The valence of the nitride ion is incorrect.
(D) The valance of the magnesium ion is incorrect.
(E) The coefficient of N_2 is incorrect.

30. A lithium carbide (Li_xC_y) reacts with water as follows:

$$Li_xC_y + H_2O \rightarrow LiOH + C_2H_2 \text{ (unbalanced)}$$

What is the simplest formula of the carbide?

(A) LiC (B) Li_2C (C) LiC_2 (D) Li_3C_4

Gases:

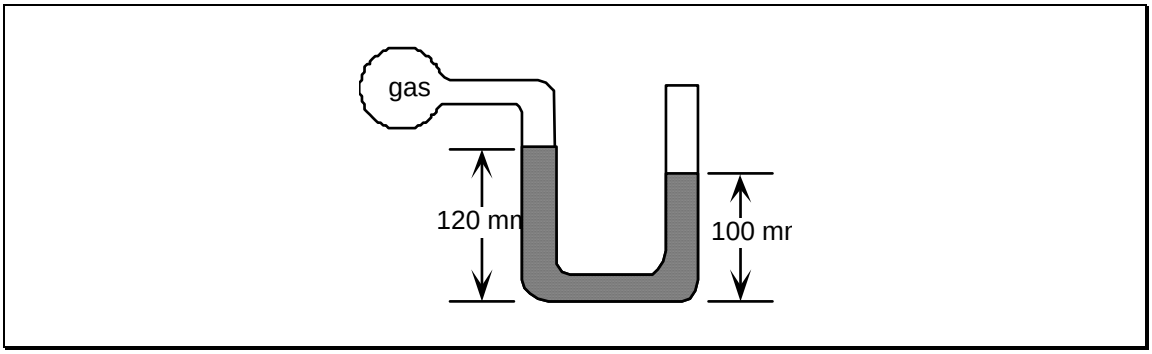
31. In which gas are the forces between molecules strongest?

(A) Ne (B) CH_4 (C) O_2 (D) H_2O

32. The density of a gas is 1.96 g·L^{-1} at 1.00 atm and 0 °C. What is the density of this gas at 0.855 atm and 25.0 C?
(A)0.00276 g·L^{-1} (B)0.651 g·L^{-1} (C)1.54 g·L^{-1} (D)1.82 g·L^{-1}

33. A 1200 mL sample of helium gas is at a pressure of 350 mmHg and a temperature of 300 K. What volume will this gas sample occupy if the pressure is increased to 700 mmHg and the temperature is increased to 400 K?
(A) 450 mL (B) 800 mL (C) 1650 mL (D) 3200 mL

34. The height of the mercury in the right arm open to atmospheric pressure (760 mmHg) is 100 mm and the height in the left arm is 120 mm.



What is the pressure of the gas in the bulb?
(A)20 mmHg (B)640 mmHg (C)740 mmHg (D)780 mmHg

35. A sample of nitrogen at pressure *P* is contained in a sealed syringe with a movable piston. If the volume of the sample were doubled and the absolute temperature tripled, the new pressure of the gas would be (A) 6.0 *P* (B) 5.0 *P* (C) 3.5 *P* (D) 1.5 *P*

Introductory Concepts:

36. When equal volumes of 0.1 M solutions of HCl and NaOH are mixed, the ***total number*** of ions present will be approximately
(A) twice as great as before mixing. (B) the same as before mixing.
(C) half as great as before mixing. (D) 10^{-7} times as great as before mixing.
(E) 10^{-14} times as great as before mixing.

37. Oxygen and ozone have the formulas O_2 and O_3 respectively. They are
(A) isomers. (B) isobars. (C) allotropes. (D) isotopes.

38. Which instrument is directly used to determine the relative masses of atoms?
(A) spectroscope (B)Geiger counter (C)mass spectrograph (D)microbalance
(E)electron microscope

39. An enclosed mixture has a mass of 12.69723±0.00003 g, and after a chemical change occurs the mixture has a mass of 12.69724±0.00003 g. These results show that
(A)the law of conservation of matter is not always true.
(B)the law of conservation of mass is not always true.
(C)the mass of the enclosed mixture remains constant within the experimental error of the measurement.
(D)the mass of the enclosed mixture does not change.
(E)the mass of the enclosed mixture increased.

