This print-out should have 50 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

LDE Planck relation 001 001 10.0 points

What is the energy, in Joules, of a photon of wavelength 200 nm? What bond energy would this correspond to, in $kJ \cdot mol^{-1}$?

1.
$$1.32 \times 10^{-31}$$
 J; 7.95×10^{-11} kJ \cdot mol⁻¹

2. 9.94×10^{-17} J; 1.65×10^{-43} kJ \cdot mol⁻¹

3. 1.32×10^{-21} J; 795 kJ · mol⁻¹

4. $9.94 \times 10^{-19} \text{ J}; 599 \text{ kJ} \cdot \text{mol}^{-1}$

5. 1.32×10^{-40} J; 7.95×10^{-20} kJ \cdot mol⁻¹

6. 9.94×10^{-21} J; 5.99 kJ · mol⁻¹

LDE Balmer Series 001 002 10.0 points

Which of the following electronic transitions for a hydrogen atom would correspond to the highest energy emission found in the Balmer series?

- **2.** n=2 to n=4
- **3.** n=3 to n=1
- **4.** n=3 to n=2
- **5.** n=1 to n=2

6. n=4 to n=2

LDE Classical Failure 002 003 10.0 points

Which of the following statement(s) is/are true?

I) The failure of classical mechanics to predict the absorptions/emission spectra of gases is called the ultraviolet catastrophe.

- II) Quantum mechanics accurately predicted the behavior of blackbody radiators.
- III) The emission spectra of gases are discrete rather than continuous.
- IV) Any frequency of light will eject an electron from a metal surface as long as the intensity is sufficient.

 $\mathbf{1.} \text{ II and III}$

- 2. I and III
- 3. I, II and IV
- 4. III and IV
- 5. II, III, and IV

LDE Uncertainty Principle Theory 001 004 10.0 points

Which of the following are true consequences of the uncertainty principle?

I) The uncertainty in an electron's momen- \hbar

tum can never be less than $\frac{\hbar}{2}$;

- II) An electron can be measured in two places at once;
- III) Electrons and other particles do not have a well-defined position or momentum like particles in classical mechanics do.
- 1. II only
- **2.** I only
- **3.** I and II
- 4. II and III
- 5. I and III
- 6. III only

De Broglie Wavelength 01 005 10.0 points

Consider a flea of mass 4.5×10^{-4} g moving

at 1.0 m/s midway through its jump. What is its de Broglie wavelength?

1. 2.9818×10^{-40} m

2. 1.4725×10^{-30} m

3. 1.47244×10^{-27} m

4. 2.9818×10^{-37} m

Msci 01 0303 006 10.0 points

Which of the following is an intensive property?

1. density

 $\mathbf{2.}$ mass

3. weight

4. volume

5. number of moles of molecules

LDE quantum rules 002 007 10.0 points

Which of the following sets of quantum numbers are **invalid**, i.e. violate one or more boundary conditions?

I) $n = 3, \ell = 2, m_{\ell} = -2, m_s = +\frac{1}{2}$
II) $n = 9, \ell = 5, m_{\ell} = 6, m_s = +\frac{1}{2}^2$
III) $n = 2, \ell = 1, m_{\ell} = 0, m_s = +1$
IV) $n = 2, \ell = 0, m_{\ell} = 0, m_s = +\frac{1}{2}$
V) $n = 1, \ell = 0, m_{\ell} = 0, m_s = -\frac{1}{2}$
1. II, III
2. I, III, IV
3. I, II, IV
4. II only
5. I only

6. III only

7. IV only

8. I, IV

Msci 05 1648 008 10.0 points

Hund's rule states that

1. electrons occupy all the orbitals of a given sublevel singly before pairing begins.

2. no two electrons in an atom may have identical sets of four quantum numbers.

3. it is impossible to determine accurately both the momentum and position of an electron simultaneously.

Mlib 02 4077 009 10.0 points

Write the electron configuration for P.

1. $1s^{2} 2s^{2} 2p^{6} 3d^{5}$ **2.** $1s^{2} 2s^{2} 2p^{6} 3s^{2} 3p^{6}$ **3.** $1s^{2} 2s^{2} 2p^{6} 3s^{2} 3p^{3}$ **4.** $1s^{2} 2s^{2} 2p^{6} 3p^{5}$

LDE periodic trend theory 001 010 10.0 points

Which of the following BEST describes the purpose of effective nuclear charge?

