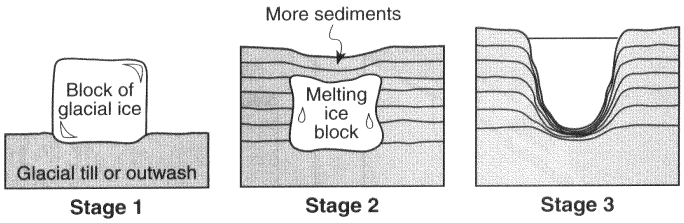
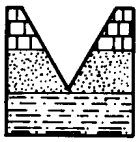
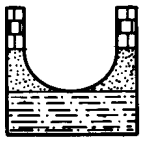
1. The cross sections below show a three-stage sequence in the development of a glacial feature.

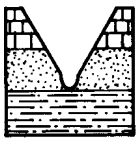


Which glacial feature has formed by the end of stage 3?

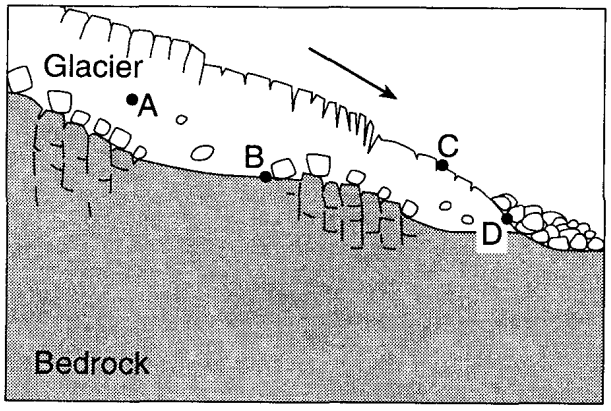
A) kettle lake B) finger lake
C) drumlin D) parallel scratches

2. Which diagram best represents a cross section of a valley which was glaciated and then eroded by a stream?

A)  B) 

C)  **D)** 

3. The cross section below represents the transport of sediments by a glacier.



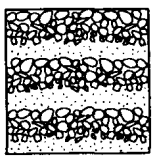
At which location is deposition most likely the dominant process?

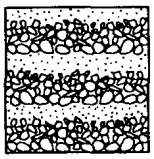
A) *A* B) *B* C) *C* **D) *D***

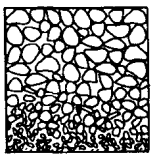
4. Which rock material was most likely transported to its present location by a glacier?

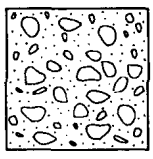
A) rounded sand grains found in a river delta
B) rounded grains found in a sand dune
C) residual soil found on a flat plain
D) unsorted loose gravel found in hills

5. Which soil profile diagram best represents the type of deposit left by a glacier?

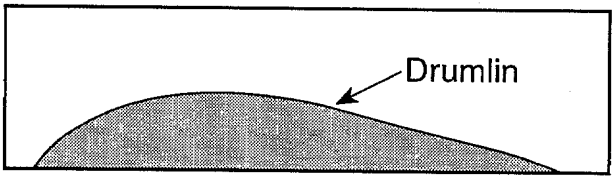
A) 

B) 

C) 

D) 

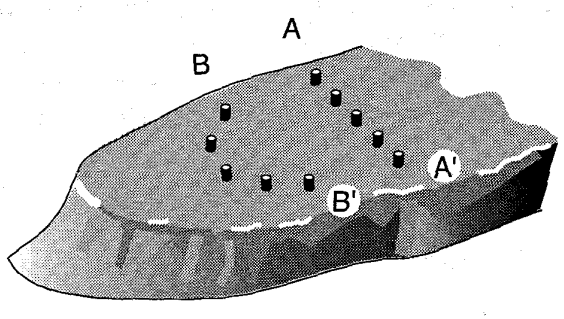
6. The diagram below represents a side view of a hill (drumlin) that was deposited by a glacier on the Atlantic coast.