40. The mechanism of electrical conduction in metals is thought to be
(A) the same as that in solid electrolytes. (B) the same as that in molten electrolytes.
(C) dependent on the movement of ions. (D) dependent on the movement of valence electrons.

Kinetics:

41. Which is ***not*** a characteristic of ionic substances?
(A) Their reactions are generally extremely slow.
(B) They conduct an electric current when fused.
(C) Those having a common ion exhibit some similar chemical properties.
(D) They lower the vapor pressure of water when dissolved in it.
(E) They raise the boiling point of water when dissolved in it.

42. The addition of a catalyst in a chemical reaction
(A) increases the concentration of products at equilibrium.
(B) increases the fraction of reactant molecules with a given kinetic energy.
(C) provides an alternate path with a different activation energy.
(D) lowers the enthalpy change in the overall reaction

43. Which procedure will lower the activation energy for a particular reaction?
(A) subdividing the reactants (B) increasing the reactant concentrations
(C) increasing the temperature (D) adding a catalyst

44. Which statement most accurately describes the behavior of a catalyst?
(A) A catalyst increases the ΔG of a reaction and hence the forward rate.
(B) A catalyst reduces the ΔH of a reaction and hence the temperature needed to produce products.
(C) A catalyst reduces the activation energy for a reaction and increases the rate of a reaction.
(D) A catalyst increases the equilibrium constant and final product concentrations.

45. A catalyst will
(A)alter the pathway (mechanism) of a chemical reaction. (B)increase ΔH for the reaction.
(C)decrease ΔH for the reaction. (D)decrease E_a for the forward reaction only.

Laboratory:

46. A student determines the mass of an object using a triple beam balance which is sensitive to 0.01 g. When the beam balances, the rider on one beam is in the notch marked 60 g, the rider on another beam in the notch marked 7 g, and the rider on the third beam, which is graduated by hundredths of a gram, is at zero. Considering significant figures, what mass should be recorded?
(A) 67.0 g (B) 76.0 g (C) 67.00 g (D) 76.000 g (E) 67.000 g

47. Which instrument is used to measure the gain or loss of heat?
(A)manometer (B)hydrometer (C)calorimeter (D)barometer (E)voltmeter

48. What would be the most rapid method of preparing a saturated aqueous solution of KNO_3 if the solubility is known?
(A)Add the calculated amount of solute to the proper amount of water at 20 °C and wait until all is dissolved.
(B)Add to water at 20 °C a slight excess over the calculated amount of solute and water and wait until no more solute dissolves.
(C)Dissolve less than the calculated amount of solute and let some of the water evaporate at 20 °C.

(D)Add an excess over the calculated amount of solute to hot water and cool to 20 °C, with stirring.
(E)Neutralize a dilute solution of KOH with dilute HNO_3 and evaporate to the desired volume.

49. Incandescent carbon particles cause a gas flame to be yellow. To obtain a hotter blue flame you should
(A)open the air holes. (B)close the air holes.
(C)open the needle valve at the base of the burner to increase the gas supply.
(D)partly close the supply valve at the gas jet. (E)place a beaker of cold water over the flame to cool the flame.

50. The electrical conductance of a solution of $Ba(OH)_2$ slowly decreases upon the addition of H_2SO_4 to a minimum, and then slowly increases. The best ***experimental*** evidence for this is
(A)The $Ba(OH)_2$ solution becomes more dilute since its volume is increased by adding the H_2SO_4 solution.
(B)Ions are removed from the solution by the formation of water and insoluble $BaSO_4$.
(C)The inter-ionic attraction effect is increased by adding the H_2SO_4.
(D)An electric lamp placed in a circuit in series with the solution becomes dim as the H_2SO_4 is added and then becomes bright again.
(E)An indicator placed in the solution changes color.

Metals & Non-Metals:

51. Heating zinc sulfide in air causes the formation of
(A)Zn and S. (B)Zn and SO_2. (C)ZnO and S (D)ZnO and SO_2. (E)Zn and SO_3.

