

1. Give the complete or full name in English for each of the following chemical elements or compounds: (30%)

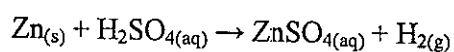
- (1) H    (2) N    (3) S    (4) P    (5) Si    (6) Ca  
(7) Be   (8) Mn   (9) Cu   (10) Pb   (11) CO<sub>2</sub>   (12) H<sub>2</sub>S  
(13) CaCO<sub>3</sub>   (14) Fe(OH)<sub>3</sub>   (15) CH<sub>4</sub>

2. Explain the following terms concisely: (30%)

- (1) solubility of a gas    (2) Avogadro's number    (3) gas constant  
(4) nuclear fission    (5) Henry's law    (6) electrolysis  
(7) latent heat    (8) solubility product    (9) redox potential  
(10) precision of measurement

3. Chlorine has 2 major isotopes: <sup>35</sup>Cl and <sup>37</sup>Cl. Their isotopic abundance is 75.53% and 24.47%, respectively. What is the atomic weight of chlorine? (10%)

4. Calculate the volume of H<sub>2</sub> at 0°C and 1 atm produced by 20g of Zn (atomic weight: 65.4g) reacting with excess sulfuric acid as expressed by the reaction: (10%)



5. If the solubility product constant (K<sub>sp</sub>) for calcite (CaCO<sub>3</sub>) is  $3.8 \times 10^{-9}$  at 25°C, calculate the solubility of calcite in pure water in moles per liter and grams per liter. Does the solubility increase or decrease if it is in seawater? Why? (20%)

20% (1) 請詳細說明你會如何量一塊  $10 \text{ cm}^3$  的鐵的質量。

20% (2) 請詳細說明 ppm 有可能代表什麼濃度？為何它不是一個好的濃度單位？

10% (3) 給你一瓶海水，請詳細說明你要如何量其鹽度？

10% (4) 請詳細說明 1 cc 與 1 ml 的水有何差別？

20% (5) 請詳細說明分光光度計之原理。

20% (6) 請詳細說明 Gas Chromotography 之原理。

- 一、試述「板塊構造」(plate tectonics) 學說之源起及發展過程，并以現今海底地形說明之。(20%)
- 二、試說明太平洋和大西洋海底沉積物之異同及其原因。(10%)
- 三、試簡繪一完整之「地質年代表」(geologic time table)，并標明其各自之起迄年代。(15%)
- 四、試說明台灣島之地體構造、岩性分佈及地層年代。(15%)
- 五、試說明如何利用地球物理探測方法研究地質問題。(15%)
- 六、試舉至少三例說明如何利用地球化學方法來研究地質相關問題。(15%)
- 七、何謂「地球系統科學」(Earth System Sciences)? (10%)

1. 畫圖解釋下列名詞，並詳細說明「構造地質」的意義。(每題5分，共15分)
  - (1) SHEAR STRESS (剪應力)
  - (2) OPEN FOLD (開闊褶皺)
  - (3) DECOLLEMENT (基底滑離面)
2. 不整合有哪些種類？代表什麼意義。分別畫圖解釋生成的經過。(10分)
3. 解釋 RULE OF V'S (V 字型法則) 及其應用。(10分)
4. 畫三個地質圖，顯示三個不同地區分別有 (1) DOME (2) MONOCLINE (單斜)  
(3) PULUNGING FOLD (傾沒褶皺)。(15分)
5. 請說明下列三種地層學的應用、對比的根據、和使用的單位。(20分)
  - (1) LITHOSTRATIGRAPHY
  - (2) BIOSTRATIGRAPHY
  - (3) MAGNETOSTRATIGRAPHY
6. 請就(1)地質年代、(2)成因、(3)岩性三方面比較台灣地區東部和西部的沈積岩。(15分)
7. 地質學上常用來決定地層年代 (DATING) 的方法有哪些？(15分)

1. Please write short answers and draw diagrams if you can, to explain the following terminologies: (50%)
  - (1). western boundary currents
  - (2). primary productivity
  - (3). carbon cycle
  - (4). compensation depth
  - (5). subduction zone
  - (6). oceanic ridge
  - (7). eutrophication
  - (8). Redfield ratio
  - (9). turbidity current
  - (10). estuary
2. What is a T-S diagram, and what can it tell us. Please give some examples. (10%)
3. What is a CTD profile, how is it used in the oceanographic research? (10%)
4. What causes coastal upwellings and what is their significance. (10%)
5. What is El Nino and what are the effects that it causes? (10%)
6. Why Japan Islands, Taiwan, and the Philippine Islands are easily subject to earthquakes? Please draw a diagram to explain your answers. (10%)

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