Answer Key

Questions 1-43 are each worth 1 pt.

1. B
2. C
3. A
4. B
5. D
6. D
7. B, E, F (must have all 3)
8. C
9. B
10. E
11. D (source)
12. A (D is a correct answer, however it does not answer the question)
13. A
14. C (A & D are not real processes. They are made up based on the Latin for snow, nix, and a few prefixes)
15. A (source: The picture shows the location of the stoss end & the leeward end. Make sure to note the "from which way" in the question)
16. B
17. B
18. C
19. A
20. E
21. B
22. C (If two glaciers merge, their lateral moraines can merge to form a medial moraine)
23. D
24. B
25. B
26. C
27. C (striations are parallel to the flow)
28. B
29. B
30. A
31. Hanging Valley
32. Cirques or Corries
33. Aretes
34. Tarn
35. Kettle (lake)
36. Crevasse
37. Bergschrund
38. Ogives
39. Roche moutonnee
40. Pingo
41. Piedmont glacier
42. Laurentide Ice Sheet

43. Cordilleran Ice Sheet
44. In 1960, the cumulative is about -1.5m. By 2000, it is about -10m. This means there was a change of about 8.5m in four decades. Thus, the change in thickness per decade is 8.5m/ 4 decades which equals **2.125 m/decade (one point for 2.125 & an additional point if the units are correct. Second point cannot be earned unless the first point is earned. Anything from 1.95 to 2.3 will be accepted as correct)**.
45a. Possible answers for 1pt (full credit): ablation was greater than accumulation, glacier had a negative mass balance etc. For .5pts: global warming, ice melted, greenhouse effect.
45b. Possible answers for 1pt: water can now cross between the lakes (dangerous if one is fresh & the other is salty), species can cross between lakes (could result in an invasive species), if one lake is polluted, the pollution can now enter the other lake.

46. (Award 2pts for a reasonable answer. NASA's answer is provided) Arctic ice is confined on all sides by land, while Antarctic ice is on the edge of the continent. This means it has more room to grow in the winter & can melt more completely in the summer. . In addition, Antarctic ice is subject to a wider range of influences from land, the atmosphere, and the ocean. (source)

47. Starting with the most recent :
___4___ Karoo
___6__ Huronian
__1__ Wisconsin
___2__ Saalian
__5__ Andean-Saharan
___3__ Elsterian
(**Award 1 point for the first five correct answers. If the first five right, then the last should be correct as well, so there is no need to award that an extra point**) (source)

48. There is a correlation (1pt). The carbon dioxide creates a "greenhouse" in the atmosphere, trapping the heat under the clouds. Since the heat cannot escape, it stays near Earth's surface which results in a temperature increase (1pt) (source)

49. **Give 1pt for identifying the method and 2pts for a description. Possible answers are below:**
1. Oxygen isotope data: increased O16 means ice age since the heavier oxygen falls out into the oceans. This means that the ocean should be high in O18.
2. Ice cores. Scientists drill the ice and removed a meter-ish long ice core. The core can be analyzed to determine the gases in the atmosphere at that time period, which can be used to estimate global climate.

50. To find the net balance, you must add the accumulations and subtract the ablations. Exactness of answer will determine points. Method used to find the range of acceptable answers for each point value:

4pts
Since we have an equation modeling the data, we can integrate from 0 to 4 to find the area under the curve. If it is positive, then the glacier is growing; if it is negative, then the glacier is

retreating. $\int_0^4 x^5 - 9.5x^4 + 31.5x^3 - 43x^2 + 20x dx$. This gives an answer of -4.2667 tons. For 4pts, anything within **4.26-4.27 tons**.

2pts
By counting boxes and estimating the half-boxes, I ended up with 1.9 tons accumulation and 4.05 tons ablation. So, for two points, **4 -4.2599999 tons.** Also accepted will be **4.2700001-4.45 tons**.

1pt
By counting every box that the curve passed through or over, I got 4.6 tons. So, for one point, **3.85-4tons or 4.45 to 4.65 tons**.

For an additional point
The mass balance must be either **negative** or it must be stated that the **glacier is losing mass** or **ablation is exceeding accumulation**.

Part IV: Award **one point** for the correct term and **one point** for a correct description of why.

51. Reconstituted glacier; the other two terms describe the activity of a glacier while reconstituted glacier describes the morphology.

52. Moraine; drumlins & eskers can only be formed by continental glaciers while either continental or alpine glaciers can form moraines.

53. Konwakiton Glacier; it does not hold a record for the largest anything. Lambert glacier is the largest glacier in the world and Malaspina glacier is the largest piedmont glacier in the world. (credit will be given for saying Lambert since it is in Antarctica while the other two are in North America. The purpose of this question was not to test student's knowledge of glacier location, but reason for the contrast is correct).

54. Valdivia; Valdivia was an interglacial period while the other two were glacier periods (mentioning only different classification system receives no credit. If the description clearly states that Devensian and Riss come from European systems (Alpine and Great Britain respectively) while Valdivia is from the South American system, the point for the description can be earned.

55. Bora; a bora is a type of katabatic wind while an outburst flood is the definition of a jökuhlaup.