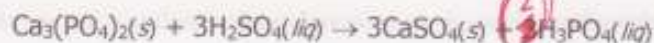


Unless otherwise specified, each question is worth 5 points.

4. Use the values of  $\Delta H^\circ$  given to calculate  $\Delta H^\circ$  for the following reaction:



COMPOUND	$\Delta H_f^\circ$ (kJ/mol)
$\text{Ca}_3(\text{PO}_4)_2(s)$	-4126
$\text{CaSO}_4(s)$	-1433
$\text{H}_3\text{PO}_4(l)$	-1267
$\text{H}_2\text{SO}_4(l)$	-814

$$\begin{aligned} \Delta H &= \Delta H_f(\text{PRODUCT}) - \Delta H_f(\text{REACTANTS}) \\ &= (3(-1433) + 2(-1267)) - (-4126 + 3(-814)) \\ &= -4299 - 2534 + 4126 + 2442 \\ \Delta H &= \boxed{-265 \text{ kJ}} \end{aligned}$$

Abbreviated Periodic Table of the Elements

1 1A 1 H 1.008	2 2A 4 Li 6.94	3	4	5	6	7	8	9	10	11	12	13 3A 5 B 10.81	14 4A 6 C 12.01	15 5A 7 N 14.01	16 6A 8 O 16.00	17 7A 9 F 19.00	18 8A 10 Ne 20.18
11 Na 22.99	12 Mg 24.31	38 Sr 87.62	46 Y 88.91	50 Zr 91.22	58 Mo 95.94	66 Ru 101.1	74 Pd 106.4	80 Cd 112.4	88 Hg 200.6	96 Pt 195.1	104 Au 197.0	112 Tl 204.4	120 Pb 207.2	128 Bi 209.0	136 Po (209)	144 At (210)	152 Rn (222)
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Al 26.98	32 Si 28.09	33 P 30.97	34 S 32.07	35 Cl 35.45	36 Ar 39.95
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La* 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226	89 Ac** (227)	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Uun	111 Uuu	112 Uub						

NAME: \_\_\_\_\_

Lab Section: 1(TuTh@3) 2(TuTh@9) 3(MW@1)CHM 101  
20 points, 30 mins.

## Basic Competency Quiz #7

Fall 2007  
week 11Chemistry, 7<sup>th</sup> ed., Zumdahl & Zumdahl, sections 6.1-6.4

Wallace

revised 11/26/2007

Unless otherwise specified, each question is worth 5 points.

1. When a reactive alkali metal, such as sodium, is dropped into water, a highly exothermic reaction occurs:  $2\text{Na}(s) + \text{H}_2\text{O}(l) \rightarrow 2\text{NaOH}(aq) + \text{H}_2(g)$ ;  $\Delta H = -654 \text{ kJ}$

How much heat is given off when 1.00g of Na is dropped into a liter of water?

$$1.00 \text{ g Na} \times \frac{1 \text{ mol Na}}{22.99 \text{ g}} \times \frac{(-654 \text{ kJ})}{2 \text{ mol Na}} = \boxed{14.2 \text{ kJ}}$$

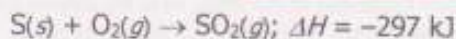
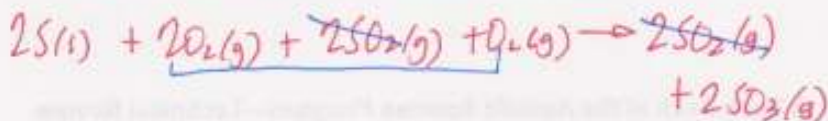
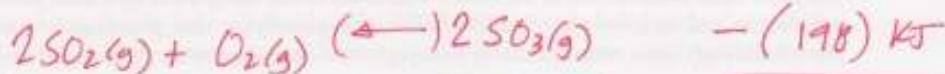
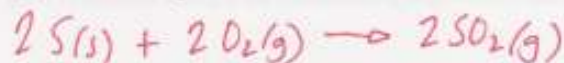
2. To make one cup of coffee, 0.180 kg of water must be heated from 19°C to the ideal brewing temperature of 96°C. How much heat (in joules) is required for this? The specific heat of water is 4.18 [J/g•°C].

$$q = J \times m \times \Delta T = 4.18 \left( \frac{\text{J}}{\text{g} \cdot ^\circ\text{C}} \right) \times 180. \text{g} \times (96 - 19)^\circ\text{C}$$

$$= 4.18 \times 180. \times 77 = 57,935 \text{ J}$$

$$\boxed{58,000 \text{ J or } 58 \text{ kJ}}$$

3. Use the following data:

to find the enthalpy change ( $\Delta H$ ) for the following reaction:  $2\text{S}(s) + 3\text{O}_2(g) \rightarrow 2\text{SO}_3(g)$ 

$$\boxed{\Delta H = -792 \text{ kJ}}$$