1. It exists only to torture foolish CH 301 students who did not study.

2. It is a method to evaluate how much attraction a given electron "feels" from the nucleus so that periodic trends can be predicted and rationalized.

3. It is used to rationalize chemical bonding in covalently bonded molecules.

4. It is a measure of the effect of filled and half-filled subshells on the stability of atoms and ions.

5. It is a measure of how many protons a given atom has which is useful because of variations from isotope to isotope.

6. It is used to determine the number of valence electrons of a given species.

LDE Ranking trends 002 011 10.0 points

Rank the following species in terms of increasing electron affinity: Sulfur (S), Rubidium (Rb), Germanium (Ge), Krypton (Kr), Floruine (F)

- 1. Not enough information
- **2.** Kr < Ge < Rb < S < F
- **3.** Ge < Rb < S < F < Kr
- $4. \mathrm{F} < \mathrm{Ge} < \mathrm{S} < \mathrm{Rb} < \mathrm{Kr}$
- **5.** Rb < Ge < S < F < Kr
- **6.** Kr < Rb < Ge < S < F

ChemPrin3e T02 07 012 10.0 points

Which of the following has the highest lattice energy?

1. NaCl

2. CaO

3. KI

4. BaO

5. MgO

Line Drawing to Formula 013 10.0 points

Determine the molecular formula for the

molecule:



1. $C_6H_6Cl_2$

2. C_6H_6

3. $C_4H_{12}Cl_2$

 $4. C_4 H_4 Cl_2$

5. $C_6H_4Cl_2$

6. C_6H_4Cl

LDE Lewis Structures 005 014 10.0 points

Which of the following is the correct Lewis structure of hydroxylamine (NH₂OH)?

$$\begin{array}{c}
 H \\
 I. : N = \dot{O} \\
 H = \dot{O} \\
 H = \dot{O} \\
 H = \dot{O} \\
 H = \ddot{O} \\
 H = \ddot{O} \\
 H = \ddot{O} \\
 H = \dot{O} \\$$



formula for hydrogen cyanide (HCN)?

1.	H - C - N
2.	H - C - N
3.	$ {H}_{-C \equiv N} : $
4.	: H-C-N:
5.	$: \underset{\cdots}{\operatorname{H-C-N}}:$
6.	H-C-N:
7.	H - C - N
8.	: H - C = N
9.	H=C=N
10.	$H-C\equiv N$:

Mlib 03 1025 016 10.0 points

How many resonance structures are there for the NO_3^- polyatomic ion?

1. 5

2. 1

3. 2

4. This molecule does not exhibit resonance.

5. 3

6. 4

ChemPrin3e 02 76 017 10.0 points

Which of the three Lewis structures is the most important for the fulminate ion (CNO^{-}) ?

I)	-1 $\ddot{C} \equiv$	+1 ≡ N -	-1 $- \overset{\cdot}{\text{O}}$:
II)	−2 Ċ =	+1 \equiv N $=$	$\stackrel{0}{=} \overset{0}{\odot}$
	-3	+1	+

- 1. I and II only
- 2. II only

3. All of these are important.

- 4. I only
- 5. None of these is important.
- 6. I and III only

7. II and III only

8. III only

Brodbelt 08 04 018 10.0 points

 ICl_3 is sp^3d hybridized. What is the electronic and molecular geometry?

- 1. trigonal bipyramidal; T-shaped
- **2.** tetrahedral; pyramidal
- 3. octahedral; T-shaped
- 4. trigonal bipyramidal, seesaw
- 5. trigonal planar; trigonal planar

LDE VSEPR Molecular Geometry 002 019 10.0 points

Which of the following molecules is/are polar?



LDE VB Sigma Pi Bonds 004 020 10.0 points

How many sigma (σ) and pi (π) bonds are in the Lewis structure for C(COOH)₄?

- **1.** 12 σ , 0 π
- **2.** 12 σ , 4 π
- **3.** 8 σ , 4 π
- **4.** 16 σ , 0 π
- **5.** 16 σ , 4 π

Brodbelt 8200504 021 10.0 points

Give the hybridization of each central atom: nitrogen, middle carbon, right carbon.

