

INFORMATION, SCRAP, AND COVER PAGE

*** KEEP YOUR WORK AND YOUR ANSWERS COVERED ***

This page contains information which may or may not be needed. This page can also be used for scrap paper or for cover paper. THIS PAGE WILL NOT BE COLLECTED. TEAR THIS PAGE OFF THE EXAM.

Temperature conversion $T(\text{K}) = T(^{\circ}\text{C}) + 273$

Gases $\text{atm} = 760 \text{ mmHg} = 760 \text{ Torr}$

$$PV = nRT$$

$$R = 0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} = 8,314 \frac{\text{g} \cdot \text{m}^2}{\text{s}^2 \cdot \text{mol} \cdot \text{K}}$$

$$d = \frac{PM}{RT}$$

$$v_{\text{rms}} = \sqrt{\frac{3RT}{M}}$$

Energy units $\text{Cal} = 4.184 \text{ kJ}$

Heat and Heat Capacity $q = \Delta T \times \text{mass} \times c$

Standard Molar Enthalpies of Formation (kJ or kJ/mol)

$\text{CO}_2(\text{g})$	-393.52	$\text{H}_2\text{O}(\text{l})$	-285.83	$\text{AgCl}(\text{s})$	-127.07
$\text{CO}_2(\text{aq})$	-413.80	$\text{H}_2\text{O}(\text{g})$	-241.83	$\text{Ag}_2\text{CO}_3(\text{s})$	-505.8
$\text{Cl}^-(\text{aq})$	-167.16	$\text{Ag}^+(\text{aq})$	105.58		

PRINT NAME _____

SIGN NAME _____

CIRCLE your recitation section in the list below.

22:	W	3:00	HM 106	23:	F	10:00	HM 221
24:	F	8:00	HM 210	25:	M	8:00	HM 210
26:	M	9:00	DA 205	27:	T	3:00	WS 108
28:	W	8:00	HM 210	29:	Th	2:00	NS 212C

SCORED GRADE: _____

All answers should be with the correct significant figures.

Atomic weights are provided in the Periodic Table. These values must be used.

The Periodic Table and Information Page will not be collected. They may be used as scratch paper or as cover paper. Do not turn them in. If you wish to check your answers against the key, you can copy your answers to those pages.

Be certain your answers are clear. If an answer is not clear, it can be considered wrong.

Problems marked with ** in the margin are from the assigned homework. These total 23 points.

Place your name in the space provided at the top of each question page. This helps to identify the pages if they are accidentally separated during grading and processing.

Work promptly. Use your time effectively.

last name: _____

****KEEP YOUR WORK AND ANSWERS COVERED.****

1. (24 pts) Indicate whether each statement is true (T) or false (F). Be certain T or F is clearly indicated.

_____ For every compound, its gas phase is more compressible than its liquid phase.

_____ Increasing the temperature of a gas increases its concentration (at constant pressure).

_____ At constant volume, the density of a gas sample increases as temperature increases.

_____ As the temperature of a gas sample increases, the particles are generally moving faster.

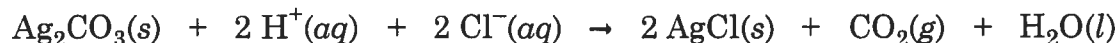
_____ Effusion of SF₆ is faster than the effusion of CO₂.

_____ After every endothermic process, the system ends with less energy.

_____ At the same temperature, a gas phase of a particular compound has more energy than its liquid phase.

_____ The standard reference elemental form for bromine is Br₂(g).

2. (5 pts) The following equation is balanced.



Circle the value for ΔH° (in kJ) for this reaction.

-80.7 -93.4 -101.6 -113.2 -128.9 -136.4

-146.1 -159.0 -166.2 -170.8 -183.0 -195.4

last name: _____

3. (6 pts) Consider three separate containers, one holding $\text{NH}_3(g)$, one holding $\text{CO}_2(g)$, and one holding $\text{O}_2(g)$. Each gas is at STP and each has a volume of 20.0 L. Answer the following questions. If all gases are the same, write 'same'.

Which gas has the highest v_{rms} ? _____

Which gas has the most moles? _____

Which gas has the highest density? _____

- ** 4. (7 pts) 10.6 g KOH are reacted with excess HNO_3 . Circle the number of grams of salt which can be formed.

18.2 18.5 18.8 19.1 19.4 19.8

20.2 20.6 20.9 21.0 21.4 21.7

- ** 5. (5 pts) Circle the rms speed (in m/s) for $\text{H}_2(g)$ molecules at 11 °C.

1,420 1,470 1,530 1,580 1,640 1,690

1,720 1,790 1,830 1,870 1,910 1,980

6. (6 pts) Consider the following reaction.



The reaction is conducted using stoichiometric amounts of reactants, and produces 17.0 g AlF_3 . The $\text{HF}(g)$ is collected in a 15.0 L vessel at 81 °C. Circle the pressure (in atm) of HF which is obtained.

0.392 0.491 0.506 0.661 0.714 0.832

0.951 1.06 1.18 1.25 1.34 1.47

last name: _____

** 7. (5 pts) Write the formation equation for $\text{Zn}(\text{NO}_3)_2(\text{s})$.

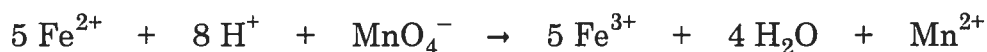
** 8. (6 pts) A mixture of two gases is contained in a 100.0 L vessel at 43 °C. The mixture contains 32.4 g C_2H_6 and 362 Torr C_4H_{10} . Circle the density (in g/L) of the gas mixture.

1.02	1.09	1.13	1.17	1.24	1.28
1.33	1.39	1.42	1.47	1.51	1.56

9. (5 pts) For the mixture in Problem 8, circle the mole percent of C_2H_6 .

22.7%	25.1%	30.5%	37.0%	43.7%	46.2%
53.8%	56.3%	63.0%	69.5%	74.9%	77.3%

10. (6 pts) You have a solution which contains some iron(II) chloride and you want to know how much is in there. You titrate a sample of the solution, using 22.32 mL of 0.02064 M MnO_4^- solution to reach equivalence point. The balanced equation is the following.



Circle the number of grams of FeCl_2 which were present in the sample.

0.2011	0.2449	0.2746	0.2920	0.3207	0.3513
0.3744	0.3861	0.4159	0.4338	0.4508	0.4862