This hill is most likely composed of

A) cemented sediments
B) unsorted sediments
C) vertically layered sediments
D) horizontally layered sediments

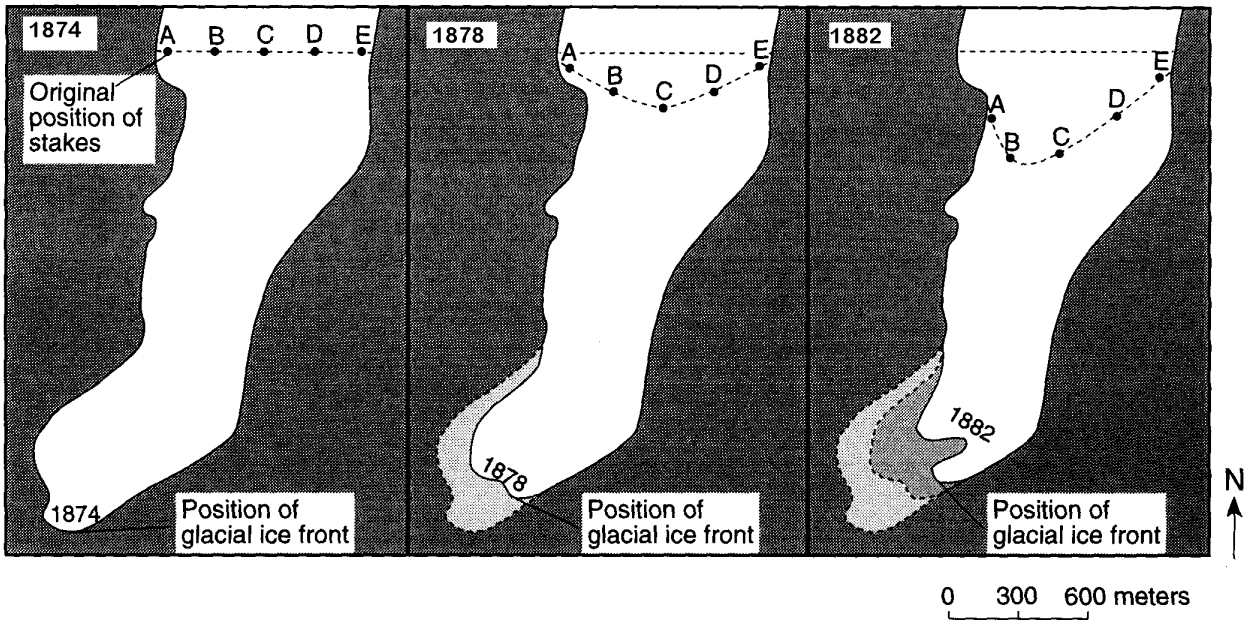
7. Wooden stakes were placed on a glacier in a straight line as represented by *A–A′* in the diagram below. The same stakes were observed later in the positions represented by *B–B′*.



The pattern of movement of the stakes provides evidence that

A) glacial ice does not move
B) glacial ice is melting faster than it accumulates
C) the glacier is moving faster in the center than on the sides
D) friction is less along the sides of the glacier than in the center

8. Base your answer to the following question on the three maps below, which show the ice movement and changes at the ice front of an alpine glacier from the years 1874 to 1882. Points A, B. C, D, and E represent the positions of large markers placed on the glacial ice and left there for a period of eight years.



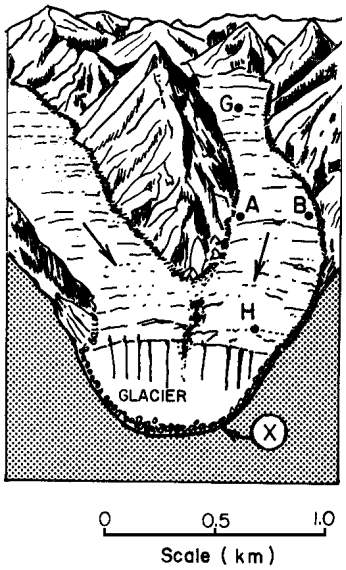
Which statement best describes the changes happening to this glacier between 1874 and 1882?

A) The ice front was advancing, and the ice within the glacier was advancing.
B) The ice front was advancing, and the ice within the glacier was retreating.
C) The ice front was retreating, and the ice within the glacier was advancing.
D) The ice front was retreating, and the ice within the glacier was retreating.

