The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 15, 2017 — 1:15 to 4:15 p.m., only

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Use your knowledge of Earth science to answer all questions in this examination. Before you begin this examination, you must be provided with the *2011 Edition Reference Tables for Physical Setting/Earth Science*. You will need these reference tables to answer some of the questions.

You are to answer all questions in all parts of this examination. You may use scrap paper to work out the answers to the questions, but be sure to record your answers on your answer sheet and in your answer booklet. A separate answer sheet for Part A and Part B–1 has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet. Record your answers to the Part A and Part B–1 multiple-choice questions on this separate answer sheet. Record your answers for the questions in Part B–2 and Part C in your separate answer booklet. Be sure to fill in the heading on the front of your answer booklet.

All answers in your answer booklet should be written in pen, except for graphs and drawings, which should be done in pencil.

When you have completed the examination, you must sign the declaration printed on your separate answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet and answer booklet cannot be accepted if you fail to sign this declaration.

Notice …

A four-function or scientific calculator and a copy of the *2011 Edition Reference Tables for Physical Setting/Earth Science* must be available for you to use while taking this examination.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part A

Answer all questions in this part.

Directions (1–35): For *each* statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the *2011 Edition Reference Tables for Physical Setting/Earth Science*. Record your answers on your separate answer sheet.

1 Evidence that the universe is expanding is best supported by the observation that the wavelengths of light from distant galaxies are shifted toward the

(1) red end of the spectrum because they are shortened
(2) red end of the spectrum because they are lengthened
(3) blue end of the spectrum because they are shortened
(4) blue end of the spectrum because they are lengthened

2 Scientists infer that the Big Bang occurred approximately

(1) 4.6 billion years ago
(2) 7 billion years ago
(3) 9 billion years ago
(4) 13.8 billion years ago

3 Which process produces the largest amount of energy given off by stars?

(1) nuclear fusion of lighter elements into heavier elements
(2) nuclear fusion of heavier elements into lighter elements
(3) radioactive decay of lighter elements into heavier elements
(4) radioactive decay of heavier elements into lighter elements

4 Which two factors caused the interior layering of Earth and other planets in our solar system during their formation?

(1) cosmic background radiation and density differences
(2) cosmic background radiation and specific heat
(3) gravity and density differences
(4) gravity and specific heat

5 The map below shows the location of the Chicxulub impact crater, which was formed in the Gulf of Mexico approximately 65.5 million years ago. With an estimated 108-mile diameter, this crater, which is now buried beneath surface crustal rocks, is one of the largest craters on Earth.

The asteroid impact that formed this large crater is theorized to have caused

(1) a drop in sea level from the sea water draining into the large crater
(2) warmer than normal worldwide ocean temperatures from the hot asteroid
(3) mass extinctions of many species on Earth from extreme climate changes
(4) an increase in worldwide greenhouse gases from vaporizing crustal rocks

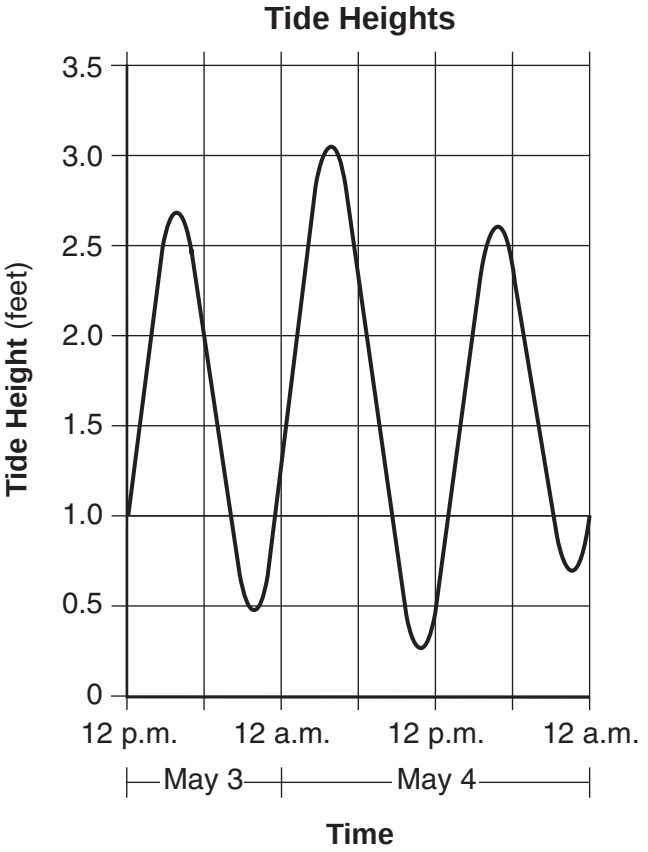
6 The altitude of *Polaris* measured by an observer at the Tropic of Cancer is

(1) 15°
(2) 23.5°
(3) 66.5°
(4) 90°

7 During which month does the Sun rise north of due east in New York State?

(1) February
(2) July
(3) October
(4) December

8 The graph below shows the change in tide heights of the Hudson River at Newburgh, New York.



According to the graph, the time difference between high tide and the next low tide is approximately

(1) 2 hours
(2) 3 hours
(3) 6 hours
(4) 12 hours

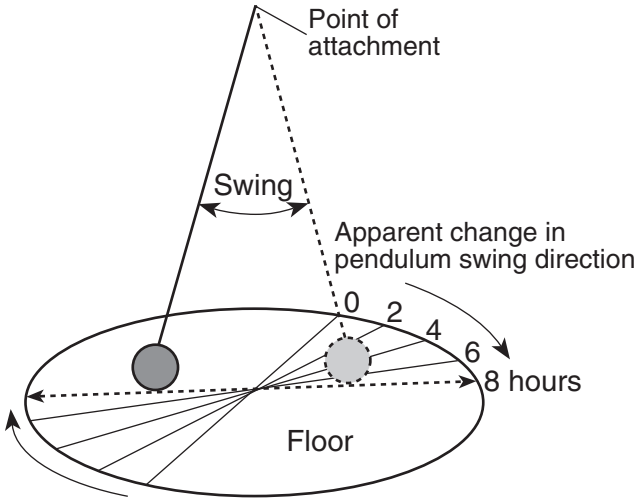
9 During a rainstorm, water is flowing down the side of a hill composed of solid bedrock. What will be the effect on the relative amounts of runoff and infiltration when the water reaches an area of unsaturated soil with a gentler slope?

(1) Runoff will decrease as infiltration decreases.
(2) Runoff will decrease as infiltration increases.
(3) Runoff will increase as infiltration decreases.
(4) Runoff will increase as infiltration increases.

10 What is the dewpoint when the dry bulb temperature is 20°C and the relative humidity is 17%?

(1) –5°C
(2) –2°C
(3) 11°C
(4) 15°C

11 The diagram below represents the apparent changes in the direction of swing of a Foucault pendulum.



This apparent change in direction of swing provides evidence that Earth

(1) has a spherical shape
(2) is tilted on its axis
(3) orbits around the Sun
(4) turns on its axis

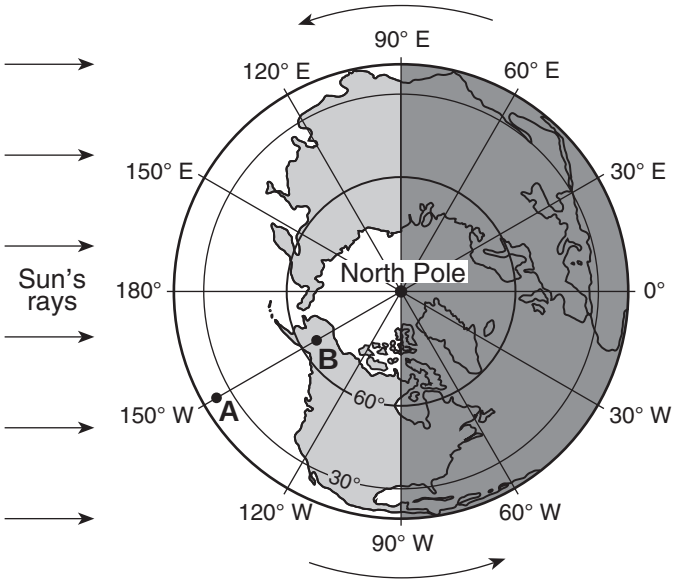
12 Which change in the heat energy content of water occurs when water changes phase from a liquid to a solid?

(1) gain of 334 Joules of heat energy per gram
(2) release of 334 Joules of heat energy per gram
(3) gain of 2260 Joules of heat energy per gram
(4) release of 2260 Joules of heat energy per gram

13 What is the primary source of energy for Earth's weather systems?

(1) incoming solar radiation
(2) subtropical jet streams
(3) precipitation from clouds
(4) heat from Earth's interior

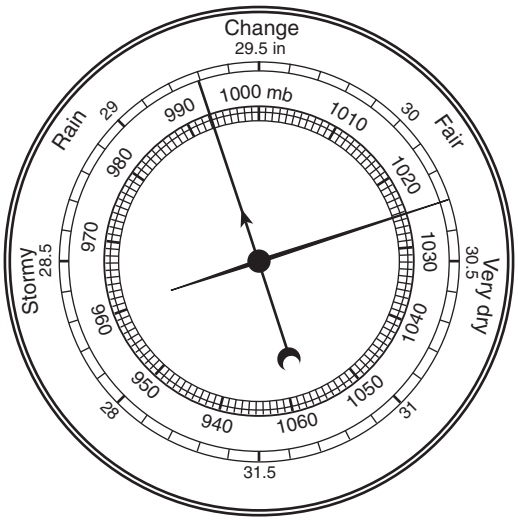
14 The diagram below represents a view of Earth from above the North Pole. Points *A* and *B* represent locations on Earth's surface.



Locations *A* and *B* have the same

(1) latitude and local time
(2) latitude and elevation
(3) longitude and local time
(4) longitude and elevation

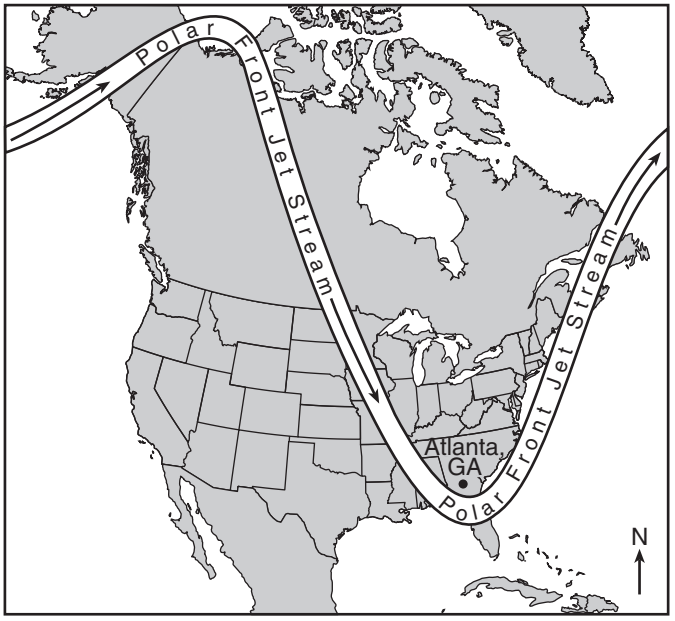
15 The diagram below shows an instrument used in weather forecasting.



This instrument measures atmospheric

(1) wind speed
(2) wind direction
(3) pressure
(4) temperature

16 The map of North America below shows the position of the polar front jet stream on January 7, 2014, and the location of Atlanta, Georgia.



Which type of air mass was most likely located over Atlanta, Georgia?

(1) mT
(2) mP
(3) cT
(4) cP

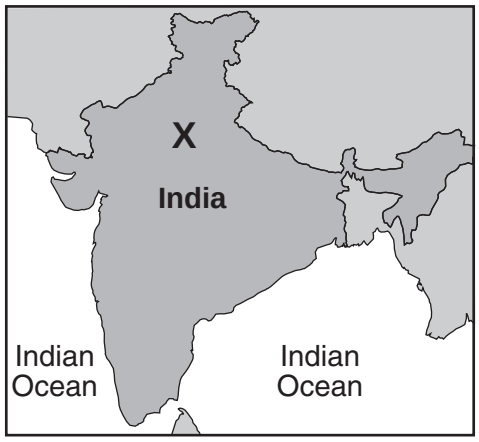
17 As altitude increases in the troposphere and stratosphere, the air temperature

(1) decreases in the troposphere and increases in the stratosphere
(2) decreases in both the troposphere and stratosphere
(3) increases in the troposphere and decreases in the stratosphere
(4) increases in both the troposphere and stratosphere

18 Which factor causes the surface of Lake Ontario to cool at a slower rate than the surface of the land along the shore of the lake?

(1) Evaporating water releases more heat into the lake than into the land.
(2) Lake water has a higher specific heat than land.
(3) Water vapor cools the lake as it condenses.
(4) Sunlight passes through the top layers of the lake water.

19 The map below shows location *X* in northern India.



Summer monsoon rains normally occur in India when

(1) high pressure exists near location *X*, pulling moisture in from the Indian Ocean
(2) high pressure exists near location *X*, pushing moisture out to the Indian Ocean
(3) low pressure exists near location *X*, pulling moisture in from the Indian Ocean
(4) low pressure exists near location *X*, pushing moisture out to the Indian Ocean

20 Which gas absorbs some of the harmful insolation in Earth's upper atmosphere before that insolation reaches Earth's surface?

(1) nitrogen
(2) ozone
(3) oxygen
(4) hydrogen

21 Which ocean current brings warm water to the southeastern coast of Africa?

(1) Agulhas Current
(2) Benguela Current
(3) West Australian Current
(4) Equatorial Countercurrent

22 The intensity of insolation at solar noon from November 1 to February 1 in New York State will

(1) decrease, only
(2) increase, only
(3) decrease, then increase
(4) increase, then decrease

23 Most scientists infer that a major factor in the increased rate of melting of Earth's glaciers is

(1) a decrease in the output of energy from the Sun
(2) a decrease in Earth's atmospheric transparency
(3) an increase in Earth's orbital distance from the Sun
(4) an increase in carbon dioxide in Earth's atmosphere

24 What is the approximate percentage of geologic time that humans have existed on Earth since its origin?

(1) less than 1%
(2) 1.8%
(3) 11.8%
(4) more than 25%

25 The photograph below shows the East African Rift Valley in Africa. Which tectonic movement of Earth's crust is most likely responsible for this feature?

(1) convergence of continental crust
(2) convergence of oceanic crust
(3) divergence of continental crust
(4) divergence of oceanic crust

26 Radioactive dating of fossils and rocks is possible because radioactive isotopes

(1) are found in all fossils and rocks
(2) are easily collected and measured
(3) disintegrate into organic substances
(4) disintegrate at a predictable rate

27 The photograph below shows the bedrock structure of a limestone outcrop.

Which process is responsible for the deformation of this bedrock?

