國立成功大學75學年度環境工程研究所考試(　　試題)　共 / 頁　第 / 頁

21% 1. Define or Explain 解釋名詞
a) 1+3 HCl b) heterotrophic bacteria c) Arrhenius equation
d) Absorption sampling e) clone f) mycoplasma g) peritrichous

15% 2. To prepare a buffer solution with a pH of 9.50, calculate how many grams of Na_2CO_3 must be dissolved into 2.0 liter of 0.50 M $NaHCO_3$?

$$H_2CO_3^* \rightleftharpoons HCO_3^- + H^+ \quad ; \quad K_1 = 10^{-6.30}$$

$$HCO_3^- \rightleftharpoons H^+ + CO_3^{2-} \quad ; \quad K_2 = 10^{-10.30}$$

Na 原子量 23
C 原子量 12

欲配製 pH 9.50之緩衝溶液,試計算需幾克之Na_2CO_3溶入於 2.0升之 0.50M $NaHCO_3$?

10% 3. What interference by chloride will occur in the COD test?
How do you prevent this interference from occurring? (Write down all the possibly involved chemical reaction equations.)
在COD分析試驗中氯離子會產生什麼干擾?如何避免其干擾發生?(寫出所有可能發生之化學反應式)

15% 4. If the electromotive force of the galvanic cell

$$Ag|AgCl(s), Cl^-(0.100\ M) \| Fe^{3+}(0.0200M), Fe^{2+}|Pt$$

is 0.319 volt. What will be the concentration of Fe^{2+} in the right half-cell? Assume that the solution in the right half-cell is 1 M H_2SO_4.
若上列之自發電池之電動勢為0.319伏特,並假定右迴半反應之溶液為 1M之H_2SO_4,試計算右迴半反應之Fe^{2+}濃度為多少?

10% 5. Show and explain bacterial mediated chemical transformation of iron.
請說明並解釋鐵離子之細菌媒介化學轉換作用。

10% 6. List the elements required by all organisms in the following three categories: a) major elements, b) minor elements, c) trace elements.
試列出上述三大分類中微生物各需要那些生長化學元素。

6% 7. Name three types of membrane transport in Gram positive cells.
寫出在 Gram ⊕ 細胞(細菌)中三種膜輸送之型式。

6% 8. Name and characterize the major genera of Gram positive unicellular spore-forming bacteria.
寫出並說明 Gram ⊕ 單細胞 spore-forming 細菌之主要屬(major genera)及其特性。

7% 9. Show the biochemical equations of nitrification process.
請說明並列出硝化程序作用之生化反應式。