



SCIENCE OLYMPIAD
AT THE
UNIVERSITY OF FLORIDA

Northern Regional: January 19th, 2019

Dynamic Planet C Test

Name(s): _____

Team Name: _____

School Name: _____

Team Number: _____

Rank: _____

Score: _____

Dynamic Planet B/C Glaciers (87 total points)

Multiple choice/fill in the blank (23 points)

1. What types of glaciers are most vulnerable to climate change? (1 point)
 - A. Rock glacier
 - B. Steep valley glaciers
 - C. Hanging glacier
 - D. Small valley glaciers
2. Approximately what percent of glaciers are in retreat? (1 point)
 - A. 50%
 - B. 85%
 - C. 90%
 - D. 98%
3. How are felsenmeer (or blockfields) created? (1 point)
 - A. Glacial erosion
 - B. Freeze-thaw action
 - C. Glacial deposition
 - D. Solifluction
4. How would the melting the the Greenland Ice Cap affect the Earth? (1 point)
 - A. Trade winds will begin to blow the opposite way because of the opened space
 - B. Sea level would rise 7m
 - C. The Atlantic ocean would spread slower from loss of mass of crust
 - D. Cities lower than 30m above sea level would be forced to evacuate since they will be completely submerged
5. If a glacier has a positive mass balance, it is: (1 point)
 - A. Advancing
 - B. Retreating
 - C. Not moving
 - D. Sinking
6. How would the type of snowflakes seen in glacier ice be different between a place (Place A) where the average winter temperature is -2C and a place with an average winter temperature of 30C (Place B)? Assume all other meteorological conditions are the same & both places received precipitation. (2 points)
 - A. Place A would have needle ice while Place B would have columns

- B. Place A would have dendrites while Place B would have needle ice
 - C. Place A would have columns while Place B would have needle ice
 - D. Place A would have dendrites while Place B would have columns
7. What does the term Interglacial mean? (1 point)
- A. The physical distance between glaciers
 - B. The period of time between glacial periods where glaciers are melted
 - C. Differences in temperatures between glaciers
 - D. The approximate mass of a glacier
8. Which of the following is not a way a glacier moves? (1 point)
- A. Creep
 - B. Basal sliding
 - C. Solifluction
 - D. Internal deformation
9. If there are striations pointing north and south in a rock over which a glacier flowed, what direction did the glacier flow? (2 points)
- A. West or East
 - B. North or south
 - C. Not enough information to tell
 - D. The glacier did not flow, the striations can only be from how the rock was originally formed
10. What percentage of earth's surface is above sea level? (2 points)
11. What percentage of the earth's surface is covered by glaciers? (1 point)
- A. 3%
 - B. 5%
 - C. 10%
 - D. 15%
12. What are the two broad categories of glaciers? (2 points)

13. Where does the term periglacial process indicate about a glacier? (1 point)
- A. Around the glacier edge
 - B. Under a glacier
 - C. In a glacier
 - D. Land that used to be covered by a glacier
14. What type of glacial sediment is deposited by a glacier undergoing basal melting? (1 point)
- A. Varve
 - B. Lodgment till
 - C. Stoss deposit
 - D. Eolian deposits
15. Where is the largest velocity in a flowing glacier? (1 point)
- A. Top in center
 - B. Bottom front
 - C. Very center of glacier
 - D. Either flank (they are both equal)
16. Sometimes when an iceberg calves underwater, it will jump out of the water. Why is that? (1 point)
- A. The ice is less dense than the water, so it moves to the surface quickly
 - B. The ice is melting so fast, the water rejects what solid water has not melted
 - C. The melting ice creates air bubbles which propels the ice to the surface
 - D. The glacier is actually hollow, and all hollow things float
17. What is the correct sequence of the North American Ice Ages in order from oldest to most recent? (1 point)
- A. Nebraskan, Kansan, Illinoian, and Wisconsinan
 - B. Montanian, Nebraskan, Wisconsinan, and Illinoian
 - C. Nebraskan, Montanian, Illinoian, and Wisconsinan

