I. 環境工程化學部份

12% 1. Explanation
   (1) lake stratification
   (2) colloid stability
   (3) sludge volume index
   (4) electrodepostion
   (5) volumetric titration
   (6) chelating effect

5% 2. Show the structure of the following organic functional groups: amine, sulfonic acids, ketone, alkyne and alkene.

5% 3. Explain why a solution of alum in water is acidic.

8% 4. What is the pE value in a solution in equilibrium with pure oxygen at pH 7.5 ?
   Given: $1/4\ O_2(g) + H^+(w) + e \rightleftharpoons 1/2\ H_2O$ $pE° = 20.75$
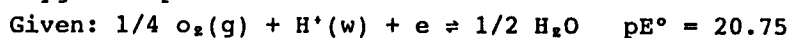
8% 5. Briefly (簡短地) discuss the "third law of thermodynamics". What is its most important message ?

5% 6. How to calibrate(校正) the DO meter in the laboratory ?

7% 7. List all important factors that affect 5-day BOD measurement.

II. 微生物學部份

一. 解釋名詞 (10%) 每小題3 分

1. microbial indicator
2. tertiary treatment
3. co-metabolism
4. xenobiotic compounds
5. MLSS (mixed liquor suspended solid)

二. 簡答題 (40%)

1. 試列舉鑑別細菌(bacteria)與真菌(fungi)之主要依據。(8%)

2. 若培養基中祇含有多醣類(polysaccharide)為微生物生長之唯一碳源，請問微生物如何利用(氧化)它產生能量，試以生化及酵素化學觀點說明之. (12%)

3. 比較好氣(aerobic)與厭氣(anaerobic)生物處理豬糞尿廢水之優劣點，並列舉兩系統中之主要微生物種類. (10%)

4. 今假設某電鍍工廠廢水中含有高濃度重金屬(如Ni, Cu等)、氰化物及少量氮、磷、鉀等無機成份，若想以生物處理法去除廢水中重金屬，請問應如何設計規畫及試驗? (10%)

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