This print-out should have 54 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Campion 05 Ex 01 04
001   10.0 points

How much heat is required to change the temperature of two cups of water (500 mL) from room temperature (25°C) to boiling?

1. 7.85 kJ

2. 15.7 kJ

3. 157 kJ

4. 1.57 kJ

5. 78.5 kJ

6. 0.785 kJ

Holt da 12 1 practice 1
002   10.0 points

What quantity of heat energy is released when 531 g of liquid water freezes?
    Answer in units of kJ.

Holt da 12 rev 19b
003   10.0 points

The standard molar heat of vaporization for water is 40.79 kJ/mol. How much energy would be required to vaporize 43.0 g of water?
    Answer in units of kJ.

Mlib 00 6035
004   10.0 points

The specific heat of liquid water is 4.184 J/g·°C. Calculate the energy required to heat 10.0 g of water from 26.5°C to 83.7°C.

1. None of these

2. 572 J

3. 837 J

4. 239 J

5. 2.39×10^3 J

LDE Electronic Configuration 006
005   10.0 points

What is the correct electronic configuration of magnesium, Mg?

1. $1s^2 2s^2 2p^8$

2. $1s^2 2s^2 2p^6 3s^2$

3. $1s^2 2s^{10}$

4. $1s^2 2s^4 2p^6$

5. $1s^2 2s^2 2p^2 3s^2$

LDE Electronic Configuration 009
006   10.0 points

What is the electronic configuration of an antimony atom (Sb)?

1. $[\text{Ar}]\, 5s^2\, 4f^{14}\, 4d^{10}\, 4p^3$

2. $[\text{Kr}]\, 5s^2\, 3d^{10}\, 4p^3$

3. $[\text{Kr}]\, 5s^2\, 4d^{10}\, 4p^3$

4. $[\text{Kr}]\, 5s^2\, 4d^{10}\, 5p^3$

5. $[\text{Ar}]\, 5s^2\, 4d^{10}\, 4p^3$

Mlib 02 4059
007   10.0 points

What is the electronic configuration of calcium (Ca)?

1. $1s^2\, 2s^2\, 2p^6\, 3s^2\, 3p^4\, 4s^2\, 3d^2$

2. $1s^2\, 2s^2\, 2p^6\, 3s^2\, 3p^6\, 4s^2$

3. $1s^2\, 2s^2\, 2p^6\, 2d^{10}$

4. $1s^2\, 2s^2\, 3s^2\, 2p^6\, 3p^6\, 3d^2$

5. $1s^2\, 2s^2\, 2p^6\, 3s^2\, 3p^6\, 3d^2$

Brodbelt 05 10

008   10.0 points
What is the electron configuration of Mg^{2+}?

1. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2$

2. $1s^2\ 2s^2\ 2p^6\ 3s^1$

3. $1s^2\ 2s^2\ 2p^6$

4. $1s^2\ 2s^2\ 2p^6\ 3s^2$

5. $1s^2\ 2s^2\ 2p^5$

DAL 006 0004
009   10.0 points
Rank the following atoms in terms of decreasing atomic radius.

1. F, Mg, Na, O, N

2. F, O, N, Mg, Na

3. F, O, N, Na, Mg

4. Na, N, O, Mg, F

5. Na, Mg, N, O, F

Nlib 02 0009
010   10.0 points
Convert 58.5 calories to Joules.
   Answer in units of J.

Holt da 17 review 17
011   10.0 points
3010 J of heat are added to a 22.3 g sample of iron at 29°C. What is the final temperature of the iron? The specific heat of iron is $0.449\ J/g \cdot K$.
   Answer in units of K.

LDE Ranking trends 004
012   10.0 points
Rank the following species by radius, from largest to smallest: $Cl^-, K^+, Ca^{2+}, Ar, S^{2-}$.

1. $S^{2-}, Cl^-, Ar, K^+, Ca^{2+}$

2. $Ca^{2+}, S^{2-}, Cl^-, Ar, K^+$

3. $Ar, K^+, Cl^-, Ca^{2+}, S^{2-}$

4. $Ar, K^+, Ca^{2+}, S^{2-}, Cl^-$

5. $K^+, Ca^{2+}, S^{2-}, Cl^-, Ar$

ACAMP FE 0011
013   10.0 points
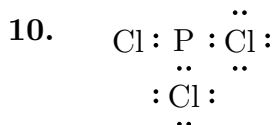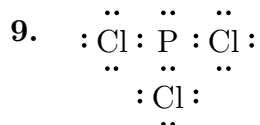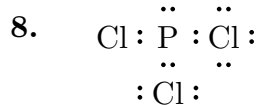How many valence electrons are in a Rn atom?

