大葉大學九十二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
生物產業科技學系 環保、特化、食品生物科技組	日	二	普通化學	7月23日	四	可使用計算機 工程用

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） 13:30～14:50

(一) 解釋名詞：15%

1、reducing agent：

2、octet rule：

3、enthalpy：

4、reaction rate：

5、activation energy：

(二) 化學式：12%

1、hydrogen bromide

2、ethyl alcohol

3、nitric oxide

4、calcium sulfide

(三) 計算題：73% (詳列計算步驟否則一概不計分)

1、The solubility of potassium chloride is 37.0 g/100g water at 30℃. Its solubility at 70℃ is 48.3 g/100g water.（10% ）

(a) Calculate the mass of potassium chloride that dissolves in 48.6 g of water at 30℃

(b) Calculate the mass of water required to dissolve 52.0 g of potassium chloride at 70℃

2、Aluminum reacts with sulfur gas to form aluminum sulfide. Initially, 1.18 mol of aluminum and 2.25 mol of sulfur are combined.（16% ）

(a) Write a balanced equation for the reaction.

(b) What is the limiting reactant?

(c) What is the theoretical yield of aluminum sulfide in moles?

(d) How many moles of excess reactant remain unreacted ?

3、Give the symbol of the atom with the following orbital diagram (8%)

	1s	2s	2p	3s	3p
(a)	(↑↓)	(↑↓)	(↑↓)(↑↓)(↑↓)	(↑↓)	( )( )( )
(b)	(↑↓)	(↑↓)	(↑↓)(↑↓)(↑↓)	(↑↓)	(↑)(↑)(↑)

4、Draw Lewis structures for the following species. (a) H_3C-C-OH (b) F_2C-CCl_2 (c) HCO_2^-（15% ）

5、A gas effuses 1.55 times faster than propane (C_3H_8) at the same temperature and pressure. What is the molar mass of the gas ?（6% ）

6、Given the following thermochemical equations

$$2H_2(g) + O_2(g) \rightarrow 2H_2O(l) \qquad \triangle H = -571.6\ kJ$$

$$N_2O_5(g) + H_2O(l) \rightarrow 2HNO_3(l) \qquad \triangle H = -73.7\ kJ$$

$$1/2\ N_2(g) + 3/2\ O_2(g) + 1/2\ H_2(g) \rightarrow HNO_3(l) \qquad \triangle H = -174.1\ kJ$$

Calculate △H for the formation of one mole dinitrogen pentoxide from its element in their stable state at 25℃ and 1 atm.(6%)

7、For the reaction $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$

the activation energy is 181 kJ/mol. The rate constant at 500℃ is 0.025 L/molxs,

(a) At what temperature is the rate constant one-third its value at 500℃ ? (6%)

(b) What is the rate constant at 825℃ ? (6%)