1. In a cold climate, what type of sediment would you predict from weathering of an ancient sequence of sandstone? Include both grain size and composition. (2 points)

2. Next to the stratigraphic column, interpret the processes that deposited the sediment for the three sedimentary rock types (diamictite, sandstone, and shale). Please include the way sediment was transported (i.e. bedload, suspension, in a laminar/turbulent flow, by wind/water/ice) and how it was deposited (i.e. by migration of a bedform, settling out, etc.). (4 points)

3. Sketch a map view of three types of deltas showing the differences in river, wave and tidal influences on delta morphology. Label the features that make them different or describe them in a list. List 3 types of cross stratification you would see in each and use arrows to indicate where each is likely to form. (9 points)
4. For the stratigraphic column below, list the process or flow regime that produced the sedimentary structures in each segment and label each with the appropriate depositional event. (3 points)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Lithology</th>
<th>Mud</th>
<th>Sand</th>
<th>Gravel</th>
<th>Texture (Sorting, color, sedimentary structures, fossils, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Process Interpretation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bioturbation</td>
</tr>
<tr>
<td>20 cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Faint Planar Lamination</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Current ripples</td>
</tr>
<tr>
<td>40 cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Planar Lamination</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sole Marks</td>
</tr>
</tbody>
</table>

Depositional Event for above column:
How does flow speed change through time?

5. List the grain size and a characteristic sedimentary structure for each of the environments labeled in the following sketch. (6 points)

<table>
<thead>
<tr>
<th>Site</th>
<th>Grain Size (mud, fine sand, or coarse sand)</th>
<th>Sedimentary Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. The following stratigraphic column represents a sequence of rocks deposited during a change in depositional environments. Interpret the processes that deposited the sediment. Please include the ways sediment was transported (i.e. bedload, suspension, in a laminar/turbulent flow, by wind/water/ice). (3 points)

7. Draw a simple sketch that illustrates the processes that deposited the sediment in the environments represented by the stratigraphic column and show the spatial relationship among the environments. Label the environments on your sketch. (2 points)
7. In the following two stratigraphic columns, the bars represent the range of fossils 1, 2, ... 12 (bold numbers). The numbers written sideways represent the location in the stratigraphic column where the fossil was first and last observed. The bentonite bed is a volcanic ash. Show three time correlations between the two columns and describe the features you used to make that correlation and why they suggest a time correlation. (6 points)

Correlation A:

Correlation B:

Correlation C:
Choose 3 sedimentary environments from this list:

Braided river  Storm-influenced Delta
Meandering river  Tide-influenced Delta
Aeolian dunes  River Dominated Delta
Alluvial Fan  Submarine turbidite fan
Beach and foreshore  Glacier ending in the ocean

Answer the questions on the following pages for each environment (20 points for each environment as listed below)

Name of Environment 1: (0 points)

8. Draw a sketch of your chosen environment showing the different fluids and flows (3 points).

9. List each flow type (e.g. ice, debris flow, flowing water, standing water, etc.) Is the flow for each of the fluids turbulent or laminar? Why is each flow turbulent or laminar? Answer the second question in reference to the variables in the Reynolds number equation (3 points)
10. Describe how the flow varies in speed in space and/or time? (2 points)

11. What are approximate grain sizes that would be transported in the various parts of this environment, and which mechanisms (e.g. in suspension, saltation, bedload, etc.) are transporting the different grain sizes if there is a range in grain size? (4 points)

12. Where are the sediments deposited in the environment, and what conditions promote or are required for their deposition? (e.g. how do variations in flow speed influence where sediments are deposited, how do these variations change relative to the depositional environment, etc.) (4 points)

13. Describe the sedimentary structures that form in the environment. Include uniquely identifying features as well as a typical vertical sequence of structures if there is one. Feel free to make a sketch of a representative stratigraphic column or cross section to help highlight these features. (4 points)
Name of Environment 2: (0 points)

14. Draw a sketch of your chosen environment showing the different fluids and flows (3 points).

15. List each flow type (e.g. ice, debris flow, flowing water, standing water, etc.) Is the flow for each of the fluids turbulent or laminar? Why is each flow turbulent or laminar? Answer the second question in reference to the variables in the Reynolds number equation (3 points)

16. Describe how the flow varies in speed in space and/or time? (2 points)
17. What are approximate grain sizes that would be transported in the various parts of this environment, and which mechanisms (e.g. in suspension, saltation, bedload, etc.) are transporting the different grain sizes if there is a range in grain size? (4 points)

18. Where are the sediments deposited in the environment, and what conditions promote or are required for their deposition? (e.g. how do variations in flow speed influence where sediments are deposited, how do these variations change relative to the depositional environment, etc.) (4 points)

19. Describe the sedimentary structures that form in the environment. Include uniquely identifying features as well as a typical vertical sequence of structures if there is one. Feel free to make a sketch of a representative stratigraphic column or cross section to help highlight these features. (4 points)
Name of Environment 3: (0 points)

20. Draw a sketch of your chosen environment showing the different fluids and flows (3 points).

21. List each flow type (e.g. ice, debris flow, flowing water, standing water, etc.) Is the flow for each of the fluids turbulent or laminar? Why is each flow turbulent or laminar? Answer the second question in reference to the variables in the Reynolds number equation (3 points)

22. Describe how the flow varies in speed in space and/or time? (2 points)
23. What are approximate grain sizes that would be transported in the various parts of this environment, and which mechanisms (e.g. in suspension, saltation, bedload, etc.) are transporting the different grain sizes if there is a range in grain size? (4 points)

24. Where are the sediments deposited in the environment, and what conditions promote or are required for their deposition? (e.g. how do variations in flow speed influence where sediments are deposited, how do these variations change relative to the depositional environment, etc.) (4 points)

25. Describe the sedimentary structures that form in the environment. Include uniquely identifying features as well as a typical vertical sequence of structures if there is one. Feel free to make a sketch of a representative stratigraphic column or cross section to help highlight these features. (4 points)
26. Discus how one could distinguish sediments deposited in two (or all three) of the depositional environments you described above. Use specific information such as grain size variations, differences in sedimentary structures, vertical changes in facies, etc. to highlight the differences. This section should use, can refer to, and will repeat some of the information in the earlier questions. (5 points)