52. The electrical conductance of a solution of $Ba(OH)_2$ slowly decreases upon the addition of H_2SO_4 to a minimum, and then slowly increases. The best ***theoretical*** explanation of this is
(A)The $Ba(OH)_2$ solution becomes more dilute since its volume is increased by adding the H_2SO_4 solution.
(B)Ions are removed from the solution by the formation of water and insoluble $BaSO_4$.
(C)The interionic attraction effect is increased by adding the H_2SO_4.
(D)An electric lamp placed in a circuit in series with the solution becomes dim as the H_2SO_4 is added and then becomes bright again.
(E)An indicator placed in the solution changes color.

53. Which group of ions can exist together in water solution in moderate concentration?
(A) Ba^{2+}, NO_3^-, K^+, CO_3^{2-} (B) Ba^{2+}, Cl^-, K^+, SO_4^{2-}
(C) K^+, Cl^-, Na^+, NO_3^- (D) Ag^+, NO_3^-, K^+, Cl^-
(E) Na^+, Pb^{2+}, Cl^-, NO_3^-

54. Which mixture will ***not*** yield hydrogen gas?
(A) sodium and water (B) calcium and water (C) zinc and hydrochloric acid
(D) zinc and concentrated nitric acid (E) steam and red hot iron

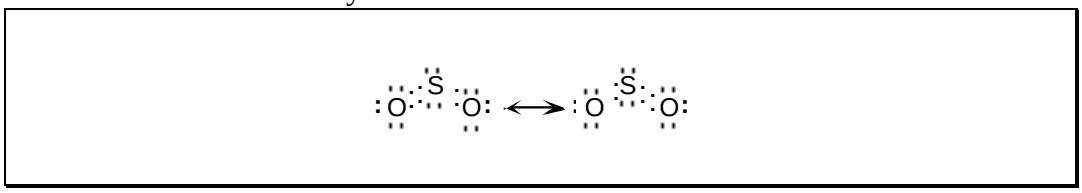
55. When sodium hydroxide solution is added to magnesium sulfate solution, a white precipitate of magnesium hydroxide is obtained. When sodium hydroxide solution is added to an "unknown" solution, a white precipitate is obtained. To conclude that the unknown solution contains magnesium ion, it must be assumed that
(A)NaOH is more soluble than $Mg(OH)_2$. (B)Na_2SO_4 is soluble in water.

(C)$Mg(OH)_2$ is insoluble in water. (D)NaOH forms no white precipitate with any other ion except Mg^{2+}. (E)Zn^{2+}, which forms white $Zn(OH)_2$, is not present in the unknown.

Molecular Geometry:

56. An *sp* hybridized central atom can be used to describe the bonding in
(A) CH_4 (B) HCN (C) H_2CO (D) OF_2

57. Sulfur dioxide can be described by the structures:



This implies that
(A)the two bonds in SO_2 are of equal length, and the electronic distribution in the two SO bonds is identical.
(B)the single bond is longer than the double bond and the electronic distribution in the two SO bonds is different.
(C)an electron pair in the SO_2 molecule alternates back and forth between the two sulfur–oxygen electron pairs so that the two different bonds seem to exchange positions.
(D)the SO_2 molecule revolves so that the two different bonds seem to exchange positions.

58. Which compound would be expected to have the largest dipole moment?
(A)CO_2 (linear) (B)SO_2 (bent) (C)BF_3 (trigonal planar) (D)CF_4 (tetrahedral)

59. Which is the largest bond angle?
(A) angle O–S–O in SO_4^{2-}
(B) angle Cl–C–Cl in $HCCl_3$
(C) angle F–Be–F in BeF_2
(D) angle H–O–H in H_2O

60. Which molecule is polar?
(A) BF_3 (B) CO_2 (C) CF_4 (D) H_2S

Oxidation & Reduction:

61. Consider the reaction $2Fe^{3+}_{(aq)} + 2I^-_{(aq)} \rightarrow 2Fe^{2+}_{(aq)} + I_{2(aq)}$
Which statement is true for the reaction?
(A) Fe^{3+} is oxidized. (B) Fe^{3+} increases in oxidation number.
(C) Fe^{3+} is reduced. (D) I^- is reduced.

62. In the chemical reaction, $Zn_{(s)} + CuSO_{4(aq)} \rightarrow ZnSO_{4(aq)} + Cu_{(s)}$,
(A) metallic zinc is the reducing agent. (B) metallic zinc in reduced.
(C) copper ion is oxidized. (D) sulfate ion is the oxidizing agent.