D. Wisconsinan, Illinoian, Kansan, Nebraskan

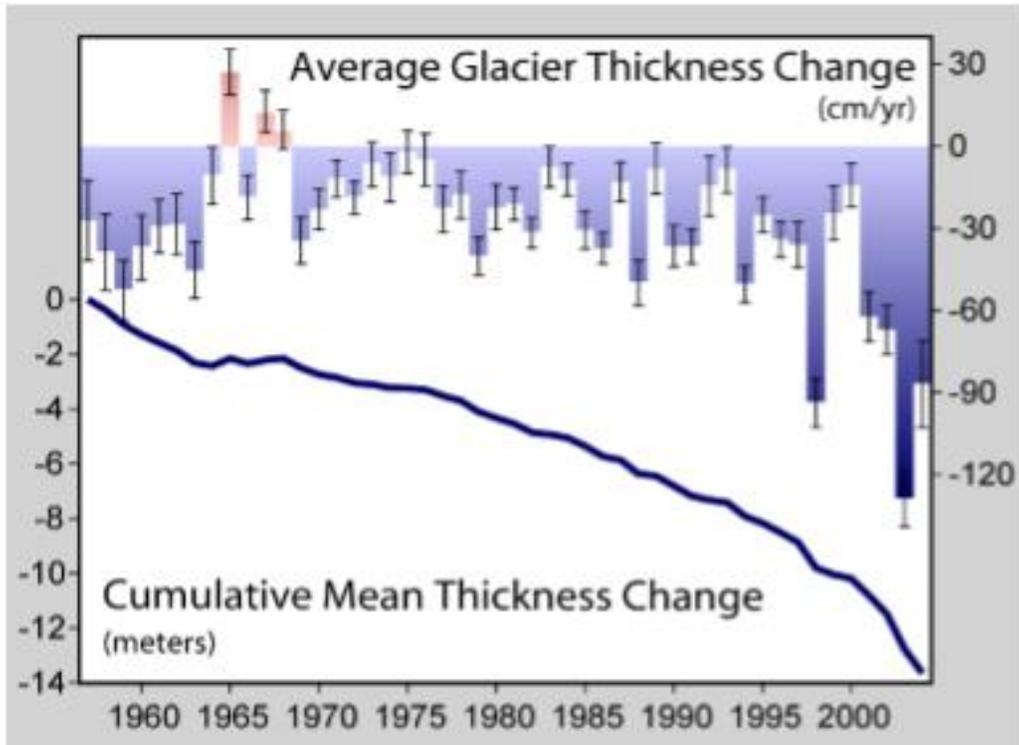
18. Which of the following pluvial lakes formerly occupied Death Valley during the Holocene Epoch (1 point)
- A. Lake Bonneville
 - B. Lake Missoula
 - C. Lake Lahontan
 - D. Lake Manly
19. What is the collective name for processes that occur under a patch of snow? (1 point)
- A. Supranixation
 - B. Solifluction
 - C. Nivation
 - D. Subnixation

Listing/explaining (24 points)

