

GLY 150 Partial Exam #2

This guide contains in an outline/question format the important points that have been covered in the course since the first exam. You will be expected to have an understanding of this material for the exam. The exam will cover **Chapters 5 and 6**. In addition to this study guide, I suggest you look at the **summary, key terms and questions and exercises** at the end of each chapter. **Please bring a scantron for the exam** on Thursday, October 15, 2009.

Chapter 5 – Water and Seawater

Describe the relationship between the properties of water and hydrogen bonds

Define heat capacity. How does the heat capacity of water compare with the heat capacity of land? What difference does it make?

Define latent heat of vaporization, latent heat of melting(fusion), and latent heat of evaporation.

Why is the latent heat of vaporization of water so much greater than latent heat of melting? How is the latent heat of evaporation related to the moderation of global temperatures?

Define salinity and its relationship to density of seawater.

What is the thermocline, pycnocline, halocline? Be able to draw typical temperature profiles at polar tropical and mid-latitudes (Fig. 5.23)

How do temperature and salinity affect the density of seawater?

Study figures 5.20 and 5.21. Know the latitudinal distribution of average sea surface temperature and salinity e.g. Equator: high salinity, high temperature,.

Discuss the relationship between temperature, salinity and density of ocean water (Fig.5.22). Why does pure water become less dense before it freezes? (Fig.5.10). Why does salt water rarely freeze?

Familiarize yourself with the unique properties of water listed in Table 5.2

What are the different reservoirs in the hydrologic cycle. Which reservoir contains the most water at any one time?

What is(are) the source(s) of salt in the oceans? What is(are) the sink(s) of salt in the oceans in the cycling of dissolved components in seawater (Fig. 16)?

Define the principle of constant proportions.

How do you measure salinity of seawater? What is Chlorinity?

Know the six major constituents of seawater and their relative ratios (Table 5.3)

What is the freezing point of fresh water? Of seawater? Why the difference?

What is the difference between an acid and an alkali (base) substance? What does the pH scale measure?

What is the average salinity in parts per thousand of seawater? Where in the world's ocean is this value higher or lower? What causes this variability?

Define residence time. What are residence times of the major elements in the oceans? Why are they different for different salts?

Explain the relationship between carbon dioxide and the pH of the oceans. Why is buffering of seawater important? How does the process of carbonate buffering occur? (Fig. 5.18)

Compare the distributions of oxygen and carbon dioxide with depth in seawater. What processes are responsible for the distribution of each gas? Why has ocean acidity experienced a recent increase?

What is the average pH of fresh water? Of seawater?

Chapter 6, Air-Sea Interactions

Know the composition of dry air (Table 6.2) How does temperature effect air? How does water vapor content effect air? What is the average atmospheric pressure at sea-level?

What is albedo? Why is the amount of solar energy received at higher latitudes much less than that a lower latitudes?

How does the tilt of the Earth's axis affect the distribution of solar radiation? Define Tropic of Cancer, Tropic of Capricorn, Arctic and Antarctic Circles.

Study Figures 6.2 and 6.3. Know where on the Earth heat is gained and where it is lost. How is the excess heat at equatorial latitudes being transferred toward the poles?

Why do winds develop? What are Hadley, Ferrel and polar cells?

Study Figure 6.10 Be able to identify on the Earth the location of: the trade winds, doldrums, horse latitudes, westerlies, polar easterlies, high pressure systems and low pressure system.

What causes the Coriolis effect? In which direction are winds and currents deflected in the northern hemisphere by the Coriolis effect? What determines the magnitude of the Coriolis effect?

On a non-rotating Earth what would be the configuration of atmospheric convection cells? How does a rotating Earth affect this configuration?

During winter what type of atmospheric pressure cell (high or low) usually

months?

What direction do high and low pressure cells rotate in the northern hemisphere?

How does the energy radiated from the Sun differ from that radiated from the Earth differ? Study Figure 6.25 Earth's heat budget.

What is the greenhouse effect?

What is the most important greenhouse gas? What are two other important greenhouse gases?

What is an electromagnetic spectrum? Know the relative wavelengths of visible light Vs ultraviolet light, x-rays, gamma rays, radio and microwaves.

What is the Kyoto Protocol? What are some possibilities for reducing green house gases?

Which gases in table 6.6 contribute to the potential **increased** greenhouse effect? What are some anthropogenic (human-made) sources of these gases? What are some natural sources of these gases?

What are some potential effects of global warming?