



NTNU – Trondheim
Norwegian University of
Science and Technology

Department of Biology

Examination paper for BI3061 Biological Oceanography

Academic contact during examination: Geir Johnsen

Phone: 9189 7027

Examination date: 24 May 2016

Examination time (from-to): 09:00 – 13:00

Permitted examination support material: none

Other information:

Only English questions (to avoid confusions regarding terms): Answer may be in english or norwegian

Date of censorship: 20 June 2016

Language: English

Number of pages (front page excluded): 1

Number of pages enclosed: 0

Informasjon om trykking av eksamensoppgave

Originalen er:

1-sidig **2-sidig**

sort/hvit **farger**

Checked by:

Date

Signature

QUESTIONS

Question 1:

- A. Describe briefly “Thermohaline circulation” (THC)
- B. Give a short overview of the viscosity of liquids (definition, what it is, etc.)
- C. Where in the oceans does production of bottom water take place?
- D. What is the impact of temperature on the viscosity of water?

Question 2:

- A. Why is remote sensing of ocean colour measured in the visible part of the spectrum (400-700 nm)?
- B. What are the “pros” (strengths) and “cons” (weaknesses) regarding remote sensing of ocean colour from satellites?
- C. Define the 7 different functional phytoplankton groups used in remote sensing.
- D. Describe shortly the inherent optical properties (IOP) in the ocean.

Question 3:

- A. The prokaryotic phytoplankton comprises two major classes. Can you name these and give examples of important genera? For these two major classes, there are important pigment tracers that can help in the identification of the groups. Can you name 2-4 class specific pigment markers for prokaryotic phytoplankton?
- B. Why is Chlorophyll *a* used as an indicator for phytoplankton biomass using remote sensing from satellites?

Question 4:

- A. How does zooplankton (heterotrophs, such as ciliates and copepods) react to increased food supply with respect to feeding rate and biomass?
- B. Can you briefly discuss the high nutrient – low Chlorophyll *a* situation related to iron availability in the Southern Ocean with respect to biomass and biodiversity in phytoplankton.

Question 5:

- A. Describe the Coriolis effect and summarize the underlying factors
- B. What are the major light harvesting pigments in phytoplankton?

Question 6:

- A. Give a brief physical description of the El Niño phenomenon
- B. What is a cyclone?
- C. What is the difference between a gyre and an eddy?