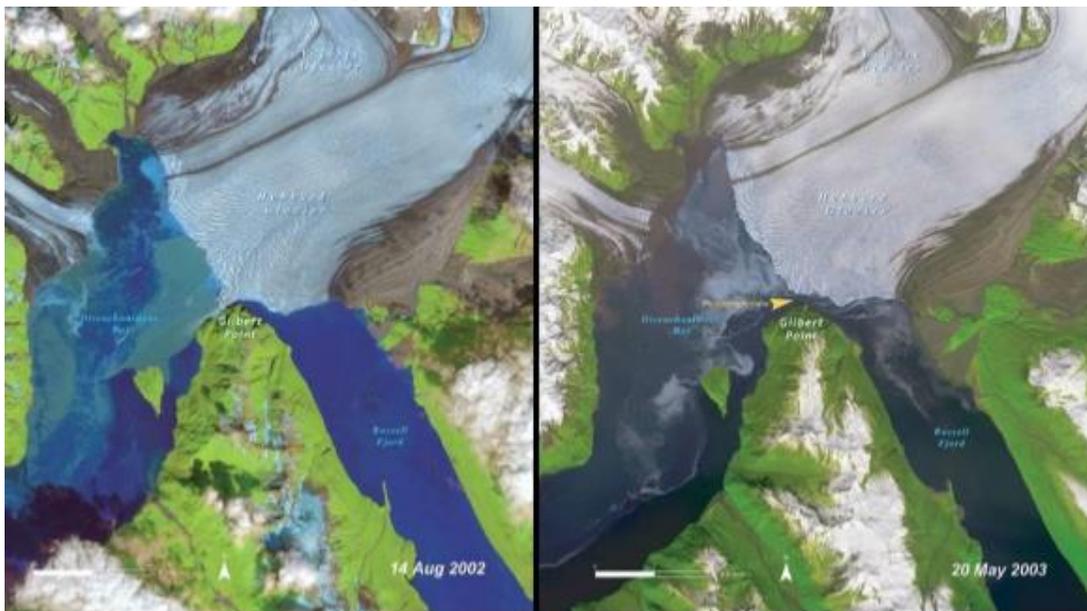
20. Name four types of moraines. (4 points)
21. Explain how a city can be below sea level. (2 points)
22. How much longer do geologists Berger and Loutre predict this interglacial period to last?* (2 points)
23. How long ago was the last glacial period? What epoch was that? (2 points)
24. Explain the glacial theories associated with Alpine glaciers, Mountain ice caps, and Continental ice sheet.** (2 points each, 6 total)
25. Define isostasy and how it relates to glaciers. (2 points)
26. What is the largest glacier on earth today and where is it found? (2 points)
27. Name the two main ice sheets in North America during the Wisconsin Ice Age.*** (2 points each, 4 total)

Short answer (8 points total)

28. Based the graph showing cumulative mean thickness change below, what was the decreased thickness per decade from 1960 to 2000? (2 points)



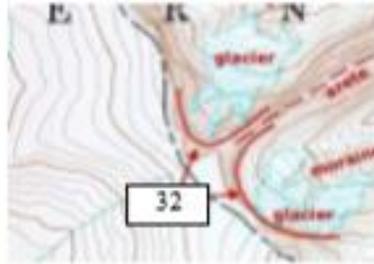
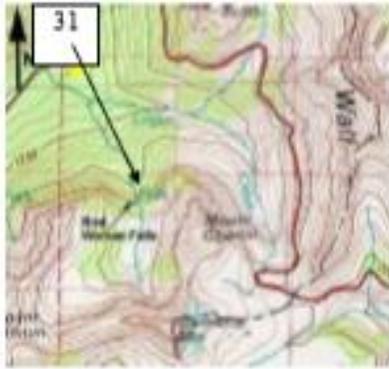
29. The following image shows the same region in August 2002 and then in May 2003. Note the formation of the passage between the bay and the fjord.