(1) folding
(2) weathering
(3) mass movement
(4) volcanic activity

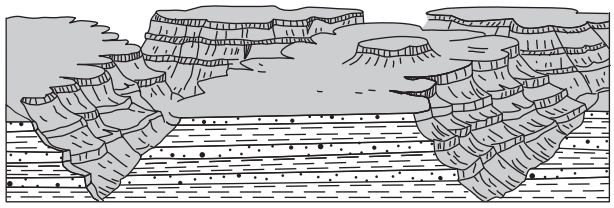
28 Which particles will be transported by a stream moving at a velocity of 5 cm/s?

(1) pebbles, sand, silt, and clay, only
(2) sand, silt, and clay, only
(3) silt and clay, only
(4) clay, only

29 The surface bedrock of New York State that is most likely to contain the mineral garnet can be found in an area 30 miles

(1) north of Binghamton
(2) south of Mt. Marcy
(3) east of Oswego
(4) west of Utica

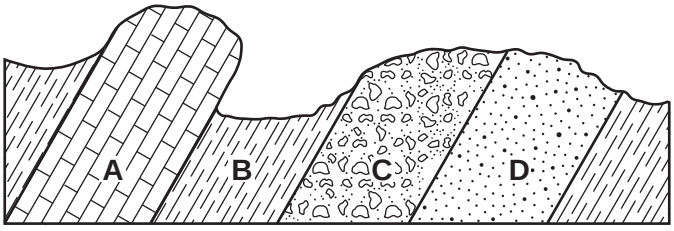
30 The geologic cross section below represents surface landscape features that developed in an arid climate.



A change in climate to one that is more humid would cause the

(1) shape of the hills to become more rounded
(2) elevation of the area to become higher
(3) porosity of the bedrock to increase
(4) rate of chemical weathering to decrease

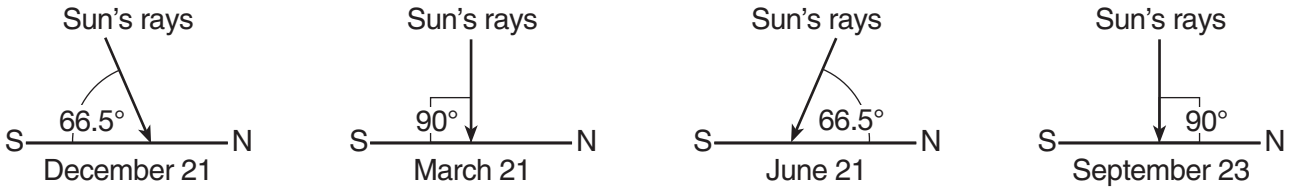
31 The cross section below represents an outcrop of sedimentary rock layers exposed on Earth's surface. Rock layers *A*, *B*, *C*, and *D* are labeled.



Which rock layer shows the greatest resistance to weathering and erosion?

(1) *A*
(2) *B*
(3) *C*
(4) *D*

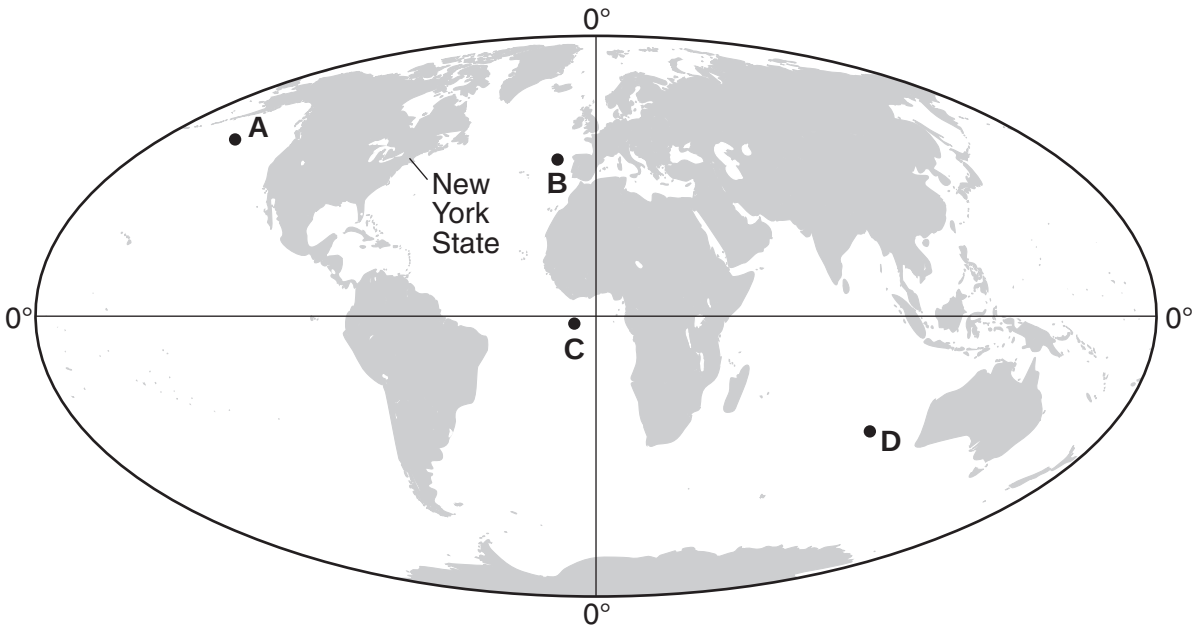
32 The diagrams below represent the compass direction and altitude of the Sun's rays at noon for a location on Earth on four different dates.



What is the latitude of this location?

(1) 0°
(2) 23.5° N
(3) 23.5° S
(4) 90° N

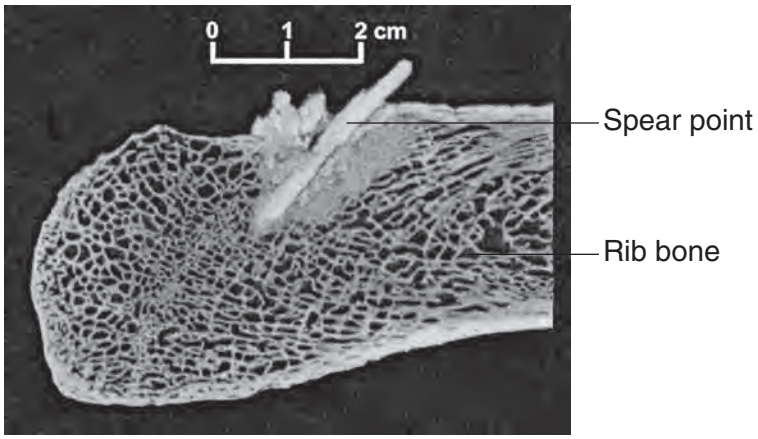
33 The map below shows the present-day positions of the continents. Points *A* through *D* represent locations on Earth's surface. The location of New York State on the North American continent is indicated.



Which letter best represents the inferred position of the New York State region on Earth at the end of the Devonian Period?

(1) *A*
(2) *B*
(3) *C*
(4) *D*

34 The image below shows a spear point embedded in part of a mastodon's rib bone, found near Seattle, Washington.

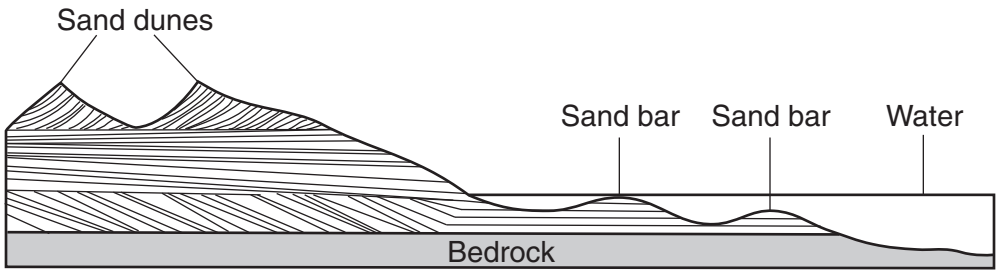


Scientists infer that early North American humans hunted the mastodon. Carbon-14 dating of the rib bone indicates that 2.4 half-lives have passed since the mastodon was killed. Approximately how many years ago did the mastodon die?

(1) 5700
(2) 11,400
(3) 13,700
(4) 17,100

35 The cross section below represents two types of sorted-sand depositional features found at a coastal location.

Cross Section of a Coastal Location



Which table correctly pairs these depositional features with the agents of erosion that formed them?

Depositional Feature	Agent of Erosion
sand dune	mass movement
sand bar	wind

(1)

Depositional Feature	Agent of Erosion
sand dune	mass movement
sand bar	glaciers

(3)

Depositional Feature	Agent of Erosion
sand dune	glaciers
sand bar	waves

(2)

Depositional Feature	Agent of Erosion
sand dune	wind
sand bar	waves

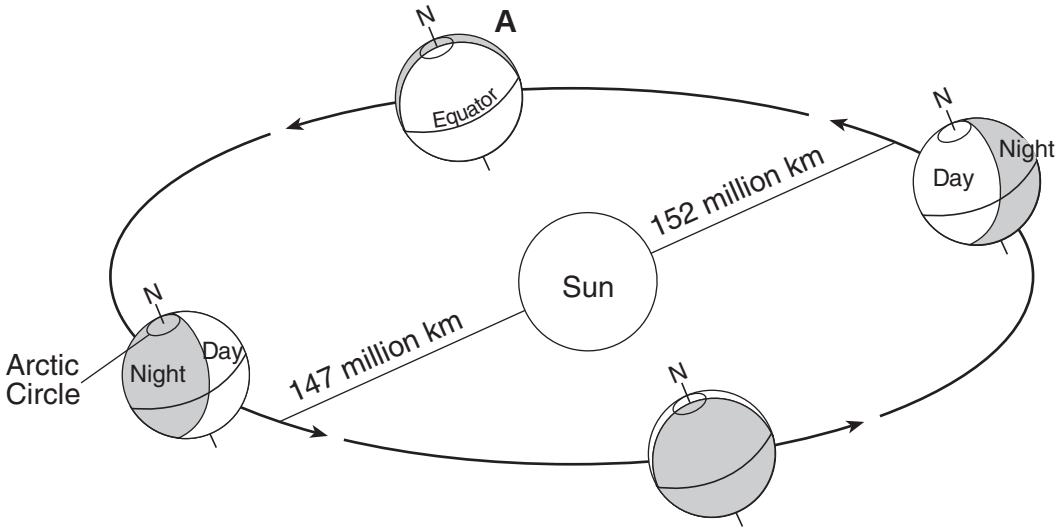
(4)

Part B–1

Answer all questions in this part.

Directions (36–50): For *each* statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the *2011 Edition Reference Tables for Physical Setting/Earth Science*. Record your answers on your separate answer sheet.

Base your answers to questions 36 through 38 on the diagram below and on your knowledge of Earth science. The diagram represents Earth's position in its orbit on the first day of each of the four seasons, one of which is labeled *A*. The North Pole is labeled *N*. Earth's closest distance to the Sun and Earth's farthest distance from the Sun are labeled in kilometers.



(Not drawn to scale)

36 How many hours (h) of daylight are received at the Arctic Circle when Earth is at position *A*?

(1) 0 h
(2) 12 h
(3) 18 h
(4) 24 h

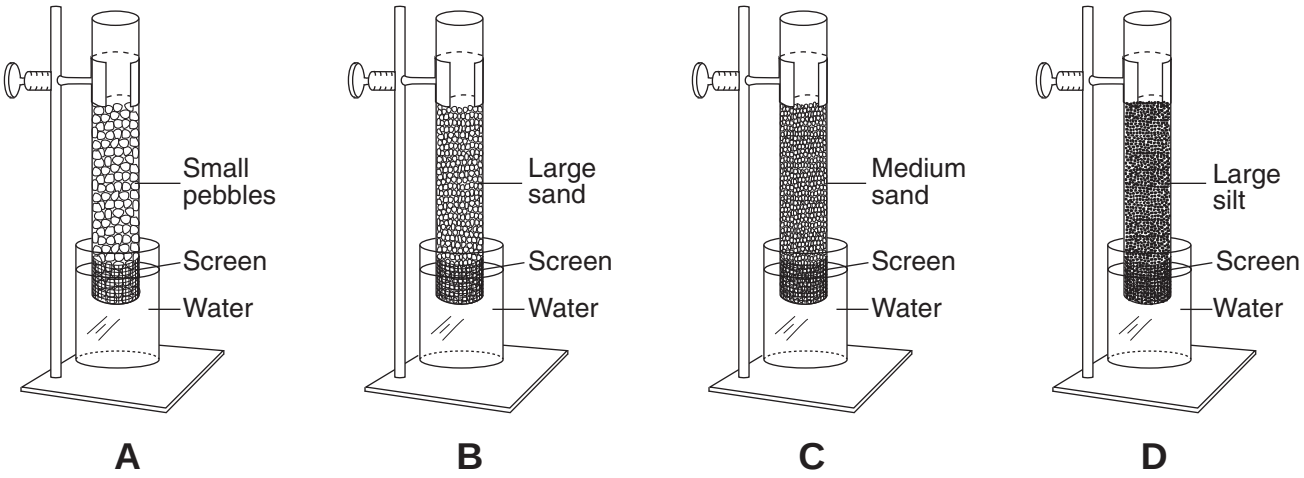
37 When Earth is closest to the Sun, which season is occurring in the Northern Hemisphere?

(1) spring
(2) summer
(3) fall
(4) winter

38 What would most likely happen to New York State's summer and winter temperatures if the tilt of Earth's axis increased from 23.5° to 30°?

(1) Both the summers and winters would become cooler.
(2) Both the summers and winters would become warmer.
(3) The summers would become cooler and the winters would become warmer.
(4) The summers would become warmer and the winters would become cooler.

Base your answers to questions 39 and 40 on the diagrams below and on your knowledge of Earth science. The diagrams represent four columns, labeled *A*, *B*, *C*, and *D*, that are partially filled with equal volumes of dry, sorted sediments. A fine wire mesh screen covers the bottom of each column to prevent the sediment from falling out. The lower part of each column has been placed in a beaker of water.

