SMS-303: Integrative marine sciences, physics (5454).

Quiz Lab 4.

1. **Diffusion:**

a. **is the process whereby a solute is transported from low to high concentration.**
b. **is the process whereby a solute is transported from high to low concentration.**
c. **is the process whereby a solute maintain its concentration.**
d. **is the process whereby a solute concentration is reduced.**

2. **Diffusion:**

a. **is the dominating nutrient transport mechanism into the upper ocean.**
b. **is the dominating nutrient transport mechanism to a phytoplankton cell.**
c. **is the dominating nutrient transport mechanism within a breaking wave.**
d. **is the dominating nutrient transport mechanism in rivers.**

3. **Diffusion of heat:**

a. **can be described as a continuous macroscopic process.**
b. **can be described as a discreet microscopic process.**
c. **is linked to the kinetic energy of molecules.**
d. **all of the above.**

4. **Double diffusion relates to:**

a. **processes arising from similar diffusion rates of heat and salt in the ocean.**
b. **processes arising from similar diffusion rates of nutrients and heat in the ocean.**
c. **processes arising from different diffusion rates of heat and salt in the ocean.**
d. **processes arising from different diffusion rates of nutrients and heat in the ocean.**

5. **The diffusion coefficient has units of:**

a. **Length^2/time.**
b. **Length/time^2.**
c. **Length/time.**
d. **None of the above.**

6. The diffusion coefficients of heat and solutes:

a. Have the same magnitude.
b. Have the same units.
c. Have opposite signs.
d. Have opposite positions.

7. Increasing temperature:

a. will tend to decrease the diffusion of solutes.
b. will not change the diffusion of solutes.
c. will tend to increase the diffusion of solutes.
d. will tend to decrease the diffusion of heat.

8. Diffusion and entropy (entropy is a measure of disorder):

a. are related in that diffusion increases entropy.
b. are related in that diffusion decreases entropy.
c. are related in that entropy decreases diffusion.
d. are not related.

9. The one dimensional differential equation of diffusion:

a. all of the answers below.
b. is a 2^{nd} order partial differential equation.
c. requires an initial condition to be solved.
d. requires two boundary conditions to be solved.

10. Biased random walk:

a. can be modeled by a drift.
b. can be modeled by a diffusion.
c. can be modeled by a diffusion plus drift
d. none of the above.

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