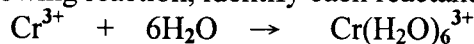


逢甲大學九十二學年度轉學生招生考試試題

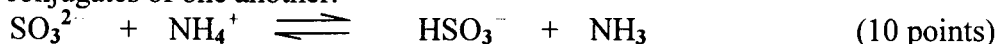
科目	普通化學	適用系別	化工二、環科二	時間	八十分鐘
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一. Draw a potential-energy diagram for an uncatalyzed exothermic reaction. On the same diagram, indicate the change that results on the addition of a catalyst. Discuss the role of a catalyst in changing the rate of reaction. (10 points)

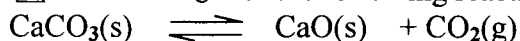
二. (a) In the following reaction, identify each reactant as a Lewis acid or a Lewis base.



(b) In the following reaction, label each species as an acid or a base. Indicate the species that are conjugates of one another.



三. (a) What is ΔG° at 1000°C for the following reaction?

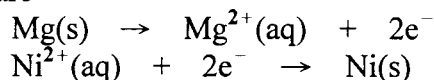


Is this reaction spontaneous at 1000°C and 1atm?

	CaCO ₃ (s)	CaO(s)	CO ₂ (g)
ΔH°_f :	-1206.9	-635.1	-393.5 kJ
S° :	92.9	38.2	213.7 J/K

(b) What is the value of K_p at 1000°C for this reaction? What is the partial pressure of CO_2 ? (15 points)

四. A voltaic cell is constructed from the following half-cells: a magnesium electrode in magnesium sulfate solution and a nickel electrode in nickel sulfate solution. The half-reactions are



Sketch the cell, labeling the anode and cathode (and the electrode reactions), and show the direction of electron flow and the movement of cations. (15 points).

五. Use bond energies to estimate the enthalpy change (ΔH) for the following reaction:



Bond Energy (C—H: 414 kJ / mole), (Cl—Cl: 243 kJ / mole),

(H—Cl: 431 kJ / mole), and (C—Cl: 339 kJ / mole).

六. A typical commercial-grade phosphoric acid is 75 % H_3PO_4 , by mass, and has $d = 1.57 \text{ g/mL}$. What are the molarity and the molality of H_3PO_4 in this acid?

(H_3PO_4 fw: 98g / mole) (10 points)

七. A buffer solution is 0.24 M NH_3 and 0.20 M NH_4Cl .

(a) What is the pH of this buffer?

(b) If 0.0050 mole NaOH is added to 0.500L of this solution, what will be the pH?

($\text{pK}_a=9.26$ for NH_4^+) (15 points)

八. A 1.108 g sample of naphthalene, $\text{C}_{10}\text{H}_8(\text{s})$, is burned in a bomb calorimeter and a temperature increase of 5.92°C is noted. When a 1.351 g sample of thymol, $\text{C}_{10}\text{H}_{14}\text{O}(\text{s})$ is burned in the same calorimeter, the temperature increase is 6.74°C . If the heat of combustion of naphthalene is $-5153.5 \text{ kJ / mole C}_{10}\text{H}_8$, what is the heat of combustion of thymol, in kJ / mole $\text{C}_{10}\text{H}_{14}\text{O}$? (C_{10}H_8 fw:128 g/mole and $\text{C}_{10}\text{H}_{14}\text{O}$ fw:150 g/mole) (15 points)