Lock Haven University
GEOS 120 - Oceanography
Study guide for test #1

There will be 20 multiple choice questions (1 points each), 10 definitions (4 points each) and 2 short answer questions (20 points each). Your definitions should not exceed 2 sentences and/or a small sketch (where appropriate). Your short answer questions should be couple of paragraphs long. You can just use bulleted points instead of writing long sentences (no mumbling, please ☺). You can enhance your answers with illustrations, graphs, and sketches (if you deem necessary).

Know the following terms. Also, look up your lab quizzes for some definitions: Oceanography, Uniformitarianism, longitude, latitude, sounding, chart, bathymetry, map projections, hypsograph, histogram, great circle, small circle, hypothesis vs. theory, Nebular hypothesis, terrestrial planets, jovian planets, crust, lithosphere, asthenosphere, mantle, core, differentiation, outgassing, lithospheric plates, Wilson Cycle, the Ring of Fire, Miller Experiment, HMS Challenger, ODP, GOOS, NOAA, Continental Drift, Sea-floor spreading, convection currents, magnetic anomaly, magnetic declination, magnetic inclination, Curie point, Mid-ocean ridges/rises, polar wander curve, MOR, oceanic trenches, transform fault, hot spots, rift valley, echo sounding, multibeam sonar, continental margin, shelf break, submarine canyon, submarine fans, turbidity current, turbidites (Bouma's sequence), Western boundary under currents (WBUC), Benthic nepheloid layer, mud waves, abyssal plain, seamount, abyssal hill, gyouts, fringing coral reefs, atoll (ring corals), Fe-Mn nodules, Escarpment, accretionary wedge, Salt domes, black smokers, white smokers, vent glow, chemosynthesis, lithogenous, biogenous, hydrogenous, cosmogenous sediments, lysocline vs. CCD, ophiolite, Facies analysis, siliceous ooze, carbonaceous ooze, microtektites, pelagic clay.

Short answer questions:

- What are four major branches of oceanography? How do they differ from each other?
- Is the knowledge of the oceans important to a non-scientist or non-oceanographer? Know at least ten reasons as to why people should study the world oceans (be specific).
- How does the Nebular hypothesis relate to oceanography? How were the world oceans created initially? How did the configuration of the world oceans change over geologic time? Why are the oceans relatively young compared to the continents?
- Know the major players and/or nations who contributed to our understanding of the oceans. Know the history of oceanography in chronological order (i.e. starting with old history and ending with 21st century). You will have to memorize at least four stages (early, middle, age of discovery, and last century) in advancement of oceanography. For example, know what did the Phoenicians, Greeks, Vikings, Chinese, Europeans, and Americans discover or contribute towards our understanding of various aspects of oceans.

- What is plate tectonics? How many plates are there? How does the concept of plate tectonics vary from the concept called the continental drift? What evidence did A. Wegener used to pursue the concept of continental drift? Why the idea of continental drift didn't fly?
- Who discovered the sea-floor spreading and the convection currents in the mantle? How do these concepts relate to plate tectonics?
- Know the major features associated with three different type of plate?
- How do the presence of hot spots verify the plate movement and their rates?
- What is magnetic anomaly? Who first demonstrated the magnetic anomaly patterns of ocean floors? How do the magnetic anomaly patterns of ocean floors support the idea of plate tectonics?
- What is polar wander curve? How do polar wander curves support the idea of plate tectonics?
- What evidence did the ODP collect that support the concept of plate tectonics?
- Know major characteristics (e.g. occurrence of volcanoes, earthquakes, trenches, mountain ranges, submarine volcanic ridges, black smokers, etc.) associated with three types of plate boundaries (convergent, divergent, transform) and geographic locations where you are likely to find such boundaries.
- What is a rift valley? Along what plate boundaries are you likely to find a rift valley (e.g. East African Rift Valley, which is also called the Red Sea)?
- Where (i.e. along what type of plate boundaries) do the new ocean floors form and where do the old ocean floors destroyed?
- What is the Ring of Fire? Why it this important for us to know (i.e. what happens there)?
- Why do ocean floors get younger and deeper away from mid-ocean ridges? Know that the Earth itself is about 4.6 billion years old. Why isn't there any ocean floor older than 200 million years old?
- What is the Wilson Cycle? Know examples of each of the stages or components of this cycle as they relate to evolution of oceans.
- What is the difference between a passive margin and an active margin type ocean?
- What is an example of a passive margin and an active margin type ocean? What makes (i.e. what zones together is called the continental margin) the continental margin of a passive margin type ocean?
- Describe geologic processes and the types of features (seascape) that could be observed in various parts of a passive margin type continental margin. Sketches might useful in answering this question
- Know each physiographic province (continental shelf, continental slope, continental rise, abyssal plain, mid-oceanic ridges) of a passive margin type ocean in terms of their typical width, depth, type of sediments found, geologic processes active (e.g. waves, tides, turbidity currents, volcanic activities, coral reef formation, etc.).
- What are submarine canyons? How to they differ from the oceanic trenches in terms of their location, size, and the processes that form them?

- What is turbidity currents? Why are they important? What is turbidite (Bouma's sequence)? Where in the ocean are you likely to find submarine fans (e.g. Bengal submarine fan)? How do they form?
- What are gyout and seamounts? Where (i.e. in which physiographic province and geographic location) are you likely to find seamounts and ring corals? How do they (ring corals) form?
- What is the difference between black smokers and white smokers? Where do you find them? Why do they look black or white? What type of organisms are you likely to find near black/white smokers?
- What are different types of marine sediments. Know the origin, distribution, and processes responsible for various types of marine deposits (lithogenous, biogenous, hydrogenous, and cosmogenous). Know specific examples (at least three from each type) of different marine deposits.
- What factors control the occurrence and distribution of marine sediments (e.g. delivery, dilution, and destruction)?
- If you were given a small amount of marine sediments collected from one of the world oceans, what analysis or reasoning will you use to determine the following aspects of your sediment sample? (1) the possible location (i.e. which ocean basin it comes from), (2) physiographic province (i.e. continental shelf, slope, rise, abyssal plain, trench, or MOR), (3) water depth, (4) age, and (5) climate zone (i.e. possible latitude). In other words, what kinds of analyses or data collection would you need to answer this question?