1. 8

2. 0

3. 7

4. 2

5. 16

Holt da 6 rev 56b
014   10.0 points

   Write the electron-dot notation for the element Cl.

1. $\overset{..}{\underset{..}{\cdot Cl}} :$

2. $Cl \cdot$

3. $: \overset{..}{\underset{..}{Cl}} :$

4. $\overset{..}{\underset{\cdot}{\cdot Cl}} \cdot$
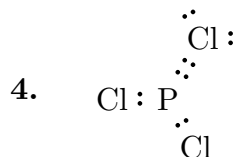
5. None of these

6. $Cl :$

7. $\overset{..}{\underset{\cdot}{\cdot Cl}} :$

8. $\overset{..}{\underset{\cdot}{Cl}} \cdot$

9. $\overset{..}{\underset{..}{Cl}} \cdot$

Holt da 6 rev 64a
015   10.0 points
Draw the Lewis structure for PCl_3.

1. $\overset{\cdot\cdot}{:}\underset{\cdot\cdot}{Cl}:P:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:$

$\quad\quad\quad :\underset{\cdot\cdot}{Cl}:$

2. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:P\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}$

$\quad\quad\quad\quad \overset{\cdot\cdot}{Cl}:$

$\quad\quad\quad\quad .\underset{\cdot\cdot}{Cl}.$

3. $Cl:Cl:::P:Cl$

4. $\quad\quad\quad \overset{\cdot\cdot}{Cl}:$

$\quad\quad Cl:P$

$\quad\quad\quad\quad \overset{\cdot\cdot}{Cl}$

5. $\quad Cl:\overset{\cdot\cdot}{P}:Cl$

$\quad\quad\quad :\underset{\cdot\cdot}{Cl}:$

6. $\quad\quad \overset{\cdot\cdot}{Cl}::\overset{\cdot\cdot}{P}$

$\quad\quad Cl\quad\quad .\underset{\cdot\cdot}{Cl}.$

7. $\quad Cl:P:Cl$

$\quad\quad\quad :\underset{\cdot\cdot}{Cl}:$

8. $\quad Cl:\overset{\cdot\cdot}{P}:\overset{\cdot\cdot}{Cl}:$

$\quad\quad\quad :\underset{\cdot\cdot}{Cl}:$

9. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:P:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:$

$\quad\quad\quad :\underset{\cdot\cdot}{Cl}:$

10. $\quad Cl:P:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:$

$\quad\quad\quad :\underset{\cdot\cdot}{Cl}:$
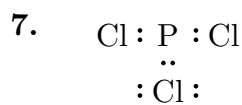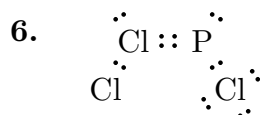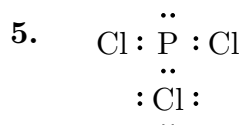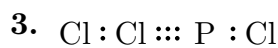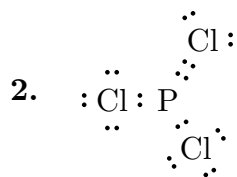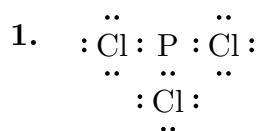
Lewis H2O dash
016   10.0 points

Which of the following is the correct Lewis formula for water (H_2O)?