H
H-
$$\ddot{N} = C - C - H$$

HO H
1. sp^2 , sp^2 , sp^3
2. sp , sp , sp
3. sp^2 , sp^3 , sp^3
4. sp^2 , sp^2 , sp^2
5. sp^2 , sp , sp^2
6. sp , sp^3 , sp^3
7. sp^3 , sp^2 , sp^3
8. sp^3 , sp^3 , sp^3

LDE VB Hybridization 002 022 10.0 points

Consider the thionoester molecule



What orbitals were used to form the π (pi) bond?

sp³, 3s
 2s, 3p
 sp³, 3p
 2p, 3p
 sp², 3s

LDE Bond Order 009

-	
023 10.0 points All of the species below have the same bond order except for one of them. Which is it?	Msci 12 0918a 026 10.0 points What volume will 40.0 L of He at 50.00°C and 1201 torr occupy at STP?
1. Ne_2^+	
э u+	1. 31.1 L
2. ¹¹ ₂	2. 53.4 L
3. F_2^-	a 10 0 f
4. H_{2}^{-}	3. 12.8 L
2	4. 18.6 L
5. B_2^-	5. 26 7 L
LDE Paramagnetism 004	
024 10.0 points	Mass Density and Pressure
agnetic?	A sample of nitrous oxide gas (NO) has a
I) Li ₂	density of 12 g L^{-1} . What pressure does the
II) O_2	sample exert at 27 $^{\circ}$ C?
III) H_2^+	
1 11	1. 61.6 atm
1. 11 and 111	2 not enough information
2. I and II	2. not chough information
	3. 9.9 atm
3. I only	
	4. 1.0 atm
4. II only	5,007.0 atm
5. I. II and III	5. 997.9 atm
	Brodbelt 12 04a
6. III only	028 10.0 points
	For the reaction
7. I and III	$2 \operatorname{HCl} + \operatorname{Na_2CO_3} \rightarrow 2 \operatorname{NaCl} + \operatorname{H_2O} + \operatorname{CO_2}$
Magi 12 0011	179.2 liters of CO_2 is collected at STP. How
$025 10.0 ext{ points}$	many moles of NaCl are also formed?
2.0 g of H_2 and 8.0 g of He are put in a 22.4 liter container at 0°C. The total pressure is	1. 4.0 moles
1. 5.0 atm.	2. 16.0 moles
2. 3.0 atm.	3. 8.0 moles
3. 10.0 atm.	4. 32.0 moles

5. 6.0 moles

4. 1.0 atm.

6. 12.5 moles

rms velocity of He 01 029 10.0 points

Helium has a rms velocity $(v_{\rm rms})$ that is 4.21 times faster than which of the following gases?

1. chlorine, Cl_2

2. oxygen, O_2

3. neon, Ne

4. argon, Ar

5. xenon, Xe

LDE Gas Non-ideality 002 030 10.0 points

Which of the following does **not** affect the ideality of gases?

- I) the temperature of the gas
- II) the density of the gas

III) the size of the gas molecules

1. none of the above

2. I only

3. II and III

4. III only

5. I and II

6. I, II, and III

7. II only

8. I and III

LDE Intermolecular Forces 001 031 10.0 points

Which of the following statements regarding intermolecular forces (IMF) is/are true?

- I) Intermolecular forces result from attractive forces between regions of positive and negative charge density in neighboring molecules.
- II) The stronger the bonds within a molecule

are, the stronger the intermolecular forces will be.

III) Only non-polar molecules have instantaneous dipoles.

1. I and II

2. III only

3. II only

4. I only

5. I, II, and III

6. II and III

7. I and III

LDE Intermolecular Forces 002 032 10.0 points

Which of the following is not correctly paired with its dominant type of intermolecular forces?

- **1.** C_6H_6 (benzene), instantaneous dipoles
- 2. SiH₄, instantaneous dipoles
- **3.** CaO, ionic forces
- 4. NH₃, hydrogen bonding
- 5. HBr, hydrogen bonding

Explaining Dispersion Forces 033 10.0 points

Carbon tetrachloride (CCl₄) and *n*-octane (C₈H₁₈) are both non-polar molecules. At standard pressure, they boil at 345 K and 399 K, respectively. Which answer choice below correctly explains their boiling points?

$$Cl \qquad \downarrow \\ Cl - Cl - Cl \\ \downarrow \\ Cl \\ Cl \\ \end{bmatrix}$$

 $\sim \sim \sim$

1. C_8H_{18} has a higher boiling point because its electron cloud is larger and allows it to form more instantaneous dipoles.