9. What will be the most probable arrangement of rock particles deposited directly by a glacier?

A) sorted and layered
B) sorted and not layered
C) unsorted and layered
D) unsorted and not layered

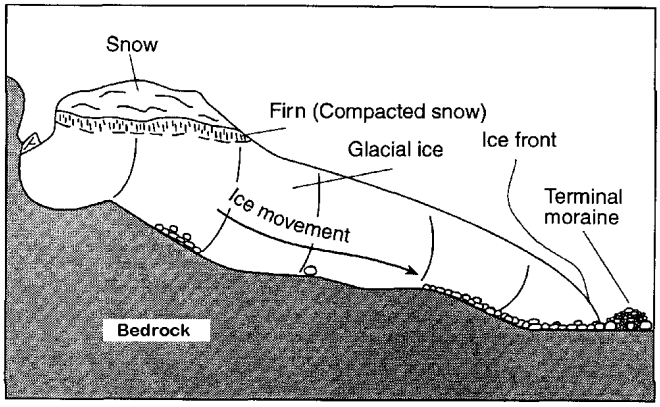
10. Base your answer to the following question on the *Earth Science Reference Tables* and the diagram below. The diagram represents two branches of a valley glacier. Points *A, B, G,* and *H* are located on the surface of the glacier. Point *X* is located at the interface between the ice and the bedrock. The arrows indicate the general direction of ice movement.



Which force is primarily responsible for the movement of the glacier?

A) ground water B) running water
C) gravity D) wind

Base your answers to questions **11** through **13** on the diagram which represents a profile of a mountain glacier in the northern United States.



11. Over a period of years, this glacier gains more snow mass than it loses. What will be the most likely result of this gain?

A) The glacier will decrease in size, and the ice front will retreat.
B) The glacier will decrease in size, and the ice front will advance.
C) The glacier will increase in size, and the ice front will retreat.
D) The glacier will increase in size, and the ice front will advance.

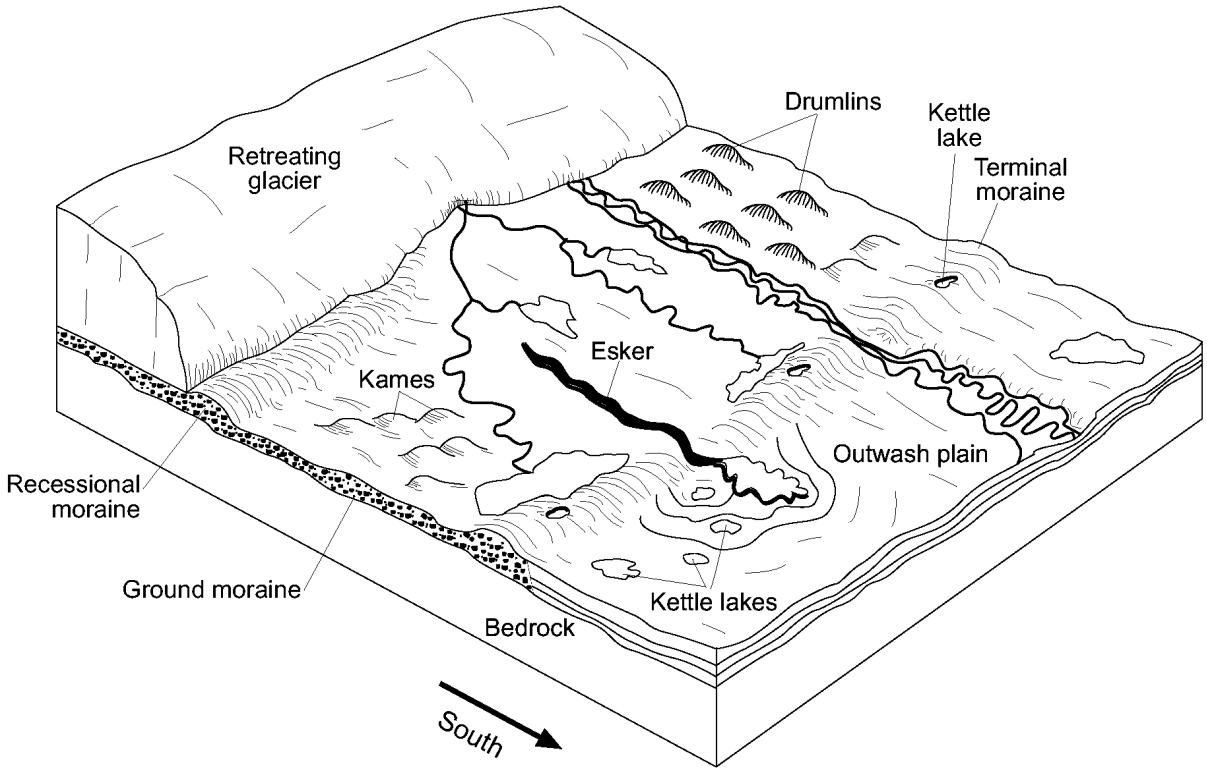
12. The downhill movement of mountain glaciers such as the one shown in the diagram is primarily caused by

