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87.202 - PRINCIPLES OF EARTH & ENVIRONMENTAL SYSTEMS II
STUDY QUESTIONS AND PROBLEMS IX

1. What factors control the density of seawater?
2. Draw a diagram which shows how the velocity of sound varies as the temperature of seawater decreases.
3. Define and illustrate with a graph (showing the variations with depth) the thermocline, halocline and pycnocline.
4. Why is it possible to calculate the concentration of a major ion in seawater once the chlorinity has been determined?

5. Why is the total percentage of dissolved solids in a sample of seawater greater than the salinity?

6. Why does seawater in mid-ocean appear blue to the observer while seawater in a coastal region appears more greenish?

7. Why are temperature and salinity useful variables for identifying specific water masses in the deep ocean?

8. Explain why a decrease in temperature causes an:
 - a. Increase in the viscosity of water

 - b. Increase in the surface tension of water

9. Calculate the depth at which solar radiation decreases to 10% of the surface value given that the attenuation coefficient for solar light is 0.05/m and invariant with depth. (ans: 46 m)
10. Calculate the latent heat of vaporization for seawater at a temperature of 20°C. (ans: 585.6 cal/g)
11. You have a sample of seawater which was collected at a depth of 2000 m. The insitu temperature was 5°C. The chlorinity of this sample is 18‰. Calculate the salinity, TDS and σ_t for this sample. Correction factors are found in Table 1. (ans: S‰ = 32.52; TDS‰ = 32.67; $\sigma_t = 25.73$)

Table 1. $\Delta_{s,t} \times 10^{-5}$ as a function of salinity and temperature ($\text{cm}^3 \text{gm}^{-3}$)

T (°C)	Salinity ‰					
	30	32	34	35	36	38
-1	379.4	225.6	72.2	-4.4	-80.8	-233.5
0	382.3	229.1	76.3	0.0	-76.2	-228.4
1	386.6	233.9	81.7	5.7	-70.3	-221.9
2	392.1	240.1	88.3	12.6	-63.1	-214.2
4	407.1	256.1	105.4	30.2	-45.0	-195.2
6	426.9	276.8	127.1	52.3	-22.4	-171.6
8	451.2	302.0	153.2	78.8	4.5	-143.9
10	479.8	331.4	183.4	109.4	35.5	-112.1
15	568.7	422.0	275.6	202.5	129.4	-16.6
20	680.5	535.1	390.0	317.5	245.1	100.3
30	966.8	822.9	679.1	607.3	535.6	392.1