ANSWER **ANSWER** **ANSWER**

Round: 12A

Four properties of ocean water change dramatically with depth. And, these depth profiles show different patterns in different ocean basins and at different latitudes.

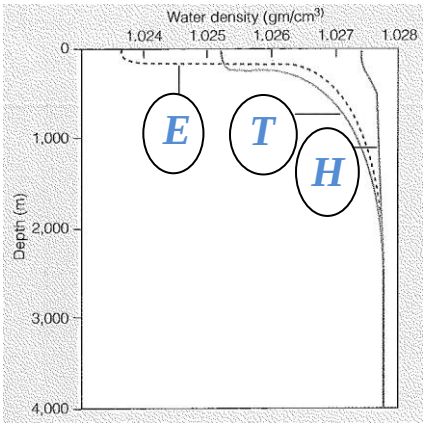

Figure 1: Water Density vs. Depth

1. Figure 1 shows water density vs. depth at different latitudes. Label, in the provided circles in Figure 1, the letter for the profile that indicates the correct characteristics for each of the following:
   a. E for Equator (*2 pts*)
   b. T for Tropics (*2 pts*)
   c. H for High latitude (*2 pts*)
2. Figure 2 shows dissolved oxygen vs. depth at different latitudes. The average depth of each basin is identified.
   a. For each latitude, identify the profile representative of the correct ocean basin in the boxes provided.

-A for Atlantic (1 *pt*) -P for Pacific (1 *pt*)

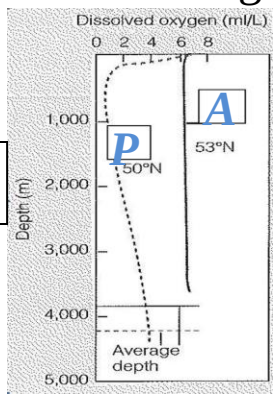

Figure 2: Dissolved Oxygen vs. Depth

   b. Explain your reasoning for your labels.

There is no deep water formation in the North Pacific (1 pt), thus the water is much older (1 pt), and therefore it has a lower dissolved oxygen level (1 pt). Deep water does form in the North Atlantic, so it does have a higher dissolved oxygen (1 pt).

3. In Figure 3, there are profiles of temperature vs. depth for two different latitudes. Place the correct label for each of the following in the triangles provided on the graph.

-L for Low latitudes (*1 pt*) -H for High latitudes (*1 pt*)

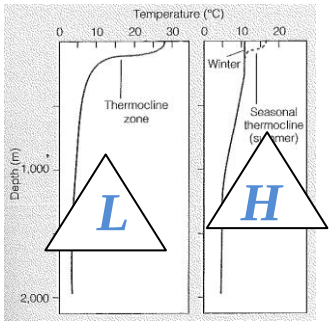

Figure 3: Temperature vs. Depth

4. Figure 4 plots dissolved CO_2, carbonate and bicarbonate with depth. The average depths and CCD depths of each basin are provided.
   a. Place the correct label for each of the following in the pentagons provided:
      -A for Atlantic (*1 pt*) -P for Pacific (*1 pt*)
   b. Why are carbonate sediments rarely observed in the deep ocean? *Almost every point in the deep ocean lies below the CCD (2 pts), the depth at which the supply of carbonate matches the rate it dissolves (2 pts).*

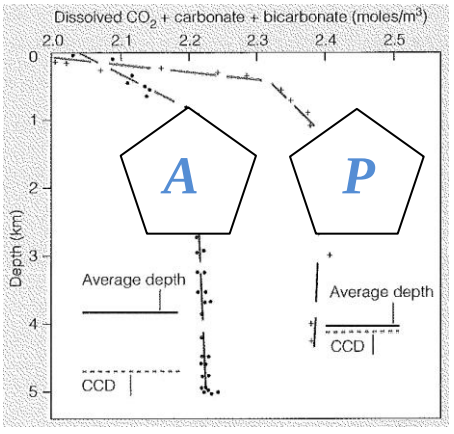

Figure 4: Dissolved CO_2 + Carbonate + Bicarbonate vs. Depth

Reference: Milne, D.H. 1995. Marine Life and the Sea. Wadsworth Publishing Co. All figures from Milne, D.H. 1995. Marine Life and the Sea. Wadsworth Publishing Co.