63. In this reaction, which substance behaves as the oxidizing agent?
$Pb + PbO_2 + 2H_2SO_4 \rightarrow 2PbSO_4 + 2H_2O$
(A) Pb (B) $PbSO_4$ (C) PbO_2 (D) H_2SO_4

64. In which group can each substance act as an oxidizing agent?
(A)Cl_2, MnO_2, Cu (B)Cl_2, MnO_4^-, Cu^{2+} (C)Cl^-, $MnO4^-$, Cu^+ (D)Cl_2, Mn, Cu^{2+}

65. Which is the strongest oxidizing agent?

Standard Reduction Potentials E^0	
$Na \rightleftarrows Na^+ + e^-$	2.71 V
$Cd \rightleftarrows Cd^{2+} + 2e^-$	0.40 V
$H_2 \rightleftarrows 2H^+ + 2e^-$	0.00 V
$Ag \rightleftarrows Ag^+ + e^-$	–0.80 V

(A) Na^+ (B) H_2 (C) Cd^0 (D) Ag^+

Periodic Properties:

66. The molecule N_2 is isoelectronic with

(A)formaldehyde, CH_2O (B)cyanide ion, CN^- (C)hydrogen, H_2 (D)water, H_2O

67. Which isoelectronic ion is the smallest in size?

(A) Al^{3+} (B) Na^+ (C) F^- (D) O^{2-}

68. Which of these isoelectronic ions is the smallest?

(A) O^{2-} (B) F^- (C) Na^+ (D) Mg^{2+} (E) Al^{3+}

69. In which pair of particles is the first member larger than the second member?

(A) Li^+ ; Be^{2+} (B) Li^+ ; Li (C) Li^+ ; Na^+ (D) Be ; Mg

70. Which ion has the largest radius?

(A) Cl^- (B) F^- (C) K^+ (D) Ca^{2+}

Stoichiometry:

71. The atomic molar mass of a hypothetical element **X** is 100 u. It is found that the 50.0 g of **X** combines with 32.0 g of oxygen. What is the simplest formula for the oxide of **X**?

Atomic Molar Mass	
O	16.0 g·mol^{-1}

(A) $\mathbf{X}_2O$ (B) $\mathbf{X}O_2$ (C) $\mathbf{X}_2O_3$ (D) $\mathbf{X}O_4$

72. An amino acid has a molar mass of 776.9 g·mol^{-1} and contains 65.34% iodine by mass. What is the number of iodine atoms per molecule of amino acid?

(A) one (B) three (C) four (D) five

73. A 6.80 g coin was dissolved in nitric acid and 6.21 g of AgCl was precipitated by the addition of excess sodium chloride,

$$Ag^+_{(aq)} + Cl^-_{(aq)} \rightarrow AgCl_{(s)}$$

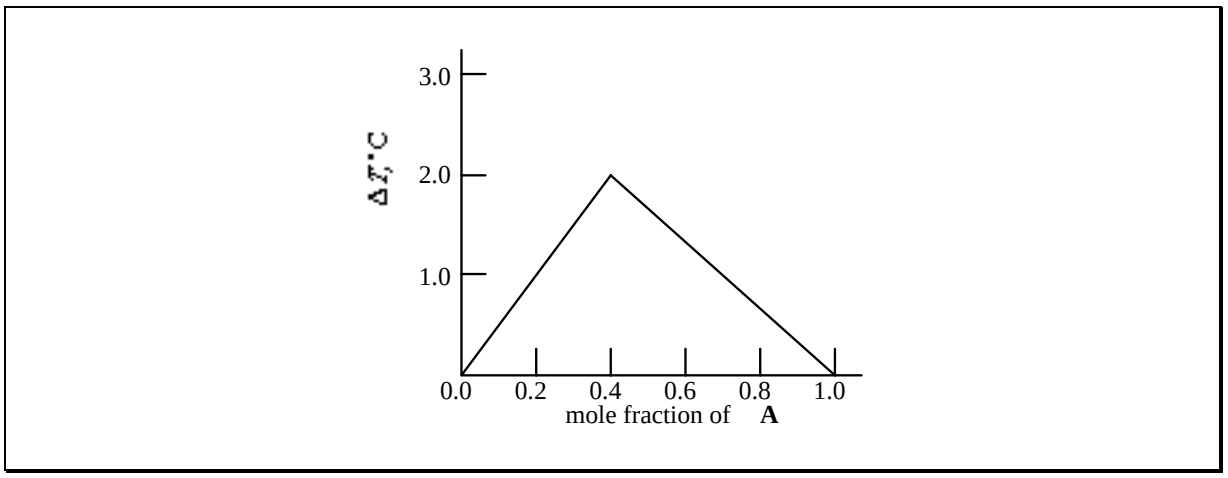
Calculate the percentage silver in the coin.