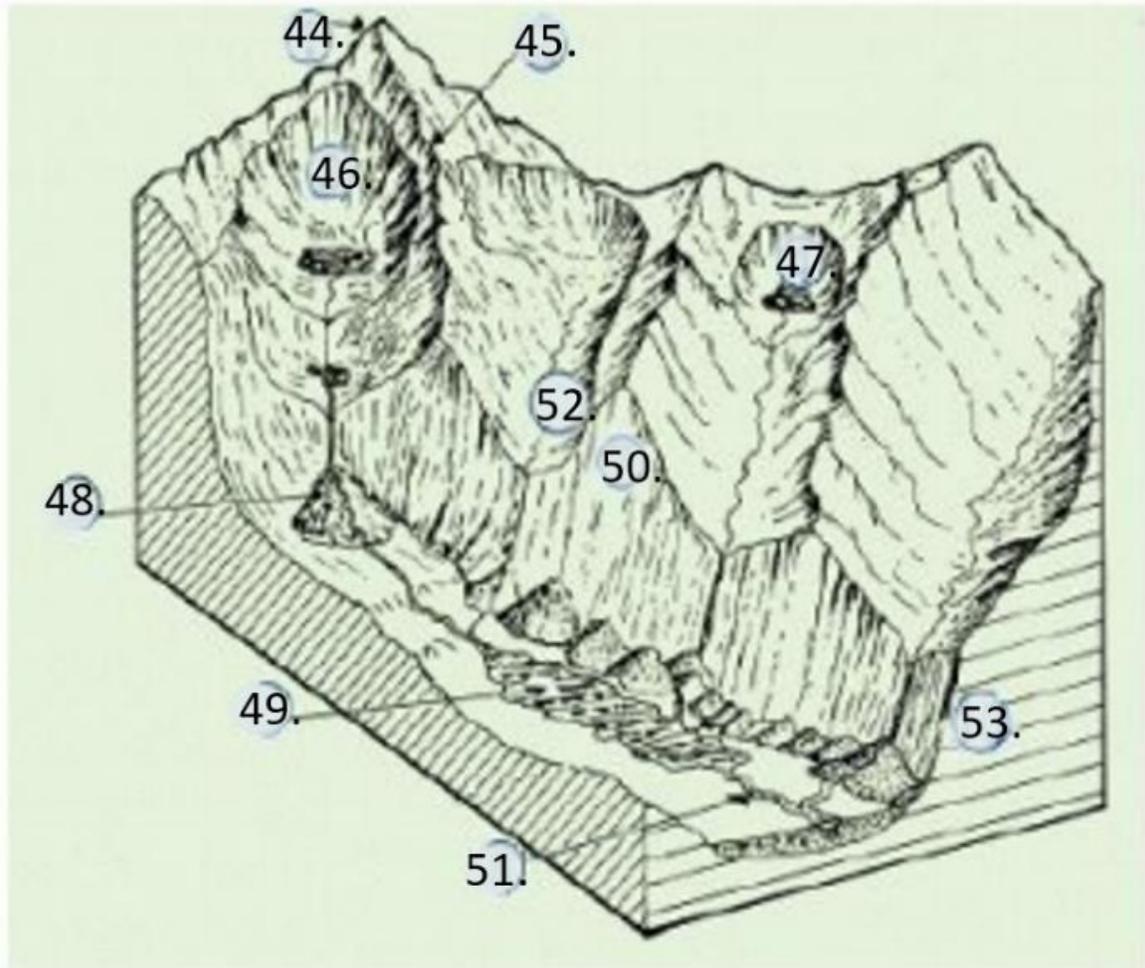
- Explain what could have happened to cause this. (2 points)
- Explain one negative consequence of the “ice dam” melting. (1 point)

30. A NASA article states that Antarctic ice shows greater variability than Arctic ice does. Why is that? (3 points)

For the next section, name the feature that the arrows point to. (1 point each, 12 total)



Glacial landscapes (2 points each, 20 points total)



44. Is a _____ because it has steep, triangular faces divided by sharp ridges or arêtes. (2 points)
45. Is an _____ because it is a sharp ridge between corries. (2 points)
46. Is a _____ because it is an armchair shaped hollow with steep back and sides. (2 points)
47. Is a _____ or _____ because water has gathered in the hollow in the floor of the corrie. (2 points)
48. Is an _____ because it is a fan shaped pile of rock remains washed down by the stream and piled up where the steep valley side meets the valley floor. (2 points)

49. Is a _____ because it is a long narrow lake in a part of the valley cut deeper by the glacier. (2 points)

50. Is a _____ because the ridge has been cut off sharply by the ice that flowed down the main valley. (2 points)

51. Is a _____ because it is too small to have cut the valley. (2 points)

52. Is a _____ because the valley floor is much higher than the floor of the main valley. (2 points)

53. Is a _____ because it has steep sides and a nearly flat floor (the other side of the valley is missing in this cut-away diagram). (2 points)