Earth History Exam 1

Name

1. (12 pts) give two examples <u>each</u> of (a) lithologic; (b) geochemical; and (c) biological climate proxies and discuss in each case what you can infer about climate.

2. (4pts) Is the name "arthropod" an example of an animal kingdom, phyla, class or order? What are at least two features that all arthropods share?

- 3. (16pts) on the following page is a global reconstruction for the Devonian Period.
  - a. In pencil, draw the major surface wind belts
  - b. Using a colored pencil, draw the major ocean surface gyres
  - c. Hypothesize whether the climate at location "X" would be most likely be warm and wet and dry and hot, and why
  - d. Label the location of the ITCZ, assuming a northern hemisphere summer
  - e. Would there have been a well developed thermohaline circulation for this time? Why or why not?



Middle Devonian (Givetian)

- 4. (8pts) Examine the following stratigraphic column. Rock types are indicated to the left of the column.
  - a. Label whether each unit represents a transgression (T) or regression (R).
  - b. What is the nature of the contact between units A and B?



5.(2pts) Geologists refer to Hudson Bay, Canada, as an example of a modern epeiric sea. What is an epeiric sea?

- 5. Shown on the following page are two lithofacies maps. Map one is older than map two.
  - a. on Map one, label where you believe that land would be found, and use an arrow to indicate the direction towards the basin (2pts)
  - b. Does Map two indicate sea level has risen or fallen in the interval of time between maps one and two? (2pts)
  - c. What two lines of evidence do you see that support your answer to question 5b? (4pts)



6. (9 pts) What are the three components of Milankovitch cycles and on what frequency does each vary?

7. (10pts) If measurements of the  $O_{18}/O_{16}$  ratio in a marine fossil shell show a decrease in value ( $O_{18}/O_{16}$  decreases), would this be characteristic of an interglacial warm period in Earth history, or a cool down? Explain your answer.

8. a. (4pts) Explain why Apparent Polar Wandering curves demonstrated that the plates moved over time.

b. (2pts) What relationship of the Earth's magnetic field to the Earth's surface enables geologists to determine the latitudinal position of various plates in the geologic past?

9. a. (10 pts) Demonstrate that you understand how extensional, collisional and transform plate boundaries differ by listing at least one characteristic of <u>each</u>, in terms of their seismicity, volcanism, and topography.
b. (2pts) of all the characteristics you just listed, which is/are the one(s) most likely to be preserved in the geologic record (*i.e.* will be the best record of that type of ancient plate boundary)?

10. (4pts) Complete the following sentence: "Determining the grain size of a sedimentary rock enables to us to draw conclusions about \_\_\_\_\_\_

Because this varies inversely with \_\_\_\_\_\_, grain size can be used as a proxy for bathymetry of the depositional environment."

11. (7pts) To demonstrate that you understand what these terms mean, provide a modern example of each of the following; you may not use the same organism twice.

- a. vascular plant
- b. echinoderm
- c. cnidarian
- d. angiosperm
- e. pelecypod
- f. non-vascular plant
- g. gastropod
- h. arthropod

12. (12 pts) List the geologic periods of the Phanerozoic, from oldest to youngest, and their ages.

13. Paleogeography is determined by examining the distribution of various rock types. What can you infer about the presence of mountains, shallow seas, shorelines, lagoons or bays, lake vs ocean, etc. from the following rock types:

- a. mica- rich sandstone
- b. limestone

- c. granite
- d. mudcracked shale
- e. well sorted, quartz-rich sandstone
- f. conglomerates
- g. vesicular basalt
- h. symmetrical rippled sandstone