1. $:\overset{\cdot\cdot}{H}-\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-\overset{\cdot\cdot}{H}:$

2. $H-\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-\overset{\cdot\cdot}{H}:$

3. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}-\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-\overset{\cdot\cdot}{H}:$

4. $\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}=O=\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}$

5. $H-\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-H$

6. $H-O\equiv H:$

7. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}-\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}-\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}:$

8. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}-O\equiv H:$

9. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}-O-\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}:$

10. $:\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}-\overset{\cdot\cdot}{O}=\overset{\cdot\cdot}{\underset{\cdot\cdot}{H}}$
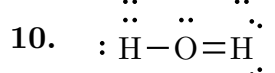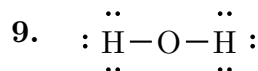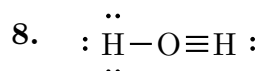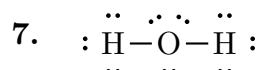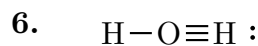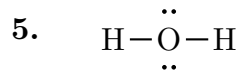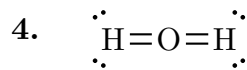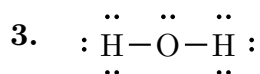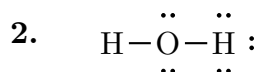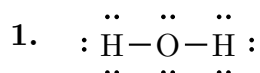
ACAMP 03 0006
017   10.0 points

The electronic geometry of NH_3 (ammonia) is

1. trigonal planar.

2. linear.

3. trigonal pyramidal.

4. tetrahedral.

5. bent.

Holt da 6 6 practice 1b
018   10.0 points

Use VSEPR theory to predict the molecular shape of the molecule whose Lewis structure is

$$:\overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}} - \overset{\cdot\cdot}{P} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}}:$$
$$|$$
$$:\underset{\cdot\cdot}{Cl}:$$
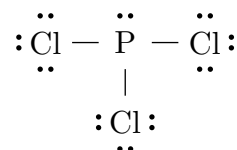
1. linear

2. None of these

3. bent or angular

4. trigonal-bipyramidal

5. octahedral

6. trigonal-planar

7. tetrahedral

8. trigonal-pyramidal

Msci 01 1222
019   10.0 points

The shape of a water molecule is

1. bent.

2. spherical.

3. linear.

Lewis CO2 dash
020   10.0 points

Which of the following is the correct Lewis formula for carbon dioxide (CO_2)?

1. $O-\overset{..}{\underset{..}{C}}-O$

2. $:\overset{..}{\underset{..}{O}}-\overset{..}{\underset{..}{C}}-\overset{..}{\underset{..}{O}}:$

3. $O-C\equiv O:$

4. $:\overset{..}{\underset{..}{O}}-\overset{..}{C}=\overset{.}{\underset{.}{O}}$

5. $:\overset{..}{\underset{..}{O}}-C\equiv O:$

6. $:\overset{..}{\underset{..}{O}}-\overset{.\,.}{C}-\overset{..}{\underset{..}{O}}:$

7. $O-\overset{..}{\underset{..}{C}}-\overset{..}{\underset{..}{O}}:$

8. $:\overset{..}{\underset{..}{O}}-\overset{..}{\underset{..}{C}}-\overset{..}{\underset{..}{O}}:$

9. $\overset{.}{\underset{.}{O}}=C=\overset{.}{\underset{.}{O}}$

10. $:\overset{..}{\underset{..}{O}}-\overset{..}{C}-\overset{..}{\underset{..}{O}}:$

Brad C12 005
021   10.0 points

A 6.35 L sample of carbon monoxide is collected at 55.0°C and 0.892 atm. What volume will the gas occupy at 1.05 atm and 59.0°C?

1. 6.10 L

2. 6.68 L

3. 5.46 L

4. 1.96 L

5. 4.82 L

Mlib 04 1007
022   10.0 points

A(n) 3.9 L sample of gas at STP is cooled to -55°C at 808 mm Hg pressure. What is the new volume?

1. 2.9 L

2. 5.2 L

3. 3.3 L

4. 4.6 L

Holt da 10 1 sample 1
023 (part 1 of 3) 10.0 points

A weather report gives a current atmospheric pressure reading of 608.1 mm Hg. Express this reading in atmospheres.

Answer in units of atm.

024 (part 2 of 3) 10.0 points

Convert the pressure of 608.1 mm Hg to torrs.

Answer in units of torr.

025 (part 3 of 3) 10.0 points

Convert the pressure of 608.1 mm Hg to kilopascals.

Answer in units of kPa.

Mlib 76 0073
026   10.0 points

The lines in an atomic line emission spectrum are due to

1. the movement of electrons from lower energy states to higher energy states in atoms.

2. the movement of electrons from higher energy states to lower energy states in atoms.

3. nuclear transitions in atoms.

4. the presence of isotopes.

Bond Type Ionic
027   10.0 points
Which pair of elements is most likely to form an ionic compound?