A) evaporation of ice directly from the glacier
B) snow blowing across the top of the glacier
C) the force of gravity pulling on the glacier
D) water flowing over the glacier

13. If the climate warms, causing the glacier to melt away, the region that the glacier formerly occupied will be a

A) U-shaped valley with polished bedrock
B) V-shaped valley with jagged bedrock
C) flat plain with bedrock that has been metamorphosed
D) deep ocean trench with bedrock that has been melted and cooled

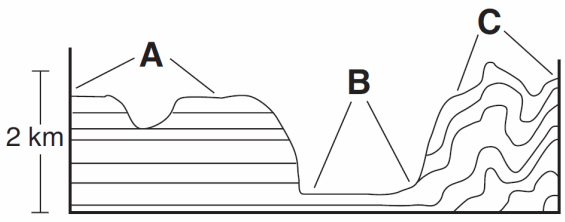
14. Base your answer to the following question on the block diagram below, which shows some of the landscape features formed as the most recent continental glacier melted and retreated across western New York State.



The shape of elongated hills labeled drumlins is most useful in determining the

A) age of the glacier
B) direction of glacial movement
C) thickness of the glacial ice
D) rate of glacial movement

15. The cross section below shows the general bedrock structure of an area containing three different landscape regions, *A, B,* and *C*.

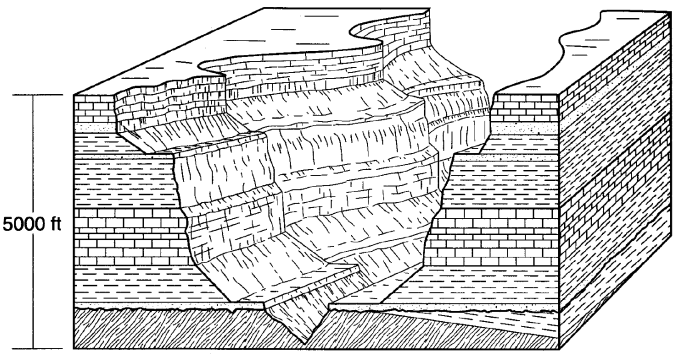


(Not drawn to scale)

Which list correctly identifies the type of landscapes represented by letters *A, B,* and *C*?

A) *A* = plain, *B* = plateau, *C* = mountain
B) *A* = mountain, *B* = plateau, *C* = plain
C) *A* = mountain, *B* = plain, *C* = plateau
D) *A* = plateau, *B* = plain, *C* = mountain

16. The block diagram below represents a portion of the Grand Canyon.



This region is best classified as a

A) plateau
B) mountain
C) plain
D) lowland

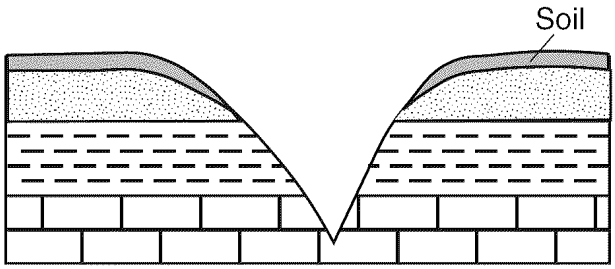
17. U-shaped valleys and parallel grooves in bedrock are characteristics of erosion by

A) mass movement B) wave action
C) running water **D) glacial ice**

18. Landscapes with horizontal bedrock structure, steep slopes, and high elevations are classified as

A) plateau regions B) plain regions
C) lowland regions D) mountain regions

19. The cross section below shows a V-shaped valley and the bedrock beneath the valley.



Which agent of erosion is responsible for cutting most V-shaped valleys into bedrock?