Atomic Molar Masses

Ag	108. g·mol^{-1}
Cl	35.5 g·mol^{-1}

(A) 24.7% (B) 68.7% (C) 75.3% (D) 91.3

74.



A and **B** react exothermically to form a compound. A series of experiments is performed in which varying ratios of **A** to **B** are used, with a constant total number of moles, in each case. The observed temperature rise is plotted above. The simplest formula for the compound is probably

(A) $\mathbf{A_3B_2}$ (B) $\mathbf{A_2B_3}$ (C) $\mathbf{AB_2}$ (D) **AB**

75. If a 17.0 g sample of impure nickel metal reacts under standard conditions with 25.0 L of CO to form 6.25 L of $Ni(CO)_4$ gas, what is the percentage of Ni in the metal sample?

$$Ni_{(s)} + 4CO_{(g)} \rightarrow Ni(CO)_{4(g)}$$

Molar Masses	
Ni	58.7 g·mol^{-1}
$Ni(CO)_4$	171. g·mol^{-1}

(A) 24.1% (B) 25.0% (C) 96.4% (D) 100%

Thermochemistry

76. Which molecule has the greatest bond energy?

(A) H—Br (B) H—F (C) H—At (D) H—Cl (E) H—I

77. For which process is the entropy change per mole the largest at constant temperature?

(A)$H_2O_{(l)} \rightarrow H_2O_{(g)}$ (B)$H_2O_{(s)} \rightarrow H_2O_{(g)}$ (C)$H_2O_{(s)} \rightarrow H_2O_{(l)}$ (D)$H_2O_{(l)} \rightarrow H_2O_{(s)}$

78. Under which conditions does nitrogen have the largest entropy per mole?

(A) $N_{2(s)}$ at 50 K and l atm (B) $N_{2(l)}$ at 70 K and l atm
(C) $N_{2(g)}$ at 80 K and 1 atm (D) $N_{2(g)}$ at 80 K and 0.5 atm

79. In which process is entropy decreased?

(A)dissolving sugar in water (B)expanding a gas (C)evaporating a liquid (D)freezing water

80. Which reaction has the largest positive entropy change per mole of product formed?

(A) $S_{(s)} + 3F_{2(g)} \rightarrow SF_{6(g)}$ (B) $SO_{2(g)} + Na_2O_{(s)} \rightarrow Na_2SO_{3(s)}$

(C) $Fe^{3+}{}_{(aq)} + SCN^{-}{}_{(aq)} \rightarrow FeSCN^{2+}{}_{(aq)}$ (D) $H_2O_{(l)} \rightarrow H_2O_{(g)}$

ACS Practice Test 1 Answer Key

Acids & Bases:
1. D
2. C
3. C
4. A
5. E

Atomic Structure:
6. A
7. D
8. A
9. B
10. C

Bonding:
11. B
12. D
13. A
14. E
15. C

Electrochemistry:
16. C
17. B
18. C
19. A
20. B

Equilibrium:
21. D
22. D
23. C
24. A
25. D

Formulas & Equations:
26. D
27. B
28. D
29. A
30. A

Gases:
31. D
32. C
33. B
34. C
35. D

Introductory Concepts:
36. C
37. C
38. C
39. C
40. D

Kinetics:
41. A
42. C
43. D
44. C
45. A

Laboratory:
46. C
47. C
48. D
49. A
50. D

Metals & Nonmetals:
51. D
52. B
53. C
54. D
55. D

Molecular Geometry:
56. B
57. A
58. B
59. C
60. D

Oxidation & Reduction:
61. C
62. A
63. C
64. B
65. D

Periodic Properties:
66. B
67. A
68. E
69. A
70. A

Stoichiometry:
71. D
72. C
73. B
74. B
75. C

Thermochemistry:
76. B
77. B
78. D
79. D
80. D