2. CCl₄ has a lower boiling point because its smaller surface area allows it to form stronger instantaneous dipoles.

3. C_8H_{18} has a higher boiling point because its greater molecular weight enables it to form stronger instantaneous dipoles.

4. C_8H_{18} has a higher boiling point because its smaller surface area allows it to form stronger instantaneous dipoles.

5. CCl_4 has a lower boiling point because its greater molecular weight enables it to form stronger instantaneous dipoles.

LDE Physical Properties 001 034 10.0 points

Which of the following statements about boiling is false?

1. Boiling occurs when vapor pressure exceeds atmospheric pressure.

2. For a given pressure, the boiling point is always at a higher temperature than melting point.

3. The boiling point of a liquid is independent of atmospheric pressure.

4. As intermolecular forces increase, boiling point increases as well.

VP IMF Ranking 035 10.0 points

Rank the compounds

CH₃CH₂OH CH₃NH₂ CH₃OH NaOH in terms of increasing vapor pressure.

$$\label{eq:hardenergy} \begin{split} \textbf{1.} \ \mathrm{NaOH} &< \mathrm{CH}_3\mathrm{NH}_2 < \mathrm{CH}_3\mathrm{OH} \\ &< \mathrm{CH}_3\mathrm{CH}_2\mathrm{OH} \end{split}$$

 $\label{eq:ch3OH} \begin{array}{l} \mbox{2. NaOH} < \mbox{CH}_3\mbox{OH} < \mbox{CH}_3\mbox{NH}_2 \\ < \mbox{CH}_3\mbox{CH}_2\mbox{OH} \end{array}$

 $\label{eq:starses} \begin{array}{l} \textbf{3.} \ \mathrm{NaOH} < \mathrm{CH}_3\mathrm{CH}_2\mathrm{OH} < \mathrm{CH}_3\mathrm{OH} \\ < \mathrm{CH}_3\mathrm{NH}_2 \end{array}$

$$\label{eq:charge} \begin{array}{l} \mbox{5. CH}_3 \mbox{NH}_2 < \mbox{CH}_3 \mbox{OH} < \mbox{CH}_3 \mbox{CH}_2 \mbox{OH} \\ < \mbox{NaOH} \end{array}$$

LaBrake CIC CH5 02 036 10.0 points

Which of the following substances would you predict might evaporate the fastest?

 $\textbf{1.} C_8 H_{18}$

2. C_6H_{14}

3. $C_{10}H_{22}$

 $\textbf{4.} C_{12}H_{24}$

LDE Thermodynamic Theory 012 U not E 037 10.0 points

Which of the following statements concerning the laws of thermodynamics is not true?

1. Entropy always increases in an isolated system.

2. S = 0 for a perfect crystal at absolute zero.

3. $\Delta S_{univ} > 0$

4. Free energy is conserved in a closed system.

5. $\Delta U_{univ} = 0$

LDE Thermodynamic Work 0034 038 10.0 points

For which of the following reactions at room temperature $(25^{\circ}C)$ would there be 5.0 kJ of work done on the system?

1.
$$2 \operatorname{H}_2O_2(\ell) \to 2 \operatorname{H}_2O(\ell) + O_2(g)$$

2.
$$2 \operatorname{H}_2 O(\ell) + O_2(g) \rightarrow 2 \operatorname{H}_2 O_2(\ell)$$

3.
$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$$

$$\begin{array}{l} \textbf{4.} \operatorname{N_2H_2(g)} + \operatorname{CH_3OH(g)} \rightarrow \\ \operatorname{CH_2O(g)} + \operatorname{N_2(g)} + 2\operatorname{H_2(g)} \end{array}$$

5.
$$CH_2O(g) + N_2(g) + 2H_2(g) \rightarrow N_2H_2(g) + CH_3OH(g)$$

6.
$$\operatorname{CO}_2(g) + 2\operatorname{H}_2O(g) \to \operatorname{CH}_4(g) + 2\operatorname{O}_2(g)$$

LDE Bomb Calorimeter 002 039 10.0 points

If we set up a bomb calorimetry experiment to determine the molar internal energy of combustion of ethene (C₂H₄) using 1 L of water as our heat sink, 2.805 g of ethene, and measure an initial and final temperature of 25.20°C and 58.92°C, respectively, what will be the experimentally determined molar internal energy of combustion of ethene? Assume the density of water is 1.00 g \cdot mL⁻¹ and the calorimeter itself absorbs no heat. The specific heat capacity of water is 4.184 $J \cdot g^{-1} \cdot K^{-1}$.

