大葉大學 94 學年度轉學招生考試試題紙

| 系　組　別	日\第二部	年級	考 試 科 目（中 文 名 稱）	考試日期	節次	備註
環境工程系	日	二	普通化學	7月12日	四	可使用計算機

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）

P1-1

13:30~14:50

I. 選擇題(全部單選), 每題 6 分

1. 醋酸鈉與醋酸之濃度皆為 1M 時所配成的緩衝溶液之 pH 為多少？(醋酸 $Ka = 1.8 \times 10^{-5}$) (A). pH=3.74 (B). pH=4.74 (C). pH=4.14 (D). 3.14

2. $MnO_2 + OH^- + O_2 \rightarrow MnO_4^{2-} + H_2O$ 之方程式經平衡後,各係數為簡單整數比時, 則各係數之和為 (A). 11 (B). 13 (C). 12 (D). 9

3. 有關催化劑之敘述下列何者錯誤 (A). 增加正反應之反應速率 (B). 增加逆反應之反應速率 (C). 降低活化能 (D). 增大平衡常數

4. 下列化合物中硫原子之氧化數由高至低之排列順序為: (a) H_2S, (b) S_8, (c) H_2SO_4, (d) SO_2.
(A). (a)＞(b)＞(c)＞(d) (B). (c)＞(d)＞(b)＞(a) (C). (c)＞(b)＞(d)＞(a) (D). (a)＞(b)＞(d)＞(c)

5. $Ca_3(PO_4)_2$ 之 $Ksp=1.3 \times 10^{-26}$, $Ca_3(PO_4)_2$ 之莫耳溶解度(molar solubility)?
(A). 2.6×10^{-6}M (B). 1.3×10^{-26}M (C). 1.5×10^{-7}M (D). 4.6×10^{-6}M

6. If a process is both endothermic and spontaneous then
(A) $\triangle S > 0$ (B) $\triangle S < 0$ (C) $\triangle H < 0$ (D) $\triangle G > 0$

7. The reaction below is a reversible elementary process.

$$A + 2B \rightleftharpoons C$$
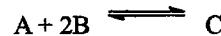
If the rate constant for the forward reaction is k_1 and that the reverse reaction is k_{-1}, what is the equilibrium constant for this reaction?

(A) $K = k_1 + k_{-1}$ (B) $K = k_1 - k_{-1}$ (C) $K = \dfrac{k_{-1}}{k_1}$ (D) $K = \dfrac{k_1}{k_{-1}}$

8. For the following reaction at equilibrium

$$N_{2(g)} + O_{2(g)} \rightleftharpoons 2 NO_{(g)}$$

Which one of the changes will have no effect on the position of the reaction?

(A). Nitrogen gas is added (B). Addition of catalyst (C). increase the temperature (D). Remove some $NO_{(g)}$

9. Which species listed below is present in the greatest concentration in a 0.1M solution of CH_3COONa? (A). CH_3COONa (B). CH_3COO^- (C). Na^+ (D). OH^-
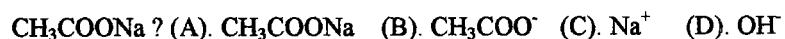
10. Calculate K_p for the reaction below at 400℃, if K_c at 400℃ for this reaction is 2.1×10^{-2},

$$2NOCl_{(g)} \rightleftharpoons 2NO_{(g)} + Cl_{2(g)}$$

(A). 2.1×10^{-2} (B). 1.7×10^{-3} (C). 0.70 (D). 1.2
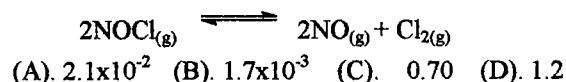
II. 計算題(可使用計算機),詳列計算步驟否則概不計分, 每題 20 分

1. $2 NO_{(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$,為單一步驟之平衡反應, 在 25℃ 條件下若正反應之速率常數 $k_f = 7.1 \times 10^9 M^{-2}$,則在相同溫度下逆反應之速率常數 k_r 為? [$NO_{(g)}$, $O_{2(g)}$, $NO_{2(g)}$ 之標準生成自由能分別為 86.7 kJ/mole, 0 kJ/mole. 51.8 kJ/mole] (20%)

2. A gas mixture consisted of $CH_{4(g)}$ and $C_2H_{2(g)}$ was put into a closed combustion chamber, and the total pressure at 25℃ was 70.5mmHg. The gas mixture was then ignited. After complete combustion, the water was completely removed, and the CO_2 left has a pressure of 96.4 mmHg in the same chamber at 25℃. Calculate the molar fraction of $C_2H_{2(g)}$ in the gas mixture. (20%)