



OCEG1029 – MARINE BIOGEOCHEMISTRY

II PAO 2025 – EXAM 1

NAME: _____ Date: _____

I hereby declare that during this exam I have fulfilled the Code of Ethics of our University.

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Questions

1. (10 pts) Salinity
 - a. How does salinity change in space? And in time?
 - b. Besides water, what are the 2 major components of seawater? In what proportions?
 - c. How does the Principle of Constant Proportions explain salinity measurement?
 - d. What is the difference between Conservative and non-Conservative properties? Give an example of each.

2. (4 pts) Temperature
 - a. Draw a typical Temperature profile for Ecuador. If salinity does not matter draw a density profile next to it. Show the location for the thermocline and pycnocline.
 - b. What are the characteristics of the densest water (salinity and temperature)?

3. (5 pts) Gasses
 - a. Name 2 Atmospheric – Ocean Exchanges, explain 1.
 - b. Draw the vertical distribution of Oxygen and of Carbon Dioxide, explain why the vertical profiles have these shapes (at least 2 processes of each). Recall what you know about their cycles.
 - c. Explain the Oxygen Minimum Zones (OMZ), and the Anoxic Marine Zones (AMZ)
 - d. What is pH? How is it changing under the Climate Change scenario? Why?
 - e. CaCO₃ is added to water and it dissolves. How will the following parameters vary?
 - i. pH
 - ii. alkalinity
 - iii. total CO₂

4. (8 pts) Nutrients – _____ (write it down)

For your specific nutrient, describe:

- a. How does this nutrient arrive to the ocean?
- b. Where would you find more of this nutrient? Why?
- c. How are the Atlantic and Pacific nutrient distribution similar or different?
- d. Draw a profile of your nutrient. Explain the main characteristics of this type of curves.
- e. Explain the nutrient cycle.