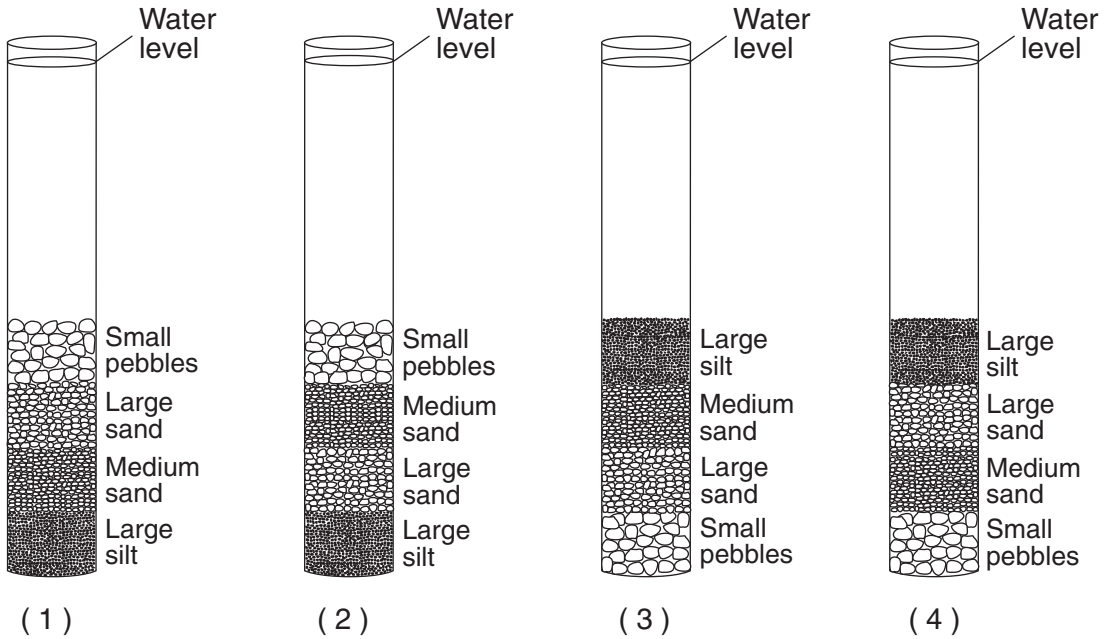


(Particles not drawn to scale)

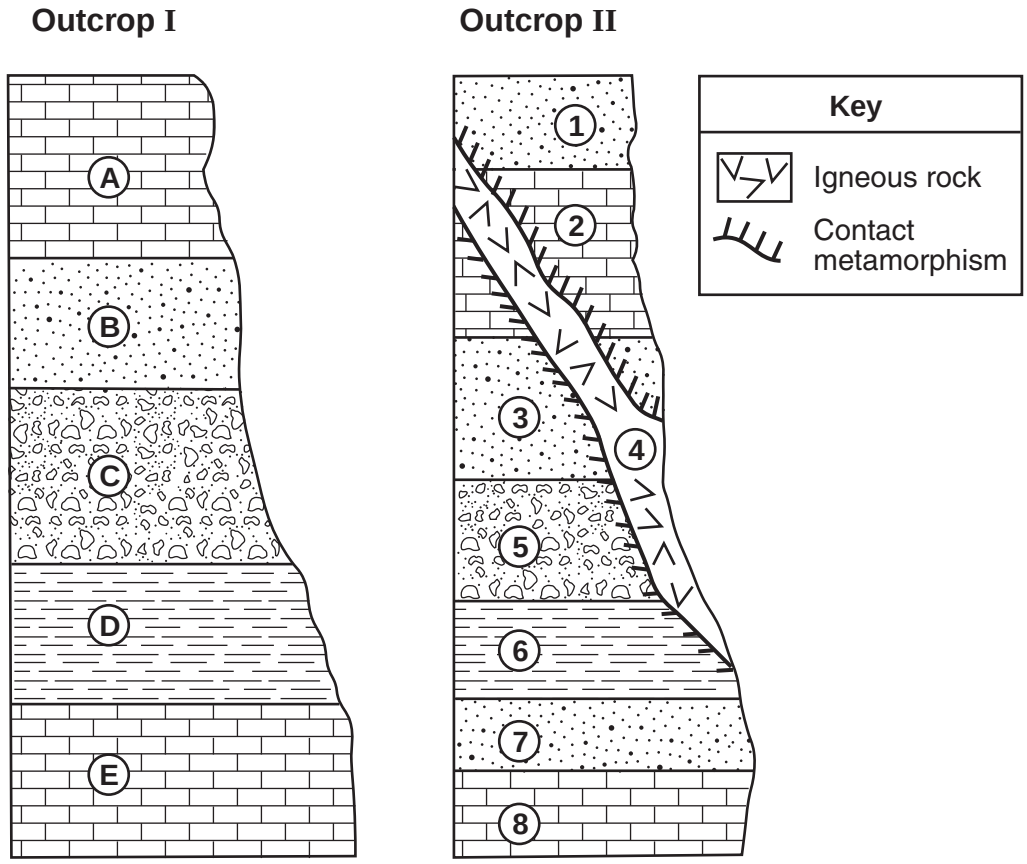
39 Capillarity will cause water to rise highest in column

(1) *A*
(2) *B*
(3) *C*
(4) *D*

40 Equal volumes of sediments from all four columns are mixed and poured into a column of water. Which diagram best represents how the sediments will most likely settle?



Base your answers to questions 41 and 42 on the cross sections below and on your knowledge of Earth science. The cross sections represent two rock outcrops, labeled I and II, located 10 miles apart. Letters *A* through *E* and numbers 1 through 8 identify rock units. The rock units have *not* been overturned.



41 In outcrop I, which geologic principle is best represented by the rock units?

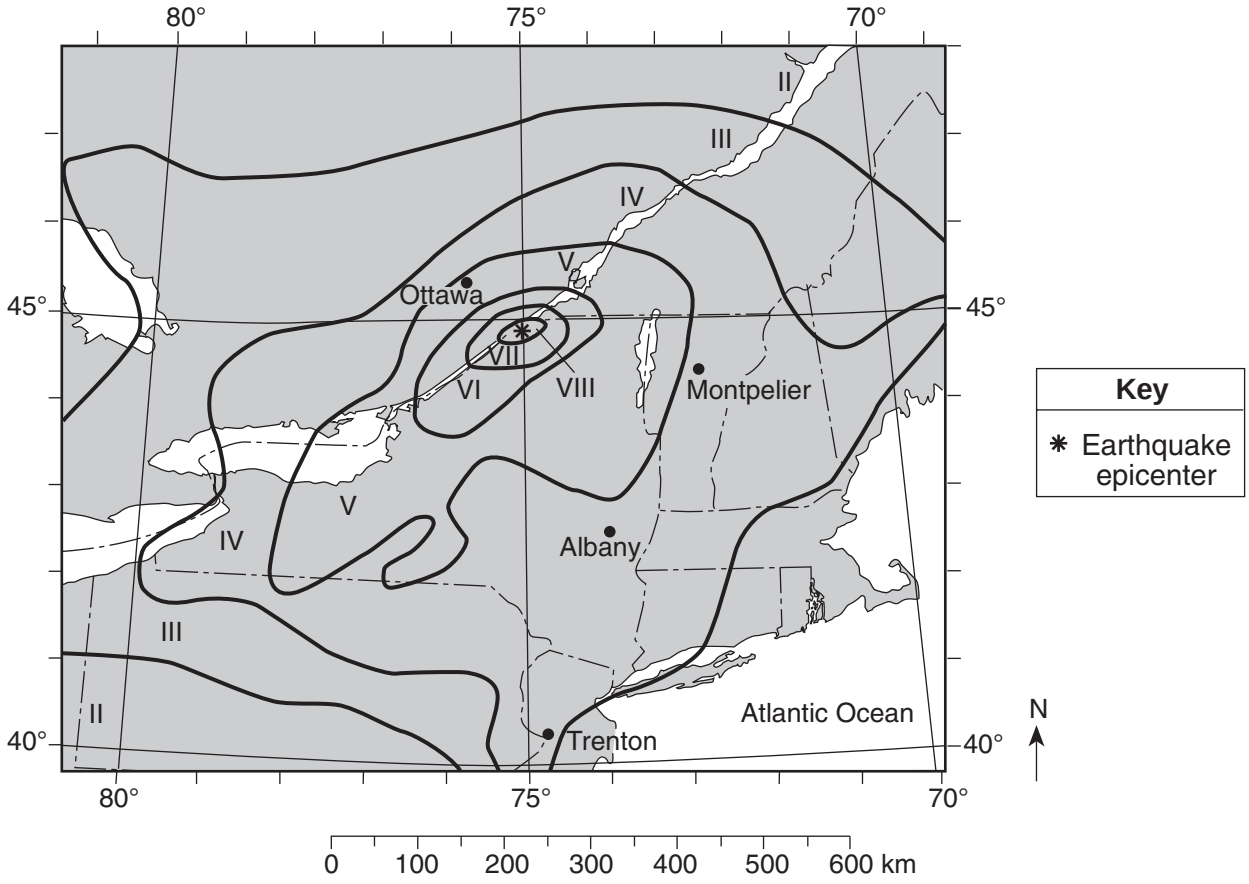
(1) crosscutting relationships
(2) correlation
(3) original horizontality
(4) inclusion

42 The rock record in outcrop II suggests that an unconformity probably exists in outcrop I between rock units

(1) *A* and *B*
(2) *B* and *C*
(3) *C* and *D*
(4) *D* and *E*

Base your answers to questions 43 and 44 on the map and table below and on your knowledge of Earth science. The map shows the zones of observed effects reported after a 1944 earthquake that occurred near Massena, New York. The isolines on the map are boundaries between zones of observed effects described in the Modified Mercalli Scale table. Four cities are labeled on the map.

Massena Earthquake, 1944



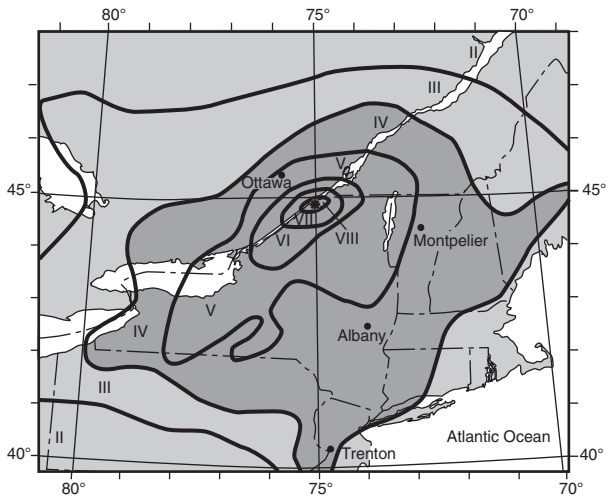
Modified Mercalli Scale

Intensity Value	Description of Observed Effects
I	Usually detected only by instruments
II	Felt by a few persons at rest, especially on upper floors
III	Hanging objects swing; vibration like passing of truck; noticeable indoors
IV	Felt indoors by many, outdoors by few; sensation like heavy truck striking building; parked automobiles sway
V	Felt by nearly everyone; sleepers awakened; liquids disturbed; unstable objects overturned; some dishes and windows broken
VI	Felt by all; many frightened and run outdoors; some heavy furniture moved; glassware broken; books off shelves; damage slight
VII	Difficult to stand; noticed in moving automobiles; damage to some masonry; weak chimneys broken at roofline
VIII	Partial collapse of masonry; chimneys, factory stacks, columns fall; heavy furniture overturned; frame houses moved on foundations

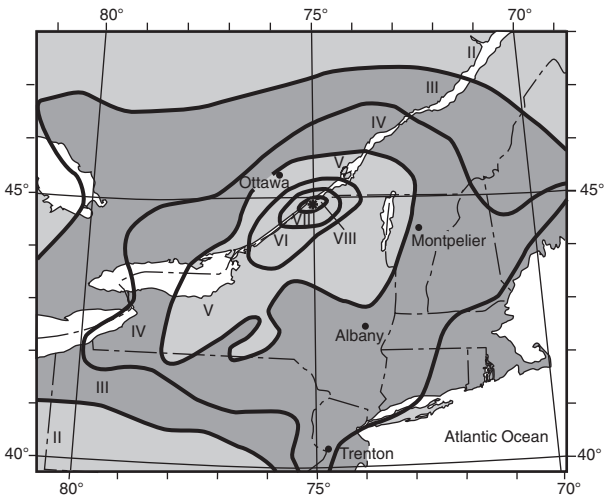
43 How long did it take for the first *P*-wave to travel from the epicenter of this earthquake to a seismic station in Trenton, New Jersey?

(1) 1 minute 10 seconds
(2) 2 minutes 10 seconds
(3) 3 minutes 20 seconds
(4) 4 minutes 20 seconds

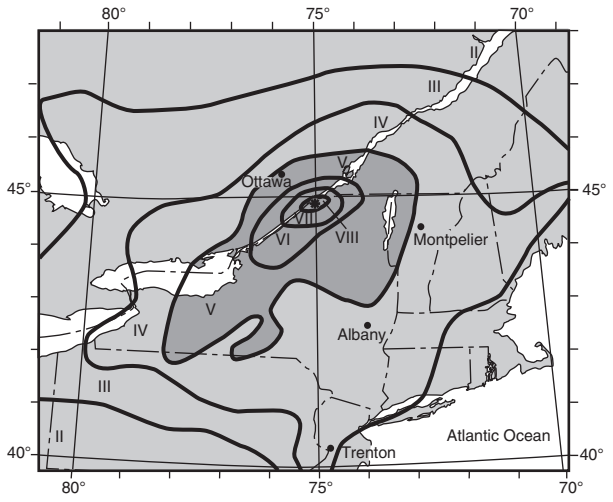
44 Based on the Modified Mercalli Scale, the darker shading on which map shows the area where the Massena earthquake was felt by nearly everyone?



