



**EXAM, BI 3061 – BIOLOGICAL OCEANOGRAPHY
(CONTINUATION)**

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Date 15 May 2014

Duration: 4 hours

Credits: 7.5

Allowed aids: None

Language: English, 2 pages

No enclosures

Date of censure: 5 June 2014

Note: The following questions are NOT multiple choice. Each item requires an answer. Drawn figures may be used if so wished.

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1. Viscosity of liquids:

- A. Give a short overview of the viscosity of liquids (definition, what it is, etc.)
- B. Give a few examples of liquids with high and low viscosity
- C. What is the impact of temperature on the viscosity of water?
- D. What is the impact of high viscosity on micro-organisms?
- E. How are viscosity and the diffusion rate related?

2. Reynolds numbers

- A. Give a short description of the Reynolds number
- B. How is the Reynolds number associated with swimming ability?
- C. Which size-class plankton swim near the borderline between viscous and turbulent flow?
- D. In which range of Reynolds numbers is the above mentioned borderline?
- E. Give a few examples of organisms (groups) with very high and very low Reynolds numbers, respectively

3. Coriolis effect

- A. Describe the Coriolis effect and summarize the underlying factors
- B. How does the Coriolis effect vary with latitude and speed of a moving object?
- C. What is the direction of the Coriolis effect in the Northern and Southern hemispheres, respectively?
- D. What is a cyclone?
- E. What is the difference between a gyre and an eddy?

4. Thermohaline circulation

- A. Describe briefly Thermohaline circulation (THC)
- B. Describe the flow of North Atlantic Deep Water (NADW)
- C. What is the North Atlantic Current?
- D. Where in the oceans does production of bottom water take place?
- E. What are the biologically most high-productive areas in the oceans and why?

5. Miscellaneous

- A. Give a brief physical description of the El Niño phenomenon
- B. What are the biological consequences of El Niño off Peru and Chile?
- C. What are the two main types of calcium carbonate in marine organisms?
- D. Which of the two types of calcium carbonate dissolves first (faster) when seawater turns more acidic?
- E. What is meant by 'alkalinity' of seawater?