A) surface winds **B) running water**
C) glacial ice D) ocean waves

20. Which evidence could be used to help classify a landscape region as a plateau?

A) rounded peaks
B) trellis drainage pattern
C) V-shaped river valleys
D) horizontal rock structure

21. The longest portion of the Genesee River in New York State flows through which landscape region?

A) Erie-Ontario Lowlands
B) Tug Hill Plateau
C) Allegheny Plateau
D) St. Lawrence Lowlands

22. Which two types of rock are most commonly found as outcrops in New York State's Newark Lowlands landscape region?

A) rock salt and gypsum
B) limestone and granite
C) gneiss and quartzite
D) conglomerate and sandstone

23. In which landscape region is Ithaca, New York, located?

A) Appalachian Uplands
B) Adirondack Highlands
C) the Catskills
D) St. Lawrence Lowlands

24. Which landscape region separates the Adirondack Mountains from the Catskills?

A) Taconic Mountains
B) Tug Hill Plateau
C) Hudson-Mohawk Lowlands
D) Champlain Lowlands

25. Which city is located on the oldest bedrock?

A) Jamestown B) Binghamton
C) Syracuse **D) Watertown**

26. Most of the surface bedrock in New York State south of latitude 43° N. and west of longitude 75° W. was formed during which period?

A) Silurian **B) Devonian**
C) Cambrian D) Ordovician

27. In New York State, the St. Lawrence River flows over a landscape region classified as

A) mountains **B) lowlands**
C) plateau D) coastal plain

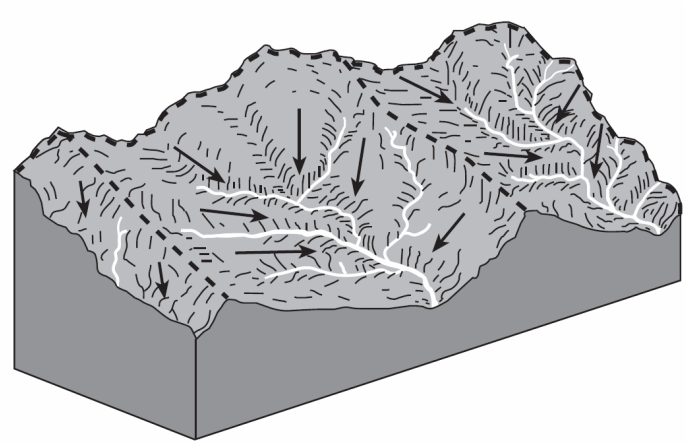
28. During which geologic period was the largest area of New York State surface bedrock formed?

A) Cambrian B) Cretaceous
C) Devonian D) Triassic

29. Much of the surface bedrock of the Adirondack Mountains consists of

A) Gneiss and quartzite
B) limestone and sandstone
C) conglomerate and red shale
D) slate and dolostone

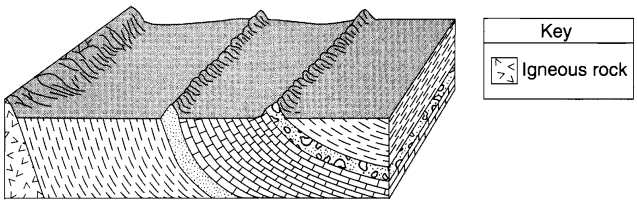
30. The block diagram below represents the drainage basins of some river systems separated by highland divides, shown with dashed lines. The arrows show the directions of surface-water flow.