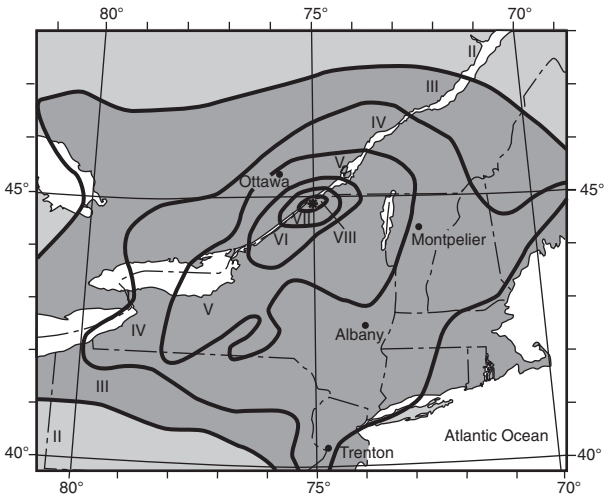
(1)



(3)



(2)

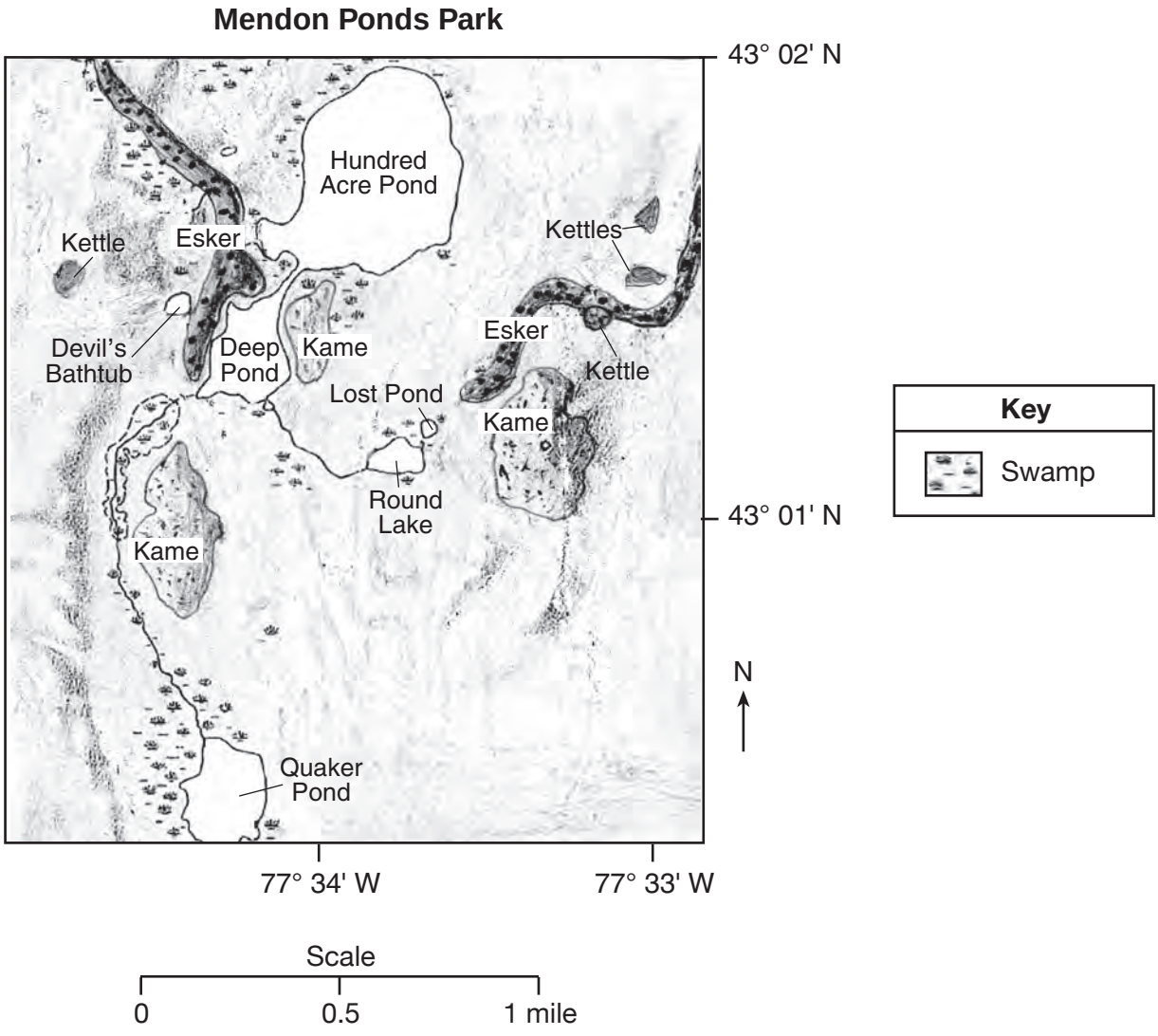


(4)

Base your answers to questions 45 through 48 on the passage and map below and on your knowledge of Earth science. The map shows glacial features found in Mendon Ponds Park.

Mendon Ponds Park

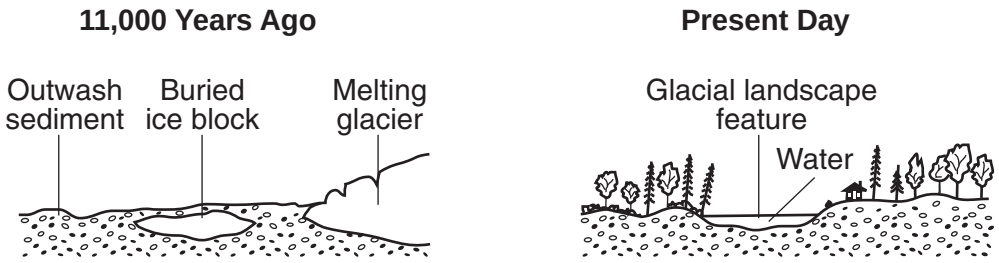
Mendon Ponds Park, in New York State, is listed in the National Registry of National Landmarks due to its outstanding glacial landscape features. Glacial ice that covered most of New York State retreated northward at the end of the last ice age. As this glacial ice melted, great amounts of sediments were deposited at the glacier's southern edge. Four glacial features dominate the park's landscape. Kettles are bowl-shaped depressions formed when buried blocks of glacial ice melt. If the depressions fill with water, they are called kettle lakes. The Mendon Park ponds are all kettle lakes. Eskers are ridges of sorted sediments deposited within streams flowing beneath the melting glacier. Kames are small hills of unsorted sediment deposited at the base of waterfalls formed by streams flowing over the edge of a melting glacier.



45 The last continental ice sheet retreated northward across New York State during which geologic epoch?

(1) Pleistocene
(2) Pliocene
(3) Eocene
(4) Paleocene

46 The cross sections below represent how a present-day glacial landscape feature was formed in Mendon Ponds Park and its appearance at present.



Which glacial landscape feature is indicated in the present-day cross section?

(1) esker
(2) kame
(3) finger lake
(4) kettle lake

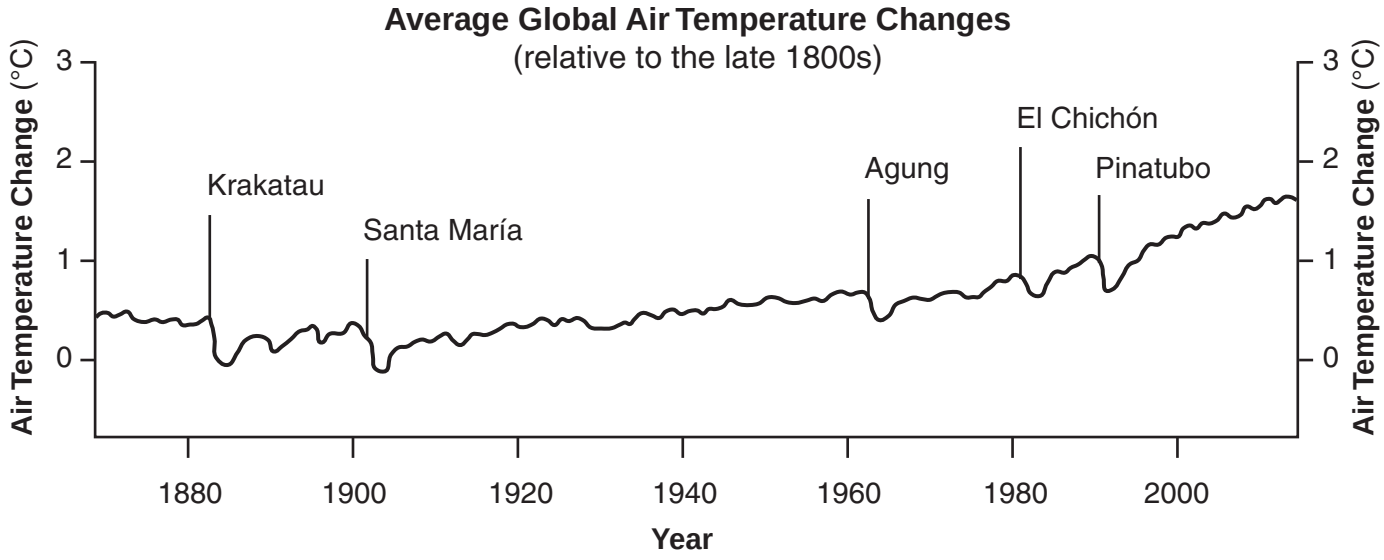
47 Based on the map, in which New York State landscape region is Mendon Ponds Park located?

(1) Allegheny Plateau
(2) Tug Hill Plateau
(3) Erie-Ontario Lowlands
(4) Hudson-Mohawk Lowlands

48 Which landscape feature is also formed directly by glacial deposition?

(1) drumlin
(2) delta
(3) barrier island
(4) escarpment

Base your answers to questions 49 and 50 on the graph below and on your knowledge of Earth science. The graph shows the average global air temperature changes that have occurred since the late 1800s. Five volcanoes that experienced major eruptions during this time period are indicated.



49 In the years immediately after each volcanic eruption occurred, average global air temperatures

(1) decreased because volcanic gases and dust blocked insolation
(2) decreased because molten rock released heat
(3) increased because volcanic gases and dust blocked insolation
(4) increased because molten rock released heat

50 Which conclusion can be made from the data shown in the graph?

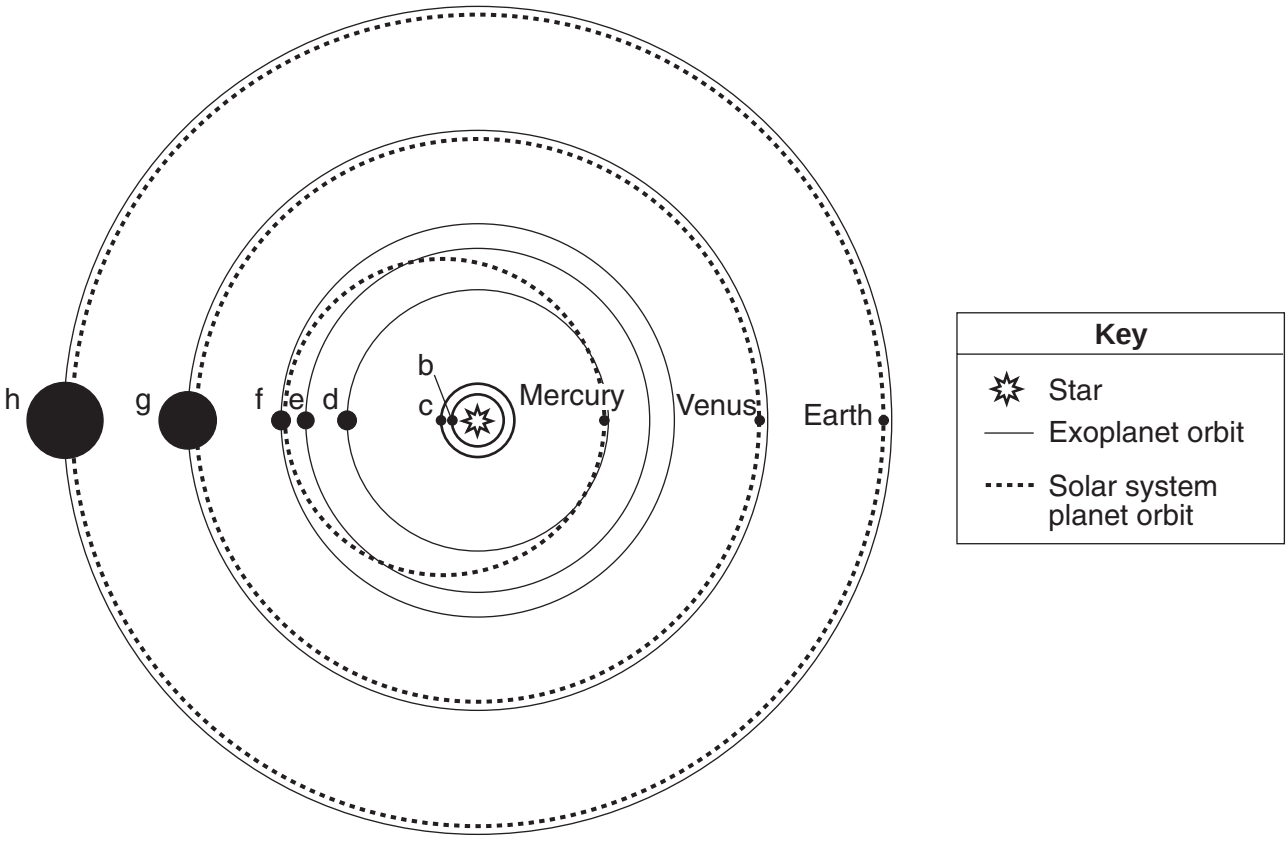
(1) Volcanic eruptions occur in a cyclic and predictable pattern.
(2) Volcanic eruptions have generally increased in strength since the late 1800s.
(3) Global air temperatures are warmer today than they were in the late 1800s.
(4) Global air temperatures have had fewer changes since 1950.

Part B–2

Answer all questions in this part.

Directions (51–65): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *2011 Edition Reference Tables for Physical Setting/Earth Science*.

Base your answers to questions 51 through 53 on the diagram below and on your knowledge of Earth science. The diagram represents a planetary system, discovered in 2013, with seven exoplanets (planets that orbit a star other than our Sun) labeled *b* through *h* orbiting a star. The exoplanet orbits are represented with solid lines. For comparison, the orbits of three planets of our solar system are shown with dashed lines. The sizes of the star, exoplanets, and planets are not drawn to scale.



(Orbits are drawn to scale.)

51 Identify the name of the planet represented in the diagram that has the most eccentric orbit. [1]

52 *In your answer booklet*, circle the type of planet (terrestrial or Jovian) to indicate the classification of the three solar system planets shown in the diagram. Describe *one* characteristic of this type of planet that distinguishes it from the other type of planet. [1]

53 Identify the letter of the exoplanet with the shortest period of revolution and explain why that exoplanet has the shortest period of revolution. [1]

Base your answers to questions 54 through 56 on the star chart in your answer booklet and on your knowledge of Earth science. The star chart shows the approximate locations of the Big Dipper, Little Dipper, and Cassiopeia visible in the night sky from Syracuse, New York, at a particular time of night. The dots represent individual stars. During the night, these stars appear to move counterclockwise around the star in the center of the chart. Straight lines are at 15-degree intervals. The stars *Caph*, *Kochab*, and *Merak* are labeled.

54 On the star chart *in your answer booklet*, circle the dot that represents the star *Polaris*. [1]

55 On the star chart *in your answer booklet*, place an **X** to indicate the location of the star *Merak* after five hours have passed. [1]

56 Identify the Earth motion that causes the apparent counterclockwise movement of these stars. [1]

Base your answers to questions 57 through 59 on the table below and on your knowledge of Earth science. The table shows how many million years each group of organisms existed on Earth before they became extinct.

