



FIRST-TERM EXAM
JAN 2026



Program: Biological Oceanography
Chemical Oceanography (204 B.O.)

المستوي الثاني / برنامج علوم البحار البيولوجية
علوم البحار الكيميائية

Department: Zoology

Mark: 90

Time: 2 Hours

Date: 28/12/2025

Answer the Following Questions:

Question One: (20 Marks/ 2 each)

A- Complete the following statements with the suitable scientific word:

1. and are the main resources of trace metals.
2. Fish in waters containing excessive dissolved gases may suffer from
3. The iron cycle can be facilitated by microorganisms, such as and
4. The main causes initiating sediment resuspension in aquatic environments are, and
5. Reverse osmosis membranes is a key technology for
6. Atmospheric deposition is the largest source of in the oceans.

Question Two: (25 Marks)

A- Compare ligands and chelating agents in terms of their definition, binding behavior, and role in metal complex formation. (15 marks)

B- Summarize the key aspects of aquatic chemistry as they relate to environmental chemistry using equations only. (10 marks)

Question Three: (25 Marks)

A- Indicate whether the following sentences are true or false and correct the false ones: (15 marks /3 each)

1. Both black smokers and white smokers are associated with pressure difference. ()
2. Inorganic mercury and particle-bound mercury enter through wet and dry deposition. ()
3. Hydrothermalism is a significant source for several bioactive trace metals in their particulate form. ()
4. Fulvic acid is considered a type of humic substance. ()
5. The amount of gas dissolved in water depends only on the partial pressure of the gas in the atmosphere. ()

B- Given that nitrogen changes its form in the ocean, illustrate the nitrogen cycle using diagrams only. (10 marks)

Question Four: (20 Marks)

A-What are manganese nodules, what is their chemical composition, through which processes do they form, and where are they commonly found in the world's oceans? (10 marks)

B- Compare the characteristics of the epilimnion and hypolimnion in terms of temperature, oxygen levels, and biological activity. How do these differences influence the types of organisms found in each layer? (10 marks)

انتهت الاسئلة

With Best Wishes

Dr. Shimaa Kteeba '

Head of Department: Prof. Dr. Ayman Hyder