The three areas separated by highland divides are called

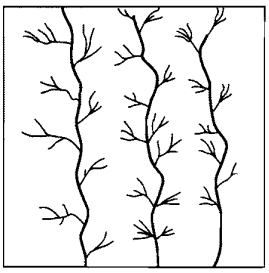
A) meanders
B) floodplains
C) watersheds
D) tributaries

31. The block diagram below shows a landscape region.

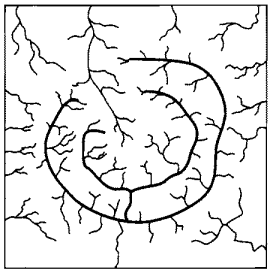


Which stream drainage pattern would most likely develop at the surface of this region?

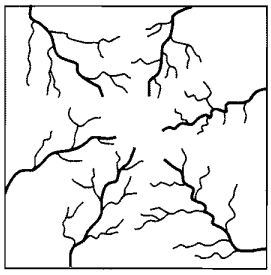
A)



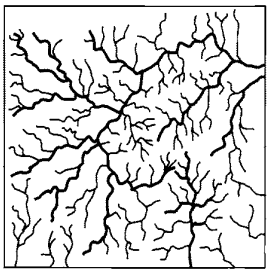
B)



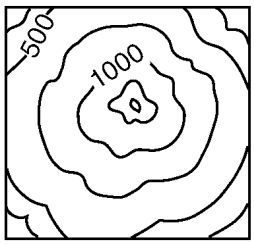
C)



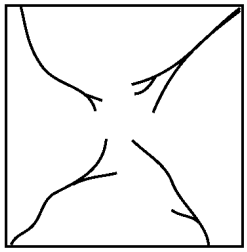
D)

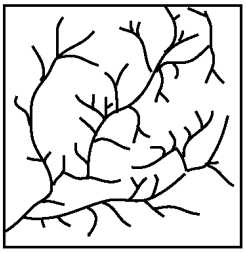


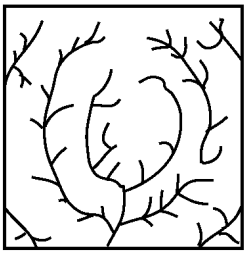
32. The topographic map below shows a particular landscape.

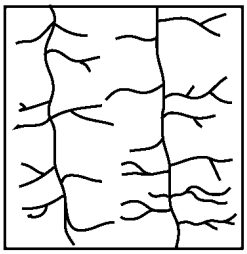


Which map best represents the stream drainage pattern for this landscape?

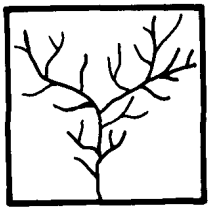
A) 

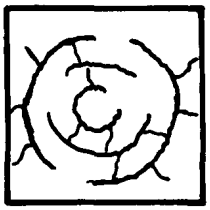
B) 

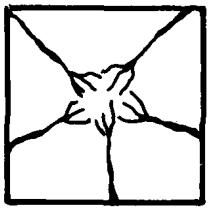
C) 

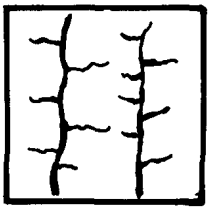
D) 

33. Which map shows the stream drainage pattern that usually develops on the surface of horizontal rock layers?

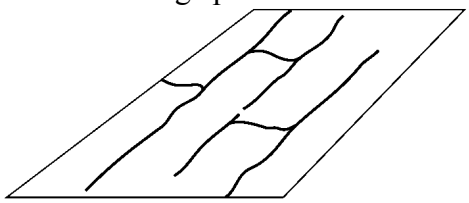
A) 

B) 

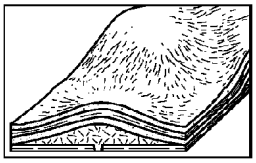
C) 

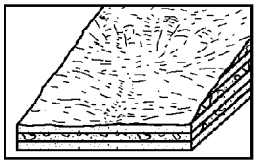
D) 

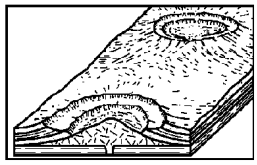
34. The diagram below represents a map view of a stream drainage pattern.

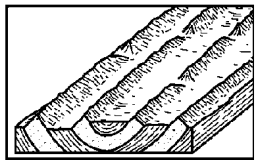


Which underlying bedrock structure most likely produced this stream drainage pattern?