Existence on Earth

Group of Organisms	**Duration of Existence** (million years)
Ammonoids	340
Eurypterids	200
Graptolites	195
Placoderm fish	70
Trilobites	270

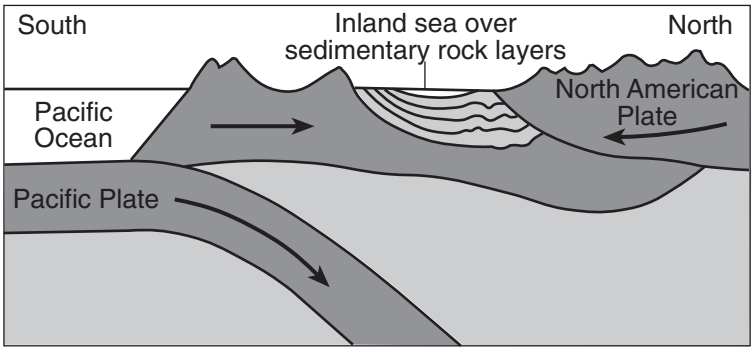
57 Identify the group of organisms listed on the data table that was the first group to exist on Earth. [1]

58 Identify the name of *one* specific index fossil from the eurypterid group that is found in New York State bedrock. [1]

59 Identify the type of environment on Earth where all of these groups of organisms appear to have lived. [1]

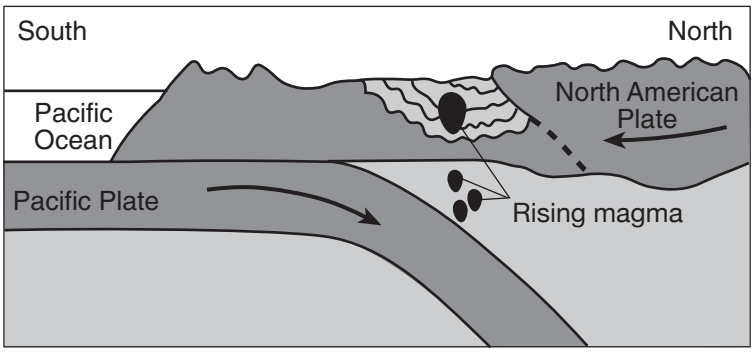
Base your answers to questions 60 through 62 on the cross sections below and on your knowledge of Earth science. The cross sections represent three different stages in the development of Denali (Mt. McKinley) and the growth of the North American Plate in Alaska near the boundary with the Pacific Plate. Arrows represent the direction of plate movement.

Formation of Denali (Mt. McKinley)



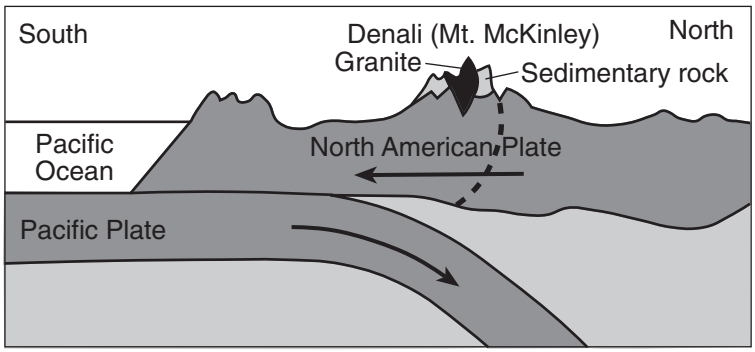
(Not drawn to scale)

Stage 1
100 Million Years Ago:
Sedimentary rocks that would later form Denali's (Mt. McKinley's) north peak began as sediments deposited under an inland sea.



(Not drawn to scale)

Stage 2
56 Million Years Ago:
Magma rose into the sedimentary rocks. This would later form the granite rock making up Denali's (Mt. McKinley's) south peak.Tectonic forces continued to push up the land surface.



(Not drawn to scale)

Stage 3
Today:
Tectonic forces continue to cause uplift in the region.

60 Identify the type of plate boundary represented in the cross sections. [1]

61 *In your answer booklet*, circle either volcanic or plutonic to identify the environment of formation of the granite found on Denali (Mt. McKinley). Describe the cooling rate of the magma that produced this granite. [1]

62 State the average density of the continental crust of the North American Plate and the average density of the oceanic crust of the Pacific Plate. [1]

Base your answers to questions 63 through 65 on the map in your answer booklet and on your knowledge of Earth science. The map shows the total amount of snowfall, measured in inches, from a lake-effect snow storm that affected western New York from November 17 through November 21, 2014. The 20-inch and 40-inch snowfall isolines have been drawn. Niagara Falls and Cowlesville are labeled on the map.

63 On the map *in your answer booklet*, draw the 60-inch snowfall isoline. Extend the isoline to the edge of Lake Erie. [1]

64 Cowlesville, New York, received a total of 88 inches of snow in 85 hours. Calculate the average rate of snowfall in inches per hour (in/h) for Cowlesville. [1]

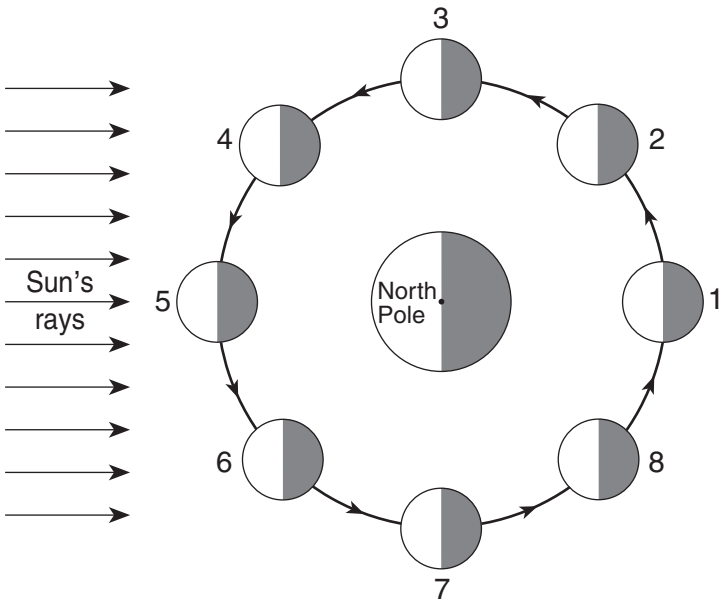
65 Describe *two* actions that people could take to prepare for a forecasted lake-effect snowstorm. [1]

Part C

Answer all questions in this part.

Directions (66–85): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *2011 Edition Reference Tables for Physical Setting/Earth Science*.

Base your answers to questions 66 through 68 on the diagram below and on your knowledge of Earth science. The diagram represents Earth as viewed from above the North Pole. The nighttime side of Earth and the Moon have been shaded. The Moon is represented in eight positions in its orbit around Earth.



(Not drawn to scale)

66 Identify by number the Moon's position where a solar eclipse might be observed from Earth. [1]

67 The photographs *in your answer booklet* show the changing appearance of the Moon as viewed from New York State during three consecutive Moon phases. In the space below each photograph, identify the number of the Moon position that matches each of these phases. [1]

68 Explain how the Moon's rotation and revolution cause the same side of the Moon to always face Earth. [1]

Base your answers to questions 69 through 71 on the map in your answer booklet and on your knowledge of Earth science. The weather map shows isobars, recorded in millibars (mb).

69 On the map *in your answer booklet*, place an **L** to indicate the location of the center of a low-pressure system and place an **H** to indicate the location of the center of a high-pressure system. [1]

70 A weather station recorded the barometric pressure on a weather station model as shown below.

On the map *in your answer booklet*, place an **X** to represent a possible location for this weather station. [1]

71 The table below lists some weather conditions for another location on this map.

Temperature (°F)	**Dewpoint** (°F)	**Precipitation** (inches in past 6 hours)	**Present Weather**
76	74	0.85	Rain showers

On the weather station model *in your answer booklet*, using the proper format, record the weather conditions listed in the table. [1]

Base your answers to questions 72 through 75 on the topographic map in your answer booklet and on your knowledge of Earth science. The map is centered on the peak of New York State's Slide Mountain at 42° North. Points *A*, *B*, and *X* represent locations on the map. Line *AB* is a reference line on the map. Elevations are shown in feet.

72 On the map *in your answer booklet*, draw a line showing the most likely path of a stream that begins at point *X* and flows to the edge of the map. [1]

73 Determine *one* possible elevation of point *X*. [1]

74 On the grid *in your answer booklet*, construct a topographic profile along line *AB* by plotting the elevation of each contour line that crosses line *AB*. Points *A* and *B* have already been plotted. Connect *all ten* plots with a line, starting at *A* and ending at *B*, to complete the profile. [1]

75 Describe *one* piece of evidence shown on the map that indicates that the northeastern side of Slide Mountain has the steepest slope. [1]

Base your answers to questions 76 through 79 on the passage and data table below, on the graph in your answer booklet, and on your knowledge of Earth science. The data table shows the average percentages of sodium and calcium, and the average densities of samples from each of the six varieties of plagioclase feldspar. The graph in your answer booklet shows the range of sodium and calcium percentages for each of the six varieties of plagioclase feldspar.

Plagioclase Feldspars

The plagioclase feldspars are a family of six silicate minerals that are difficult to tell apart. They have the same crystal structure, cleavage, and hardness, and can be similar in color; however, they do differ slightly in chemical composition and density. The general chemical composition for plagioclase is $(Na,Ca)AlSi_3O_8$. The percentages of sodium (Na) and calcium (Ca) vary relative to each other, causing the differences in density. The mineral albite is sodium-rich, with little or no calcium, while anorthite is calcium-rich, with little or no sodium. The plagioclase feldspars with higher sodium content are more likely to be found in felsic igneous rocks, while the plagioclase feldspars with higher calcium content are more likely to be found in mafic igneous rocks.

Data Table

Variety of Plagioclase Feldspar	Average Percentage of Sodium (%)	Average Percentage of Calcium (%)	Average Density (g/cm^3)
albite	100	0	2.63
oligoclase	80	20	2.65
andesine	60	40	2.67
labradorite	40	60	2.69
bytownite	20	80	2.71
anorthite	0	100	2.73

76 Complete the line graph *in your answer booklet*, by plotting the average density for the average percentages of sodium and calcium of each sample shown on the data table. The data for albite and oligoclase have been plotted for you. Connect *all six* plots with a line. [1]

77 A sample of plagioclase feldspar was found to have a ratio of 35% sodium to 65% calcium. Based on the graph, state the name of this variety of plagioclase feldspar. [1]

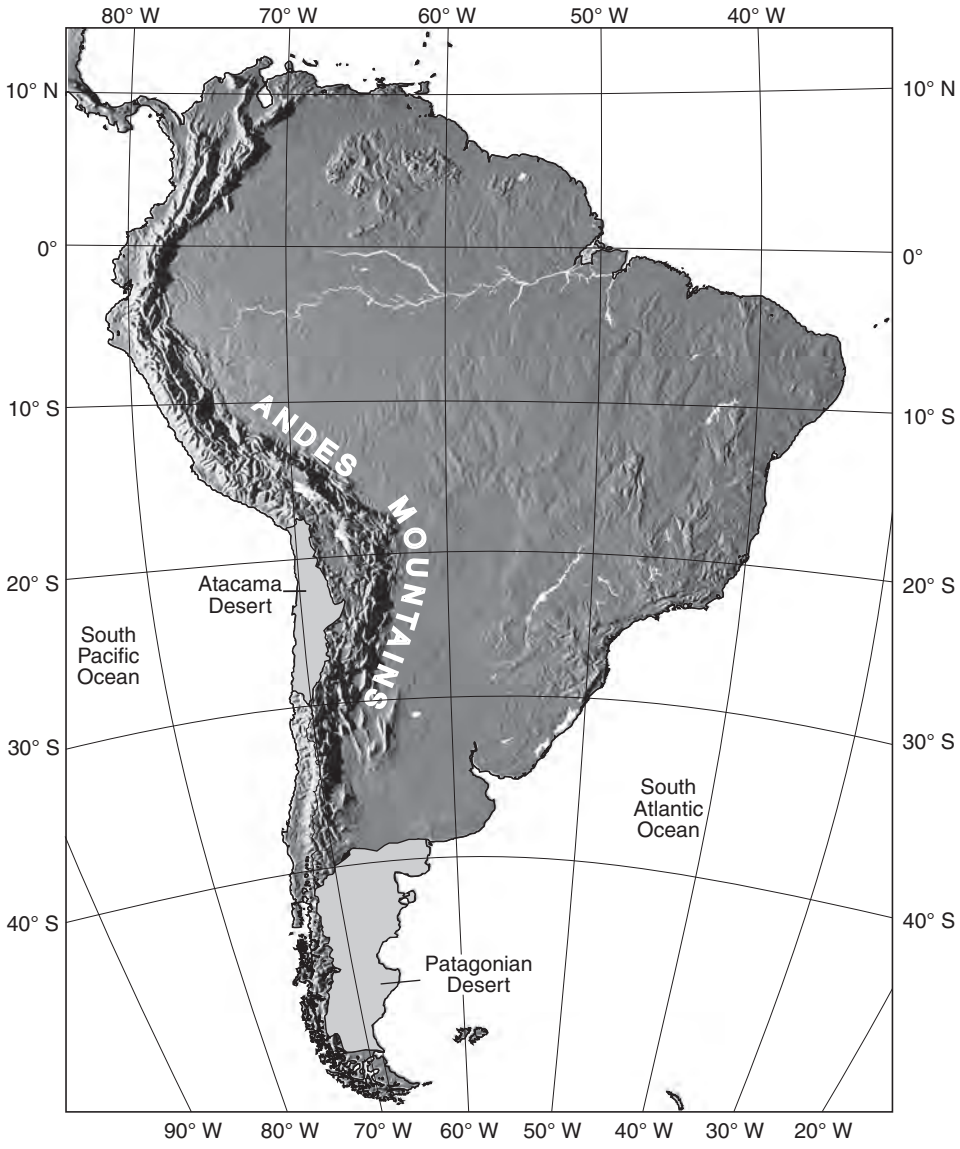
78 A sample of plagioclase feldspar has a mass of 534 grams and a volume of 200 cubic centimeters. State the name of this variety of plagioclase feldspar. [1]

79 State the name of *one* variety of plagioclase feldspar that is more likely to be found in the igneous rock pegmatite. [1]

Base your answers to questions 80 through 83 on the passage and the map of South America below and on your knowledge of Earth science.

