

OC302 Introduction to Oceanography

Examination May 2004

Answer 3 questions, at least one from each section

Time allowed: 2 hours

Section A

Q1. Answer all parts

- a) Future climate change, is expected to bring about global warming, together with a rise in global sea-level. What are the two principal effects of global warming that will cause a rise in global sea-level?
- b) Draw the depth profile of a typical nutrient, e.g. nitrate, in the open ocean. Explain why the profile is this shape.
- c) Write a brief note on the similarities and differences between the major ion chemistry of river water and that of seawater.

Q2. Answer all parts

- a) List the main anthropogenic sources of radioactive elements to the oceans
- b) Draw a typical estuarine concentration versus salinity plot for a substance which is at higher concentration in river water than in seawater and which is (i) conservative (ii) removed from solution at low salinities.
- c) Describe the adverse effects that can result from anthropogenic (human-induced) inputs of nutrients to estuarine waters.

Q3. Answer all parts

- a) What dissolved gas is taken up from seawater by phytoplankton during photosynthesis? What gas is taken up from seawater during the breakdown of organic matter?
- b) If seawater is evaporated, a series of salts will precipitate, of which the most abundant is sodium chloride (NaCl). Describe with the aid of a diagram, the full evaporation sequence
- c) Write a brief note on halmyrolysis

Section B

Q4. Describe how the equilibrium theory for the tides explains the basic features of the earth's ocean tides.

Q5. Explain the difference between shallow water and deep water surface waves and give an example of both.

Explain how waves disperse from a storm region, within which the wind has generated a spectrum of waves.

Q6. Describe the role of the ocean in transporting and re-distributing heat around the earth's surface.