

國立高雄海洋科技大學 98 學年度碩士班入學考試  
海洋環境工程研究所－環境工程與科學試題  
(本試題作答需要用計算機)

**提醒：請將所有的答案，寫在答案卷**

一、選擇題（每題 2 分共 26 分）

1. The density range of sea water is (A)  $1.02\sim 1.07\text{ g/cm}^3$  (B)  $10.2\sim 10.7\text{ g/cm}^3$  (C)  $1.02\sim 1.07\text{ kg/cm}^3$  (D)  $10.2\sim 10.7\text{ kg/m}^3$ .
2. The zone has a rapid salinity increase with depth is called (A) thermocline (B) pycnocline (C) halocline (D) salicline.
3. The strongest wind-driven current is (A) eastern boundary current (B) western boundary current (C) southern boundary current (D) northern boundary current.
4. Waves approach shore will tend to perpendicular to the shoreline and this phenomenon is called (A) refraction (B) diffraction (C) reflection (D) detection.
5. Waves with longer wavelengths travel faster from the area of their formation than short wavelength waves, separating themselves into groups having similar wavelengths and speeds. This process is known as (A) diffusion (B) dispersion (C) wave training (D) swelling.
6. Which feature has the highest coverage of ocean basin? (A) shelf (B) abyssal plain (C) plateaux (D) ridges
7. Samples of mode water from Atlantic (A), Pacific (P) and Indian (I) Oceans were analyzed for salinity. Unfortunately, the samples were incompletely identified and it was necessary to reanalyze the samples in order to determine which samples came from which oceans. Below please find the correct results from high salinity to low salinity? (A) API (B) IPA (C) AIP (D) PIA.
8. Which drilling project began operation recently? (A)IODP (B)ODP (C)DSDP (D)IMAGE
9. The length of one degree in latitude is about (A)10 miles (B) 1 mile (C) 100 miles (D) 1000 miles.
10. The science that treats the spectrum of interrelationships existing between organisms and their environments and among groups of organisms is called (A) population (B) ecology (C) biology (D) community.
11. Primary productivity in the oceans is about 95% based in the (A) autotrophic organisms (B) nekton (C) zooplankton (D) coral.
12. Photosynthesis of phytoplankton is mainly carried out in the (A) abysal (B) aphotic zone (C) disphotic zone (D) euphotic zone.
13. Which of the followings comprises vast majority of the marine zooplankton? (A) diatom (B) sponges (C) copepod (D) annelids

二、填充題（每一答案 2 分共 24 分）

1. 海洋的平均深度大約是\_\_\_\_\_公里。
2. 淺水波前進的速度（波速）與\_\_\_\_\_成正比。
3. 由於科氏力（Coriolis Force）的影響，在南半球的海洋中，大尺度流動的海流會產生往\_\_\_\_\_偏移的現象。
4. 在農曆初一或十五附近，地球、月亮、太陽三者的相對位置大約在一直線上，此時所形成的潮汐現象稱為\_\_\_\_\_潮。
5. 小明到西子灣測量海水溶氧，測量結果如下：溫度 20°C、鹽度 33、密度 1.023 g/ml、溶氧 5.34 ml/L(STP) 相當於多少\_\_\_\_\_  $\mu\text{mol/kg}$  溶氧。
6. 小明到南灣及小灣測量海水酸鹼值，測量結果如下：南灣 pH=8 及小灣 pH=7，小灣海水氫離子濃度比南灣高多少\_\_\_\_\_  $\mu\text{mol/L}$ 。
7. 小明到七股海邊取得海水，想模仿先民曬鹽。海水結晶產生了碳酸鹽、硫酸鹽及氯鹽類結晶請依結晶先後順序排列\_\_\_\_\_。
8. 海洋植物行光合作用時需要水、二氧化碳、\_\_\_\_\_和\_\_\_\_\_四要素。
9. 海洋中有一群生物，他們不能游泳或游泳能力薄弱，只能漂浮於水中隨波逐流。這樣的生物通稱為\_\_\_\_\_。
10. 生物體中的化學物質濃度會隨著食物鏈的傳遞而增加其濃度，這種現象稱為\_\_\_\_\_。
11. 依據生物的壽命長短、性成熟的快慢、繁殖頻率、繁殖數量的多寡、死亡率的高低、移動能力的強弱等，可將一棲息地內的生物分為兩大類，分別為 K-選擇種和\_\_\_\_\_。