Two South American Deserts

South America is an excellent example of the influence that plate tectonic features have on climates. The Andes mountain range, formed by plate tectonics, is on the western edge of South America. When prevailing winds come from the southeast, which usually occurs between 0° and 30° S latitudes, rainfall is increased on the eastern side of the mountain range. The Atacama Desert lies in the rain shadow (dry area) to the west of the mountains. Farther south, the reverse pattern is found, due to different prevailing winds blowing between 30° S and 60° S latitudes. The Patagonian Desert lies on the eastern side of the Andes, between the Andes and the South Atlantic Ocean.



80 Name *one* tectonic plate that is interacting with the South American Plate to uplift the Andes Mountains. [1]

81 On the map *in your answer booklet*, draw *one* arrow in the box located on the Andes Mountains to indicate the surface planetary wind direction that helped produce the Atacama Desert. [1]

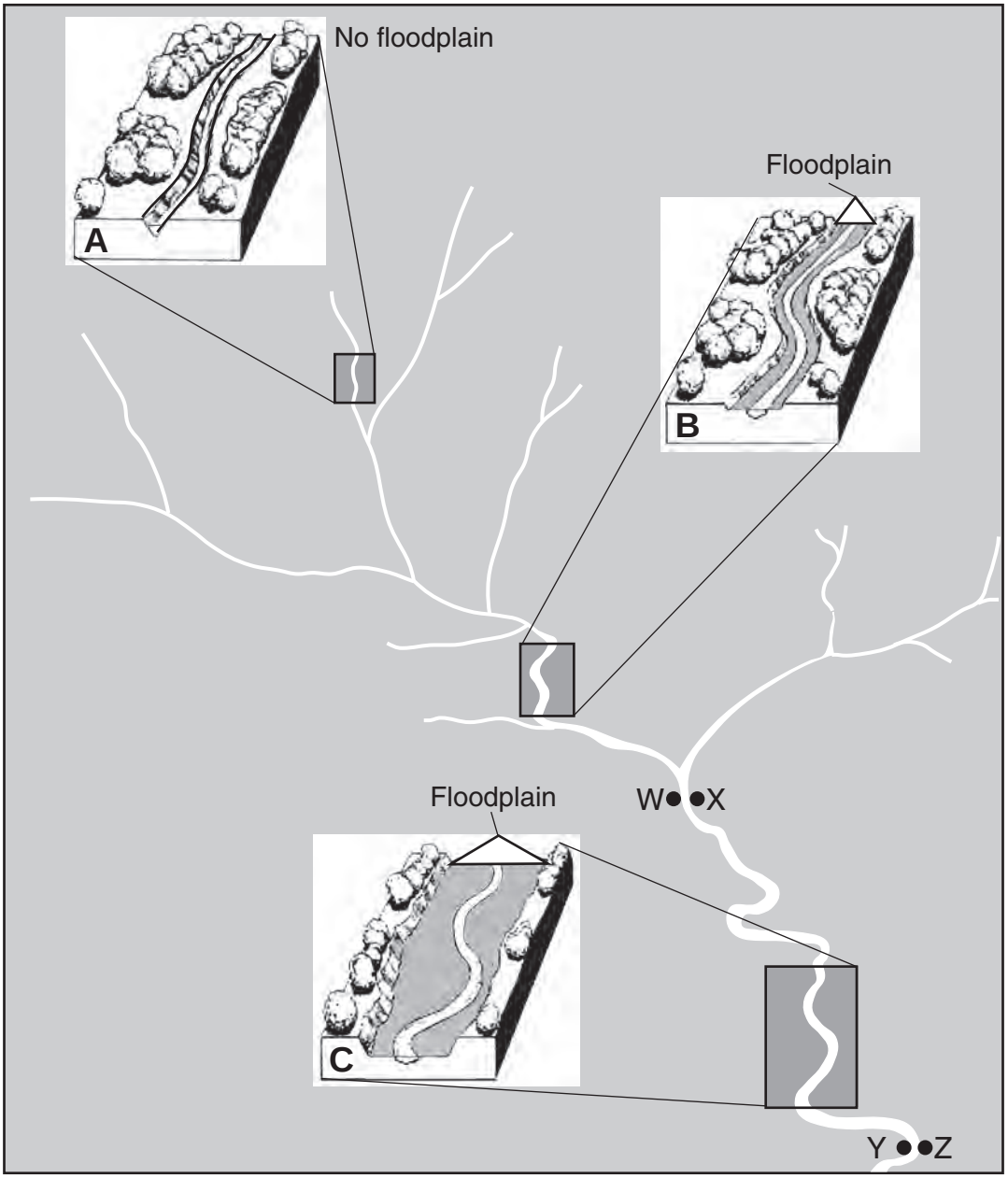
82 Glaciers are found on some of the mountains in the Andes near the equator. Identify *one* climate factor that causes the cold temperatures on these mountains. [1]

83 Andesite makes up much of the volcanic rock of the Andes Mountains. Name *three* minerals that are commonly found in a single andesite rock. [1]

GO ON TO THE NEXT PAGE ⇨

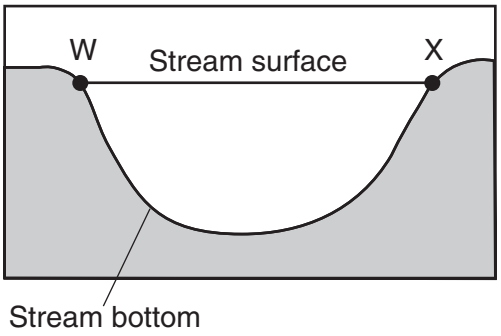
Base your answers to questions 84 and 85 on the map and block diagrams below and on your knowledge of Earth science. The map shows a stream and its tributaries. Enlarged block diagrams, labeled *A*, *B*, and *C*, indicate the relative widths of floodplains in the rectangular areas along the stream. Points *W*, *X*, *Y*, and *Z* are locations on the stream banks.

Stream and Its Tributaries



84 The slope of the stream in area *A* is steeper than the slope of the stream in area *C*. Describe *one* piece of evidence shown by the block diagrams that supports this statement. [1]

85 The cross section below represents the shape of the stream channel between *W* and *X*.



On the cross section *in your answer booklet*, draw the shape of the stream bottom between *Y* and *Z*. [1]

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 15, 2017 — 1:15 to 4:15 p.m., only

ANSWER BOOKLET

Student . . . . . Sex: ☐ Male ☐ Female

Teacher . . . . . .

School . . . . . Grade . . . . . .

Record your answers for Part B–2 and Part C in this booklet.

Part B–2

51 _____

52 Circle one: terrestrial planet Jovian planet

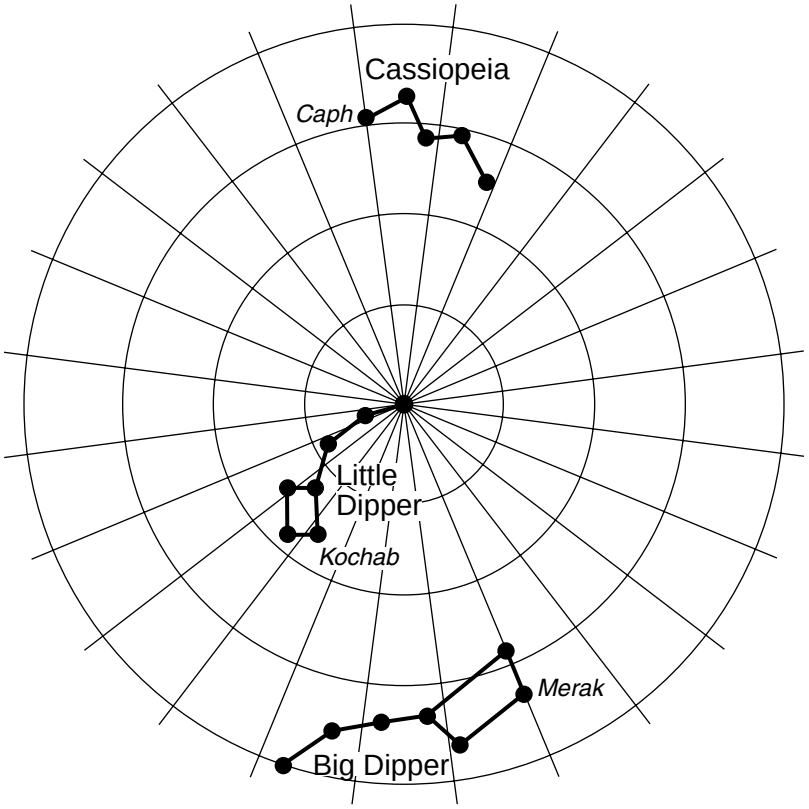
Characteristic of this type of planet: _____