1. magnesium and fluorine

2. nitrogen and sulfur

3. sodium and aluminum

4. oxygen and chlorine

Mlib 00 7015
028   10.0 points
All of the following elements are composed of diatomic molecules under normal conditions, except

1. nitrogen.

2. neon.

3. iodine.

4. fluorine.

5. oxygen.

Mlib 76 1086
029   10.0 points
Which physical state is most highly ordered?
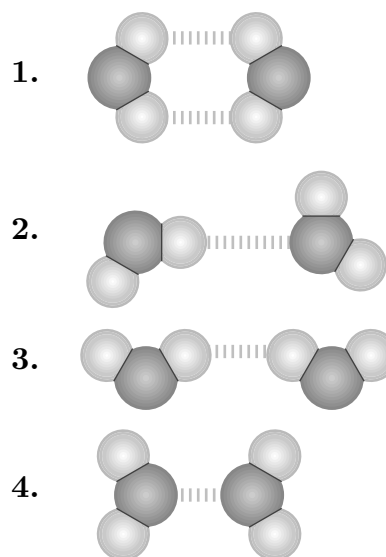
1. All are the same.

2. solid

3. liquid

4. gas

CIC T05 19
030   10.0 points

hydrogen   oxygen

Which figure best describes the hydrogen bonding between two water molecules?

Compounds 10
031   10.0 points
In a solution, the substance that does the dissolving is the

1. solvent.

2. solute.

3. gas.

4. liquid.

Brodbelt 20054100
032   10.0 points
Which of the following is true for strong acids?

1. They are almost totally ionized or dissociated in aqueous solutions.

2. They react only with weak bases.

3. After they lose a proton, they give rise to strong conjugate bases.

4. They are weak electrolytes.

5. Aqueous solutions of strong acids have a high pH.

6. They react only with strong bases.

Mlib 07 0182
033   10.0 points
Which of the following is NOT a property of bases?

1. Bases taste bitter.

2. Bases produce hydrogen ions, H^+, when added to water.

3. Bases make indicators change colors.

4. Bases feel slippery.

5. Bases react with acids.

Mlib 07 1009
034   10.0 points
A solution has a pH of 4.35. Find the pOH.

1. None of these

2. 4.35

3. 18.35

4. 9.65

Mlib 07 1017
035   10.0 points
A solution has $[H^+] = 2.0 \times 10^{-5}$ M. Find the pOH of this solution.

1. 5.20

2. 4.70

3. −4.70

4. None of these

5. 9.30

ACAMP304 E2 05
036   10.0 points
A catalyst

1. cannot be a biological molecule like an enzyme.

2. must always be solid, as in a catalytic converter.

3. increases the rate of a chemical reaction but is not consumed in the process.

4. operates only at high temperatures.

5. never occurs naturally; it is man-made.

Mlib 05 7041
037   10.0 points
In general, the rate of a reaction can be increased by

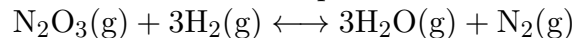**1.** increasing the temperature.

2. adding an appropriate catalyst.

3. All of these

4. increasing the concentration of reactants.

LDE Equilibrium Expressions 004
038   10.0 points
Consider the chemical equation below:
$$N_2O_3(g) + 3H_2(g) \longleftrightarrow 3H_2O(g) + N_2(g)$$
What would K_{eq} be for this reaction?

1. $K_{eq} = \dfrac{[H_2O]^3}{[N_2O_3][H_2]^3}$

2. $K_{eq} = \dfrac{[H_2O]^3[N_2]}{[N_2O_3][H_2]^3}$

3. $K_{eq} = \dfrac{[N_2O_3][H_2]^3}{[H_2O]^3[N_2]}$

4. $K_{eq} = \dfrac{[N_2O_3][H_2]^3}{[H_2O]^3}$

ChemPrin3e T09 42
039   10.0 points
Which of the following is TRUE?

1. A small value of K means that the equilibrium concentrations of the reactants are small compared to the equilibrium concentrations of the products.

2. When the value of K is small, the equilibrium lies on the product side of the equilibrium reaction.

3. A large value of K means that the equilibrium concentrations of products are large compared to the equilibrium concentrations of the reactants.