- **1.** $-14.11 \text{ kJ} \cdot \text{mol}^{-1}$
- **2.** $-141, 100 \text{ kJ} \cdot \text{mol}^{-1}$
- **3.** $-14, 110 \text{ kJ} \cdot \text{mol}^{-1}$
- **4.** $-141.1 \text{ kJ} \cdot \text{mol}^{-1}$
- **5.** $-1, 411 \text{ kJ} \cdot \text{mol}^{-1}$

1. $-710 \text{ kJ} \cdot \text{mol}^{-1}$

LDE Bond Enthalpy 002 040 10.0 points

Using the provided bond enthalpy data, calculate the change in enthalpy for the following reaction:

$$CH_4(g) + O_2(g) \longleftrightarrow CH_2O(g) + H_2O(g)$$

- 2. 710 kJ · mol⁻¹
 3. −577 kJ · mol⁻¹
 4. 577 kJ · mol⁻¹
 5. −349 kJ · mol⁻¹
- **6.** $349 \text{ kJ} \cdot \text{mol}^{-1}$

ChemPrin3e T06 48 041 10.0 points

Calculate the standard enthalpy of combustion of butane $(C_4H_{10}(g))$ at 298 K from standard enthalpy of formation data.

- **1.** $-895.49 \text{ kJ} \cdot \text{mol}^{-1}$
- **2.** $-2342.32 \text{ kJ} \cdot \text{mol}^{-1}$
- **3.** $-2877.04 \text{ kJ} \cdot \text{mol}^{-1}$
- **4.** $-2843.5 \text{ kJ} \cdot \text{mol}^{-1}$
- **5.** $-2056.49 \text{ kJ} \cdot \text{mol}^{-1}$

LDE Thermodynamic Signs 001 042 10.0 points

When wood is burning (i.e. a combustion process is occurring), which of the following quantities is positive?

- **1.** Work.
- **2.** Change in enthalpy.
- **3.** Change in entropy.
- 4. Change in Gibbs' free energy.

ChemPrin3e 07 25 26 043 10.0 points

Which one shows the substances in the decreasing order of their molar entropy?

1. $CO_2(g)$, $H_2O(\ell)$, Ne(g), Ar(g)

2.
$$H_2O(\ell)$$
, $Ne(g)$, $Ar(g)$, $CO_2(g)$

- **3.** None of these
- 4. $CO_2(g)$, Ar(g), Ne(g), $H_2O(\ell)$
- **5.** $H_2O(\ell)$, Ar(g), Ne(g), $CO_2(g)$
- **6.** $H_2O(\ell)$, $CO_2(g)$, Ne(g), Ar(g)

LDE Entropy 002 044 10.0 points

Which of the reactions below will likely have the largest increase in entropy $(\Delta S_{\rm rxn})$?

- **1.** $N_2H_4(g) + H_2(g) \rightarrow 2 NH_3(g)$
- **2.** $2 \operatorname{CH}_4(g) + 2O_3(g) \rightarrow 4 \operatorname{H}_2O(g) + 2 \operatorname{CO}(g)$
- **3.** $C_5H_{12}(\ell) + 8O_2(g) \rightarrow 6H_2O(g) + 5CO_2(g)$

4.
$$S_3(g) + 9 F_2(g) \rightarrow 3 SF_6(g)$$

5.
$$Na^+(g) + Cl^-(g) \rightarrow NaCl(s)$$

entropy change for metal heating 1 045 10.0 points

150 grams of iron is heated from 25° C to 150° C. What is ΔS for this change? The specific heat capacity of iron is 0.450 J/g K.