53 Exoplanet: _____

Explanation: _____

_____

54-55



56 _____

57 _____

58 _____

59 _____

60 _____

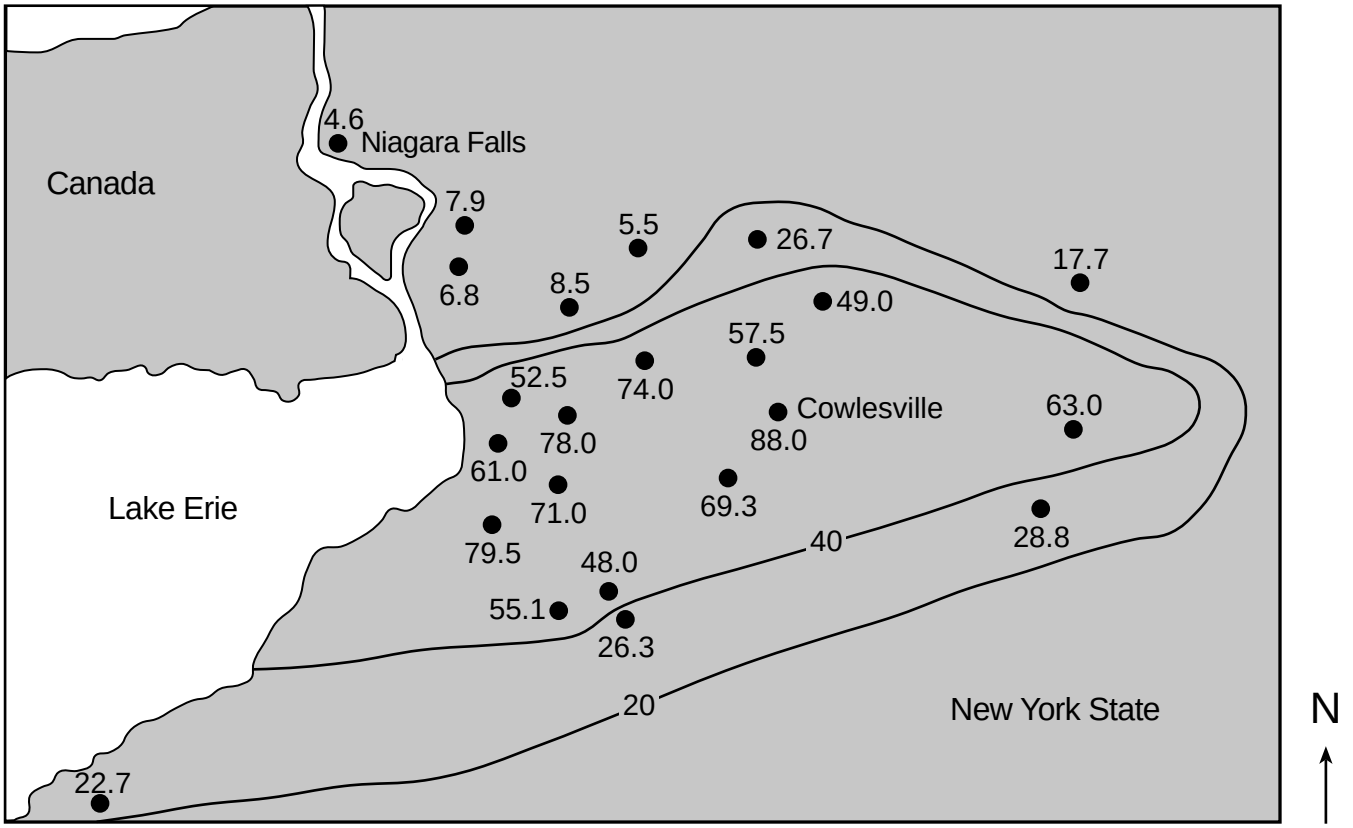
61 Circle one: volcanic plutonic

Cooling rate: _____

62 North American Plate continental crust: _____ **g/cm^3**

Pacific Plate oceanic crust: _____ **g/cm^3**

63



64 _____ **in/h**

65 Action 1: _____

Action 2: _____

Part C

66 Position: _____

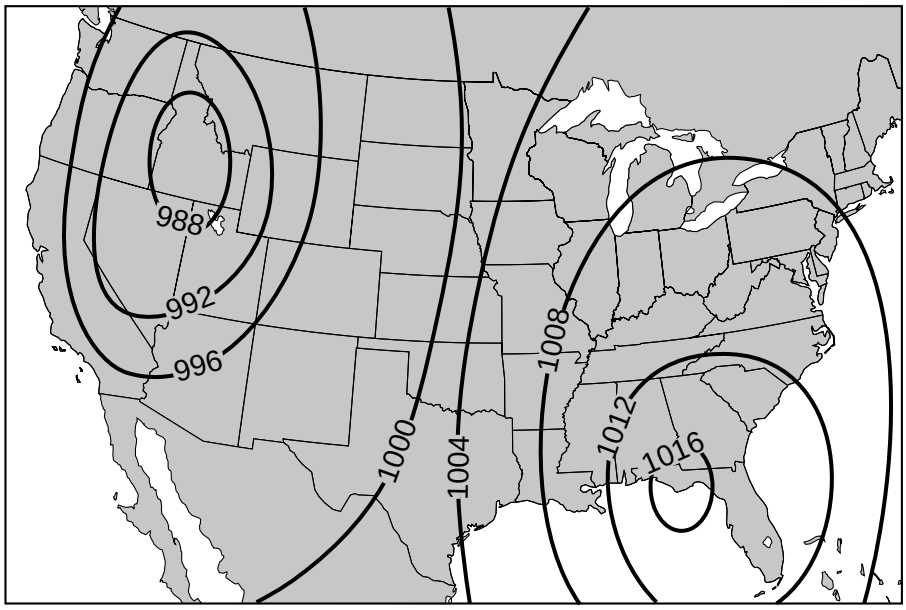
67

Position: _____ → Position: _____ → Position: _____

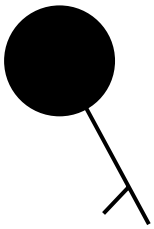
68 _____

_____

69–70

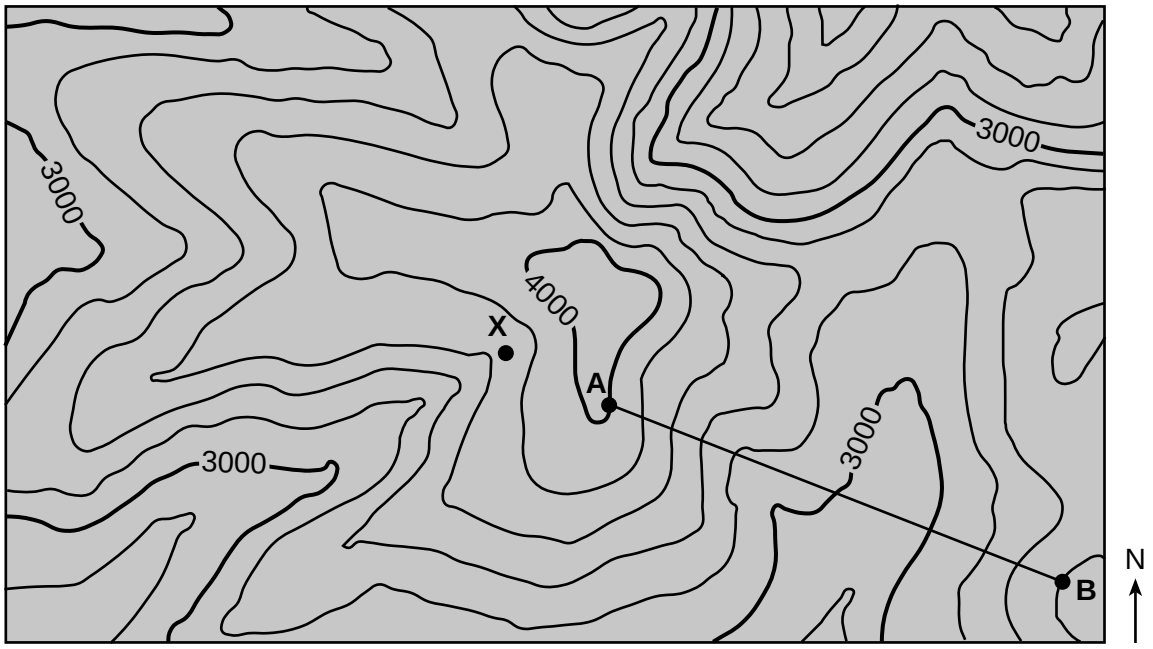


71



72

Slide Mountain



Contour interval = 200 feet

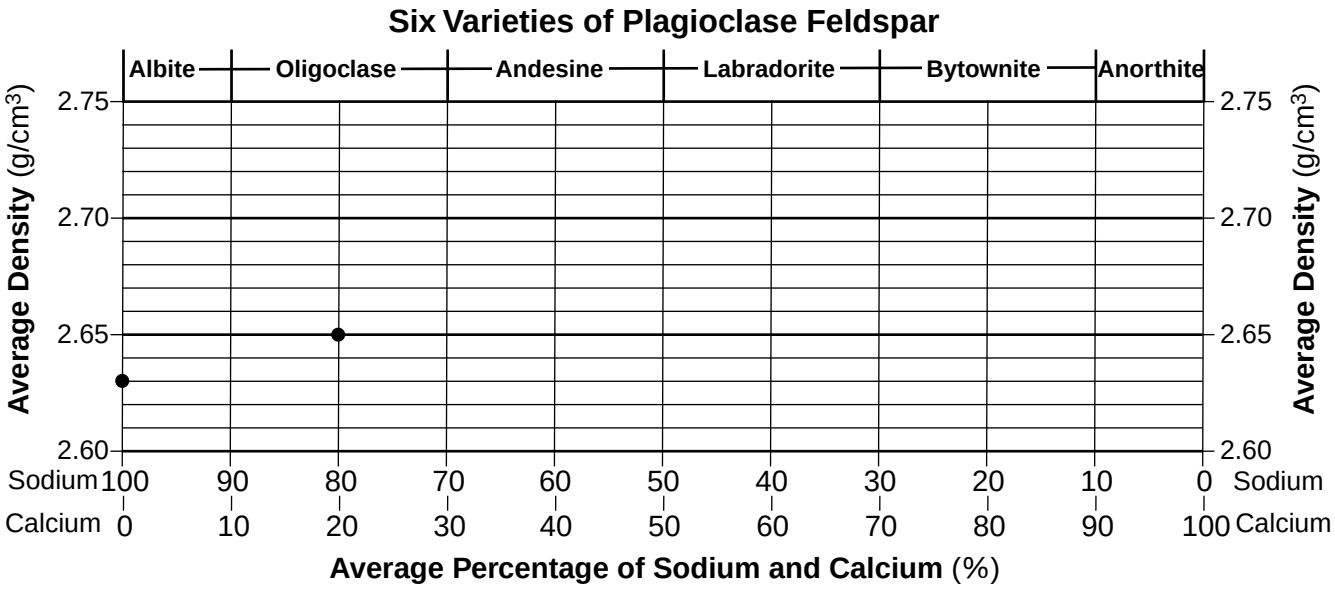
73 _____ **ft**

74

75 _____

_____

76


Six Varieties of Plagioclase Feldspar
Albite
Oligoclase
Andesine
Labradorite
Bytownite
Anorthite
Average Density (g/cm3)
2.75
2.70
2.65
2.60
Sodium 100 90 80 70 60 50 40 30 20 10 0 Sodium
Calcium 0 10 20 30 40 50 60 70 80 90 100 Calcium
Average Percentage of Sodium and Calcium (%)

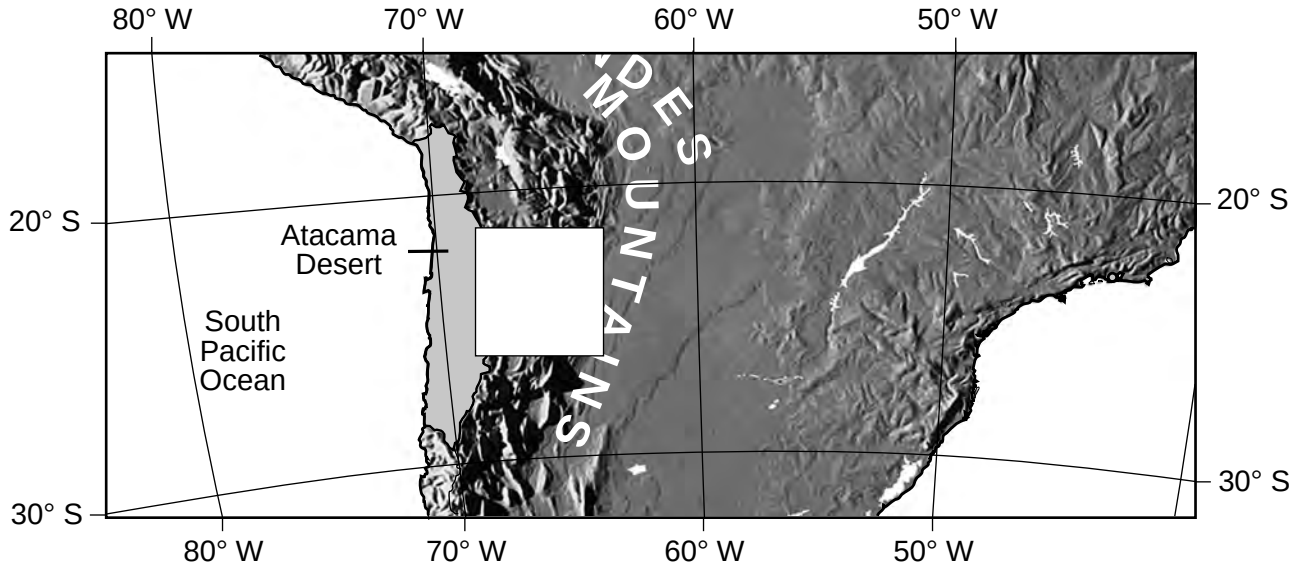
77 _____

78 _____

79 _____

80 _____ **Plate**

81



82 _____

83 Mineral 1: _____

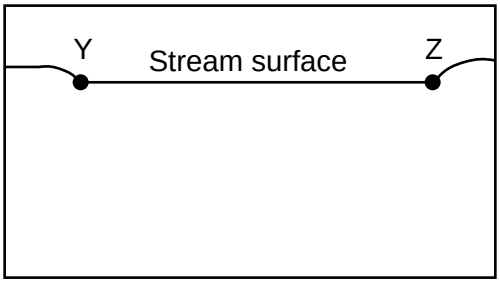
Mineral 2: _____

Mineral 3: _____

84 Evidence: _____

_____

85



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FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

P.S.–E.S. PHYSICAL SETTING/EARTH SCIENCE

Thursday, June 15, 2017 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 2 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: http://www.p12.nysed.gov/assessment/ and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

Part A and Part B–1
Allow 1 credit for each correct response.

Part A

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

Part B–1

36 . . . . . **2**	40 . . . . . **3**	44 . . . . . **2**	48 . . . . . **1** . . . . .
37 . . . . . **4**	41 . . . . . **3**	45 . . . . . **1**	49 . . . . . **1** . . . . .
38 . . . . . **4**	42 . . . . . **4**	46 . . . . . **4**	50 . . . . . **3** . . . . .
39 . . . . . **4**	43 . . . . . **1**	47 . . . . . **3**	

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Physical Setting/Earth Science. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Do not attempt to correct the student's work by making insertions or changes of any kind. If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the Part B–2 and Part C open-ended questions on a student's paper. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score more than approximately one-half of the open-ended questions on a student's answer paper. Teachers may not score their own students' answer papers.

Students' responses must be scored strictly according to the Scoring Key and Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the rating guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the rating guide. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the space provided. The student's score for the Earth Science Performance Test should be recorded in the space provided. Then the student's raw scores on the written test and the performance test should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Thursday, June 15, 2017. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

Part B–2

Allow a maximum of 15 credits for this part.

To ensure the accuracy of overlays, select a printer setting such as *full*, *actual size* or *100%* when printing this document. Do ***not*** select the *fit to page* setting.

51 [1] Allow 1 credit for Mercury.

52 [1] Allow 1 credit if *both* terrestrial planet is circled and an acceptable characteristic is described. Acceptable responses include, but are not limited to:

— smaller diameter than Jovian

— higher density

— Terrestrial planet densities range from 3.9 g/cm^3 to 5.5 g/cm^3.

— rocky/solid

— not gaseous

— closer to the Sun

— less mass

— shorter period of revolution

— longer periods of rotation

— Terrestrial planets don't have rings.

53 [1] Allow 1 credit for exoplanet *b* with an acceptable explanation. Acceptable explanations include, but are not limited to:

— The planet closest to the star moves fastest due to greatest gravitational force.

— It is closest and has the least distance to travel in its orbit.

— The planet with the shortest period of revolution is always the planet that is nearest to the star.

— The closer to the star, the faster an exoplanet orbits.

— closest to the star/Sun

— Exoplanet *b* has the smallest/shortest orbit.

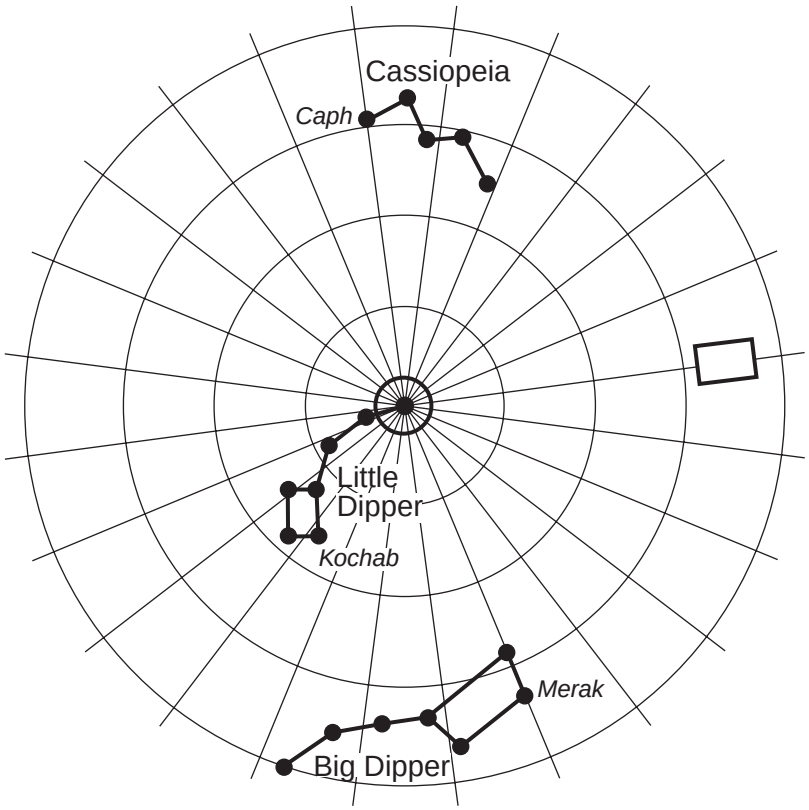
54 [1] Allow 1 credit for circling only the star *Polaris* in the center of the star chart as shown in the diagram below.

55 [1] Allow 1 credit if the center of the **X** is located within or touching the box shown on the star chart below.

Note: Allow credit if a symbol other than an **X** is used.

It is recommended that an overlay of the same scale as the student answer sheet be used to ensure reliability in rating.

Example of a 1-credit response for question 54 and a 1-credit acceptable range for question 55:



56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Earth rotation

— spinning/turning on Earth's axis

— rotation

Note: Do *not* allow credit for "Earth rotates clockwise" because a clockwise rotation of the Northern Hemisphere would *not* cause the stars to appear to move counterclockwise around *Polaris*.

57 [1] Allow 1 credit for trilobites.

58 [1] Allow 1 credit for *Eurypterus* or *Stylonurus* or *Eurypterus remipes*.

Note: Do *not* allow credit for "eurypterid" *or* "eurypterids" because these indicate a group of organisms, not a specific index fossil.