### 三、問答及計算題（共 50 分）

1. 請你例舉任意十項衛生掩埋過程影響垃圾分解腐熟速度之參數。(5 分)
2. 何謂「臭氧層破洞」？(2 分)，臭氧層破洞形成的機制為何？(3 分)
3. 某一焚化爐煙囪半徑為 1m，煙氣流速為 10 m/sec，經量測結果其排放二氧化硫(SO<sub>2</sub>)之濃度為 500 mg/m<sup>3</sup>，請問此煙囪每年二氧化硫的排放量為多少公噸？(5 分)
4. 請用中文解釋說明你對下圖的理解。(5 分)

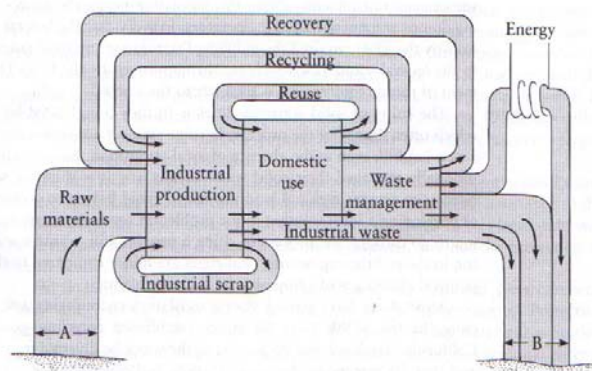
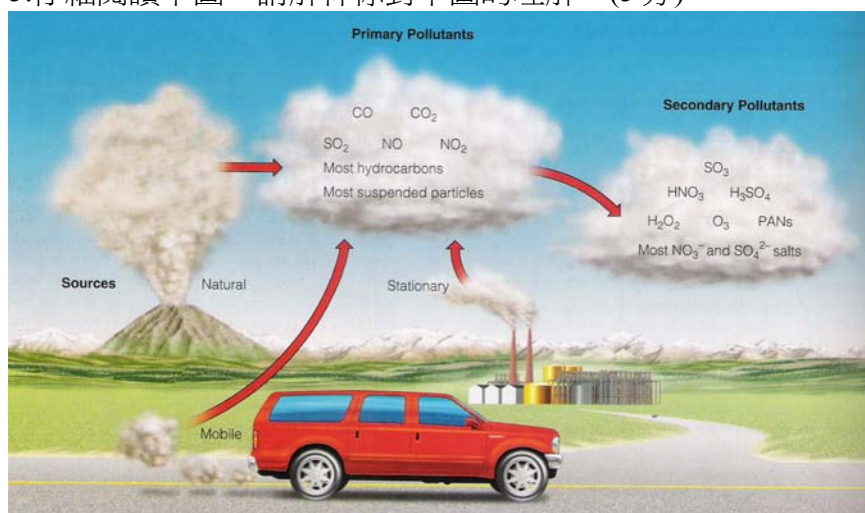


Figure 1-2 Materials flow through society.

5. 仔細閱讀下圖，請解釋你對下圖的理解。(5分)



6. 請平衡下列化學反應方程式(8分)

- (1)  $\text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{NaHCO}_3$
- (2)  $\text{C}_2\text{H}_5\text{NH}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{NH}_3$
- (3)  $\text{Mn}^{2+} + \text{OH}^- + \text{O}_2 \rightarrow \text{MnO}_2 + \text{H}_2\text{O}$
- (4)  $\text{Fe}^{2+} + \text{Cr}_2\text{O}_7^{2-} + \text{H}^+ \rightarrow \text{Fe}^{3+} + \text{Cr}^{3+} + 7\text{H}_2\text{O}$

7. 請寫出兩種可將海水脫鹽製成淡水的方式。(包含：原理、優缺點、限制...) (9分)

8. 將 3g 的醋酸(CH<sub>3</sub>COOH)溶解於蒸餾水中，形成 1 公升的溶液，請問：(1)在未解離前，醋酸溶液的初始濃度為多少體積莫爾濃度(M)？多少 mg/L？(4分)，(2)醋酸的 K<sub>a</sub> = 2\*10<sup>-5</sup>，請問達平衡後，醋酸溶液的 pH 值？(4分)