

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、選擇題(單選題，每項 5%，共 20%)

1. Which factor facilitate by Global warming that causes sea level increase?
 - (a) Melting of ice glacier
 - (b) Melting of floating ice shelf
 - (c) Increasing the oceanic circulation
2. What causes sea water layering?
 - (a) Density differences between water masses
 - (b) Waves
 - (c) Evaporation and precipitation
3. What is the main reason that oceans can absorb a large amount of solar energy without significant increases in temperature?
 - (a) There is a huge volume of seawater.
 - (b) The Heat capacity of sea water is relatively high
 - (c) The large amount of salt in sea water.
4. Which following statement is correct?
 - (a) The pH of ocean water is usually lower than 7
 - (b) Warm water means more productivity.
 - (c) The concentration of chlorophyll in the surface layer (> 10m) is higher than in sublayer (20-50m).

二、問答題 (共 80%):

1. 臺灣東北部海域於棉花峽谷上方有一處湧昇冷渦，此為黑潮流經陸棚邊緣時較深層海水因地形爬升所致，請問：
 - (A) 該湧昇流(Upwelling)之運動方向為逆時鐘或順時鐘方向(5%)?
 - (B) 請詳細說明造成上述湧昇渦流運動方向之物理機制(15%，請以圖示說明)?
2. 海洋基礎生產力(Primary Production)是指海水中浮游植物每天行光合作用所吸收的二氧化碳量，故浮游植物生長速率與存量決定海洋生物資源量的多寡，請問影響海洋基礎生產力的主要因子有哪些(10%)?
3. 聖嬰現象是影響海洋生態系重要因素之一，請問：
 - (A) 聖嬰現象發生時哪一個海域的海表面溫度顯著上升(5%)?
 - (B) 承上，該海域的基礎生產力及漁業資源量將有何影響(15%)?
4. 根據國內科學研究報告指出，臺灣西部沿岸近三十年來受到海水侵蝕甚巨，海岸逐年退縮因而影響海岸生態與人類生存安全。請問：
 - (A) 造成西部海岸地形變遷的主要因素為何(10%)?
 - (B) 面對海岸變遷，依您之見，試以未來 30 年規劃短、中、長期的海岸帶管理策略(20%)?