4. When the value of K is large, the equilibrium lies on the reactant side of the equilibrium reaction.

5. When the value of Q is large, the equilibrium lies on the product side of the equilibrium reaction.

Msci 12 1200
040   10.0 points
Which of the following statements about the Kinetic Theory of gases is false?

1. The distance between molecules is much larger than the diameter of each molecule.

2. All of the other answers are false.

3. Gases consist of molecules in continuous, random, straight-line motion.

4. Collisions between molecules are elastic.

5. The average kinetic energy of a gas molecule is independent of the temperature.

Sparks gas veloc 010

041   10.0 points
Which gas would have the highest velocity at 60°C, He or Ne?

1. Both would have the same velocity.

2. He

3. Ne

ACAMP304 E1 42
042   10.0 points
Hydrocarbons

1. react with oxygen to give H_2 and CO_2 plus heat.

2. are compounds of carbon, hydrogen, and oxygen.

3. react to give only water and carbon dioxide in every instance.

4. are compounds composed of carbon and hydrogen.

Correct name 1
043   10.0 points
A student who stresses too much about his grades has incorrectly named an organic compound 3-propylhexane. What is the correct name?

1. None of these

2. 1,1-dipropylpropane

3. 4-ethylhexane

4. 3-ethylhexane

5. 3-propylhexane

6. 4-ethylheptane

Mlib 12 1143
044   10.0 points
The ending -yne designates

1. a carbon-carbon single bond.

2. a carbon-carbon triple bond.

3. a carbon-carbon double bond.

Msci 31 0112
045   10.0 points
In organic compounds, carbon usually forms

1. one bond.

2. four bonds.

3. three bonds.

4. two bonds.

CIC T12 11
046   10.0 points
The primary structure of a protein is the

1. overall shape or conformation of the molecule.

2. identity and sequence of amino acids present.

3. intermediate level of molecular organization.

4. association of one protein chain with another.

Brodbelt 04 10
047   10.0 points
Determine the oxidation number of S in Na_2SO_3 if the oxidation number of Na is $+1$ and O is -2.

1. $+1$

2. -1

3. -4

4. $+5$

5. $+4$

Mlib 11 7099
048   10.0 points
What is the oxidation state of nitrogen in the molecule N_2?

1. 2

2. 3

3. 1

4. zero

White 3
049   10.0 points
What is the oxidation number of C in CH_4?

1. -2

2. $+2$

3. -4

4. $+4$

5. 0

Mlib 01 4007
050   10.0 points
Classify the reaction

$$2\,HgO(s) \rightarrow 2\,Hg(\ell) + O_2(g)\,.$$
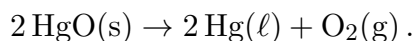
1. combustion

2. decomposition

3. synthesis

4. water forming

Reactions 20
051   10.0 points
The chemical reaction

$$2\,Bi + 3\,H_2O \rightarrow Bi_2O_3 + 3\,H_2$$
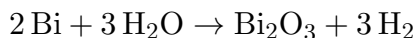
represents a

1. single-replacement reaction.

2. decomposition reaction.

3. synthesis reaction.

4. double-replacement reaction.

Balance Equation 105
052   10.0 points

When the equation

$$? \, PbS + ? \, O_2 \rightarrow ? \, PbO + ? \, SO_2$$
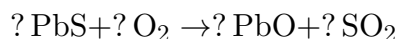
is balanced, the coefficients are

1. 1; 2; 1; 1

2. 2; 3; 2; 2

3. 2; 6; 4; 4

4. 4; 12; 4; 4

5. 2; 2; 1; 2

Brodbelt 434
053   10.0 points

Consider the reaction

$$CaCN_2 + 3 \, H_2O \rightarrow CaCO_3 + 2 \, NH_3 \,.$$
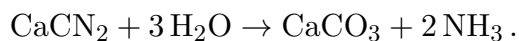
How much NH_3 is produced if 187 g of $CaCO_3$ are produced?

1. 63.6 mol

2. 2.13 mol

3. 1.06 mol

4. 3.74 mol

5. 72.3 mol

6. 36.1 mol

CIC T07 07
054   10.0 points

What type of radiation is given off in the nuclear reaction

$$^{14}_{6}C \rightarrow \ ^{14}_{7}N + ?$$
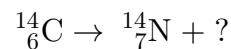
1. gamma

2. neutron

3. alpha

4. beta