- **1.** -121 J/K
- **2.** –23.6 J/K
- **3.** +23.6 J/K
- **4.** −8438 J/K
- 5. + 121 J/K
- 6. +8438 J/K
- **7.** 0 J/K

046 10.0 points Calculate $\Delta S_{\text{surr}}^{\circ}$ at 298 K for the reaction

 $6 \operatorname{C(s)} + 3 \operatorname{H}_2(g) \rightarrow \operatorname{C}_6 \operatorname{H}_6(\ell)$

 $\Delta H_{\rm r}^{\circ} = +49.0 \text{ kJ} \cdot \text{mol}^{-1} \text{ and } \Delta S_{\rm r}^{\circ} = -253 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}.$

- $1. 417 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$
- **2.** $+253 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$
- $\mathbf{3.} + 164 \, \mathrm{J} \cdot \mathrm{K}^{-1} \cdot \mathrm{mol}^{-1}$
- $4. 253 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$
- $5. 164 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1}$

LDE Temperature and Phase Changes 003 047 10.0 points

Based on the enthalpy of sublimation $(\Delta H_{sub} = 393.5 \text{ kJ} \cdot \text{mol}^{-1})$ and entropy of sublimation $(\Delta S_{sub} = 2.023 \text{ kJ} \cdot \text{mol}^{-1} \cdot \text{K}^{-1})$ of carbon dioxide, at what temperature does this phase transition occur?

0.2 K
 -78.5 °C
 78.5 °C
 -78.5 K

5. 0.2 °C

ChemPrin3e T07 59 048 10.0 points

For the reaction

 $2 \operatorname{C(s)} + 2 \operatorname{H}_2(g) \rightarrow \operatorname{C}_2\operatorname{H}_4(g)$ $\Delta H_r^\circ = +52.3 \text{ kJ} \cdot \text{mol}^{-1} \text{ and } \Delta S_r^\circ = -53.07 \text{ J} \cdot \text{K}^{-1} \cdot \text{mol}^{-1} \text{ at } 298 \text{ K}.$ The reverse reaction will be spontaneous at

1. temperatures above 985 K.

2. temperatures below 1015 K.

3. no temperatures.

4. $NO_2(g)$

4. temperatures below 985 K. **3.** HI(g)

5. all temperatures.

ChemPrin3e T07 52 049 10.0 points

Calculate $\Delta G_{\mathbf{r}}^{\circ}$ for the decomposition of mercury(II) oxide

$$\begin{array}{ccc} 2\,{\rm HgO(s)} \to 2\,{\rm Hg}(\ell) + {\rm O}_2({\rm g}) \\ \Delta H_{\rm f}^\circ & -90.83 & - & - \\ ({\rm kJ}\cdot{\rm mol}^{-1}) \\ \Delta S_{\rm m}^\circ & 70.29 & 76.02 & 205.14 \\ ({\rm J}\cdot{\rm K}^{-1}\cdot{\rm mol}^{-1}) \end{array}$$

at 298 K.

- 1. $-246.2 \text{ kJ} \cdot \text{mol}^{-1}$
- $\mathbf{2.+}117.1 \; \mathrm{kJ} \cdot \mathrm{mol}^{-1}$
- **3.** $-117.1 \text{ kJ} \cdot \text{mol}^{-1}$

4.
$$+246.2 \text{ kJ} \cdot \text{mol}^{-1}$$

5. $-64.5 \text{ kJ} \cdot \text{mol}^{-1}$

LDE Gibbs Stability Ranking 002 050 10.0 points

Use the table data

	$\Delta G^{\circ}_{ m rxn}$
	$[\rm kg/(\rm mol\cdot K)]$
$\operatorname{AgCl}(s) \to \operatorname{Ag}(s) + \frac{1}{2}\operatorname{Cl}_2(g)$	109.7
$2 \operatorname{Ag}(s) + \frac{1}{2} \operatorname{O}_2(g) \to \operatorname{Ag}_2 \operatorname{O}(s)$	-10.8
$\frac{1}{2}N_2(g) + O_2(g) \rightarrow NO_2(g)$	51.8
${ m HI}({ m g}) o {1\over 2}{ m H}_2({ m g}) + {1\over 2}{ m I}_2({ m g})$	-1.3

to pick the thermodynamically most stable species.

1.
$$Ag_2O(s)$$

2.
$$AgCl(s)$$