A) 

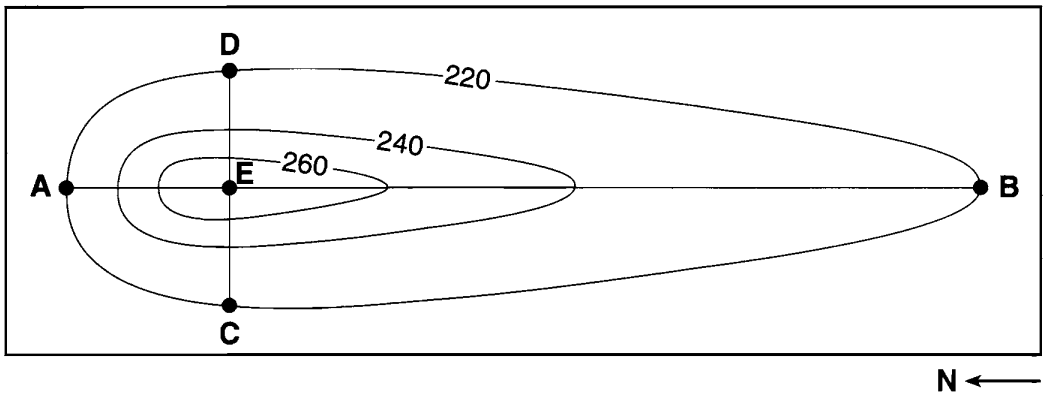
B) 

C) 

D) 

Base your answers to questions **35** and **36** on the contour map below, which shows a hill formed by glacial deposition near Rochester, New York. Letters *A* through *E* are reference points. Elevations are in feet.

Contour Map



35. Which description best compares the gradients of this hill?

A) *AE* and *EB* have the same gradient.
B) *AE* has a steeper gradient than *EB*.
C) *CE* has a steeper gradient than *ED*.
D) *CE* and *AE* have the same gradient.

36. Which set of characteristics most likely describes the sediment in this glacial deposit?

A) sorted and layered
B) sorted and not layered
C) unsorted and not layered
D) unsorted and layered

#	QID#	Ans	Thinking Skills	Standards
1	5652	A		8.B.i.;7.B.ii.c.
2	343	D		8.B.i.
3	3126	D		8.B.ii.
4	326	D		7.B.i.b.
5	1363	D		801.
6	2221	B		7.B.ii.c.
7	2805	C		7.B.ii.c.
8	3487	C		7.B.ii.c.
9	5655	D		7.B.ii.b.
10	837	C		801.
11	2993	D		7.B.ii.c.
12	2991	C		7.B.ii.a.
13	2995	A		8.B.iii.
14	4557	B		7.B.ii.c.
15	6851	D	Applying	8.C.i.
16	6582	A		8.C.i.
17	6492	D		8.C.i.
18	5311	A		8.C.i.
19	4861	B		8.C.i.
20	1936	D		8.C.i.
21	7104	C		8.C.iii.
22	5819	D	Knowing	8.C.iii.
23	693	A		8.C.iii.
24	691	C		8.C.iii.
25	98	D		8.C.iii.
26	5	B		8.C.iii.
27	2237	B		8.C.iii.
28	1496	C		8.C.iii.

#	QID#	Ans	Thinking Skills	Standards
29	3377	A		8.C.iii.
30	7622	C		8.C.ii.
31	6691	A		8.C.ii.
32	5026	A		8.C.ii.
33	1376	A		8.C.ii.
34	5332	D		8.C.ii.
35	6698	B		2.B.ii.b.
36	6699	C		7.B.ii.c.

Answer Key
Glaciers and Landscapes

1. **A**
2. **D**
3. **D**
4. **D**
5. **D**
6. **B**
7. **C**
8. **C**
9. **D**
10. **C**
11. **D**
12. **C**
13. **A**
14. **B**
15. **D**
16. **A**
17. **D**
18. **A**
19. **B**
20. **D**
21. **C**
22. **D**
23. **A**
24. **C**
25. **D**
26. **B**
27. **B**
28. **C**
29. **A**
30. **C**
31. **A**
32. **A**
33. **A**
34. **D**
35. **B**
36. **C**