59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— marine

— an ocean/sea

— in a water environment

— a shallow sea

60 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— convergent

— subduction zone

— plate collision

61 [1] Allow 1 credit for *both* circling plutonic and a correct cooling rate. Acceptable responses include, but are not limited to:

— slow

— took a long time to cool

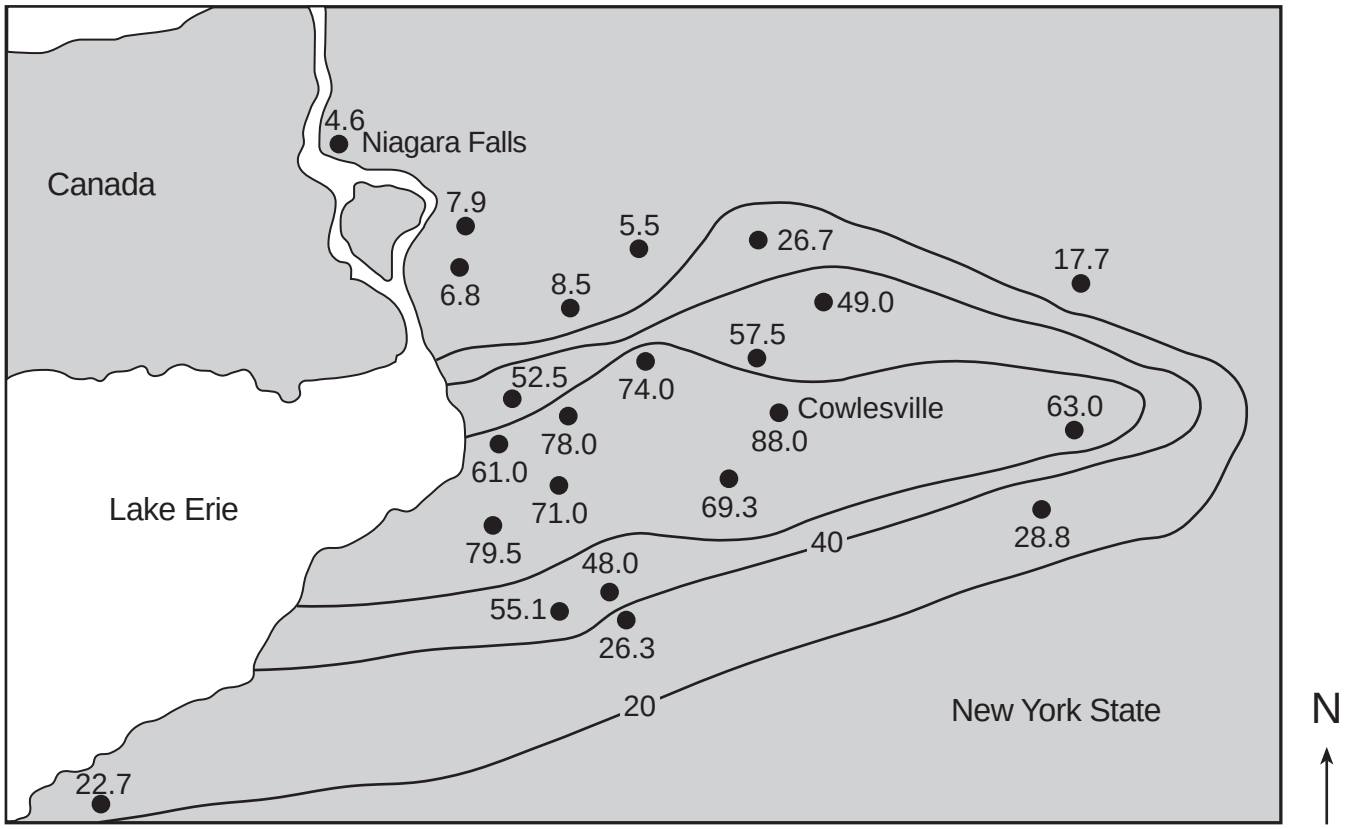
62 [1] Allow 1 credit if *both* responses are correct.

North American Plate continental crust: 2.7 g/cm^3

Pacific Plate oceanic crust: 3 *or* 3.0 g/cm^3

63 [1] Allow 1 credit if the 60-inch isoline is correctly drawn to the edge of Lake Erie. If additional lines are drawn, all isolines must be correct to receive credit. The isoline may form a closed loop *or* extend over the lake.

Example of a 1-credit response:



64 [1] Allow 1 credit for any value from 1.0 in/h to 1.1 in/h.

65 [1] Allow 1 credit for *two* correct responses. Acceptable responses include, but are not limited to:

— Have warm clothing/blankets.

— Purchase salt *or* grit/sand.

— Check for sufficient medicine.

— Make sure that extra batteries are available.

— Have flashlights handy.

— Make sure that generators are in working condition.

— Make sure that cell phone is charged.

— Stock up on water.

— Stock up on food.

— Have snowblowers/snow shovels ready.

Part C

Allow a maximum of 20 credits for this part.

66 [1] Allow 1 credit for position 5.

Note: Do *not* allow credit for "new moon" because this does not indicate a position on the diagram.

67 [1] Allow 1 credit for position 2 → position 3 → position 4.

Note: Do *not* allow credit for the names of moon phases because they do not indicate positions on the diagram.

68 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The Moon's period of rotation and period of revolution are equal.

— The Moon rotates and revolves at the same rate/in the same amount of time.

— The Moon rotates and revolves once in 27.3 days.

— The Moon rotates only once per revolution.

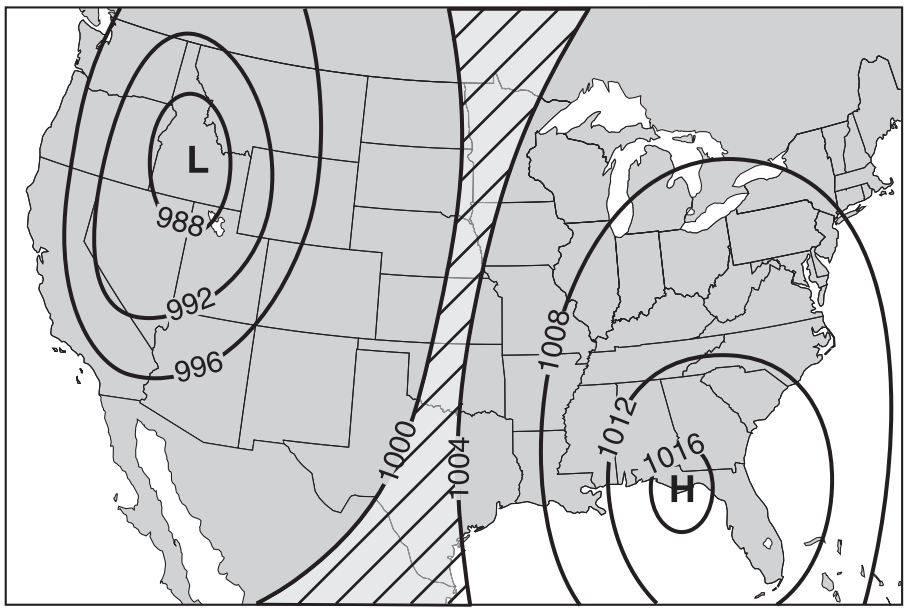
69 [1] Allow 1 credit if the **L** is mostly within the 988 isobar and the **H** is mostly within the 1016 isobar as shown on the map below.

70 [1] Allow 1 credit if the center of the **X** is within the diagonally lined area shown on the map below.

Note: If more than one **X** is drawn, all **X**s must be correct to receive credit.

Do *not* allow credit if the center of the student-drawn **X** touches either the 1000 or 1004 isobar.

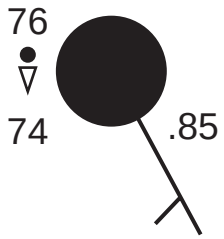
Example of a 1-credit response for question 69 and a 1-credit acceptable area for question 70:



71 [1] Allow 1 credit if *all four* weather conditions are in the correct location and in the correct format.

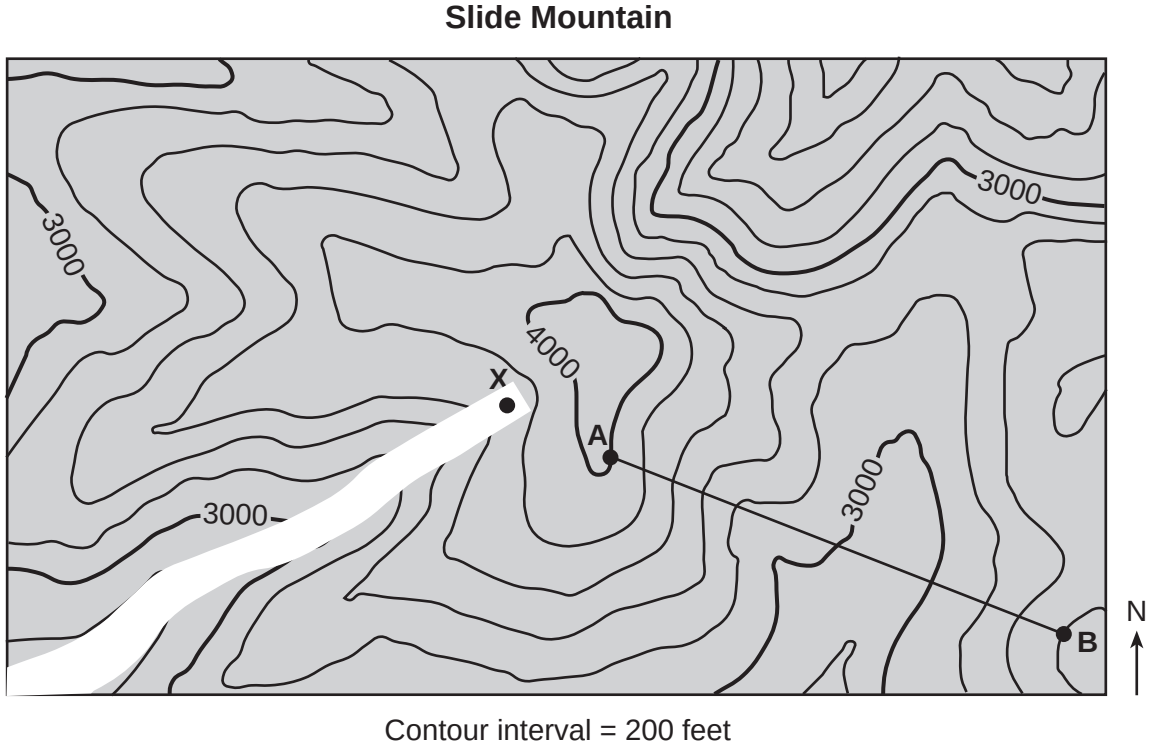
Note: Do *not* allow credit for "0.85" because this is *not* the correct format used on a weather station model.

Example of a 1-credit response:



72 [1] Allow 1 credit for a line starting at point *X*, drawn within or touching the outside edge of the unshaded region, and ending at the edge of the map, as shown below.

Note: It is recommended that an overlay of the same scale as the student answer sheet be used to ensure reliability in rating.

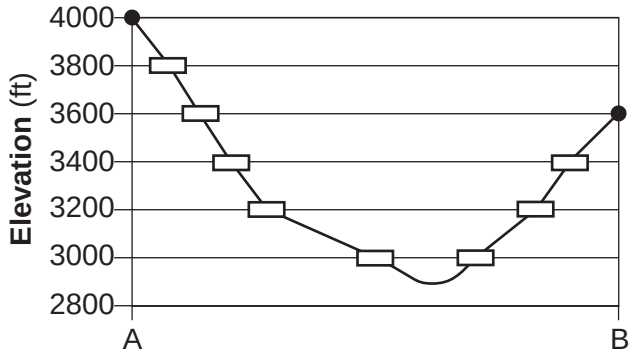


73 [1] Allow 1 credit for any value greater than 3600 ft but less than 3800 ft.

74 [1] Allow 1 credit if the centers of *all eight* student plots are within or touch the rectangles shown below and are correctly connected with a line from *A* to *B* that passes within or touches each rectangle. The line should extend below 3000 ft but not touch 2800 ft in the valley.

Note: Allow credit if the line does *not* pass through the student plots, but is still within or touches the rectangles.

It is recommended that an overlay of the same scale as the student answer sheet be used to ensure reliability in rating.



75 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Contour lines are closer together.

— The spaces between the contour lines are smallest.

— There is a greater change in elevation over a shorter distance on the northeastern side.

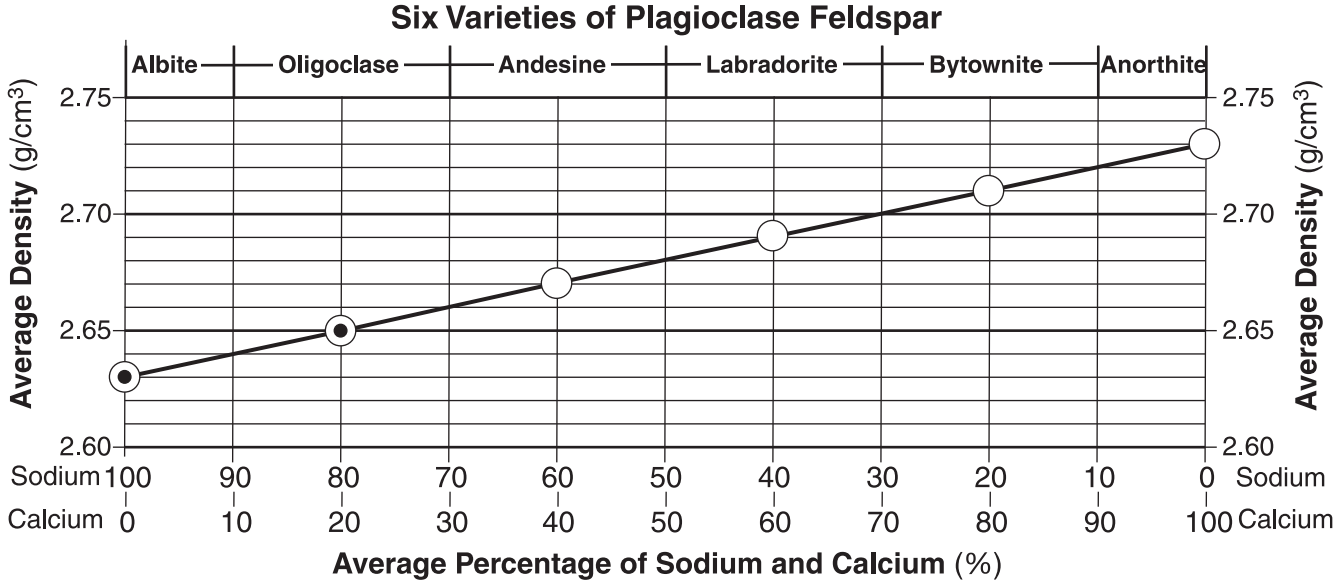
— There are more lines on the northeast side of the mountain.

— Isolines are more closely spaced.

76 [1] Allow 1 credit if the centers of *all four* student plots are within or touch the circles shown below and all *six plots* are correctly connected with a line that passes within or touches each circle.

Note: Allow credit if the line does *not* pass through the student plots, but is still within or touching the circles.

It is recommended that an overlay of the same scale as the student answer sheet be used to ensure reliability in rating.



77 [1] Allow 1 credit for labradorite.

78 [1] Allow 1 credit for andesine.

Note: Do *not* allow credit for "andesite" because this is an igneous rock, *not* a variety of feldspar.

79 [1] Allow 1 credit for albite, *or* oligoclase, *or* andesine.

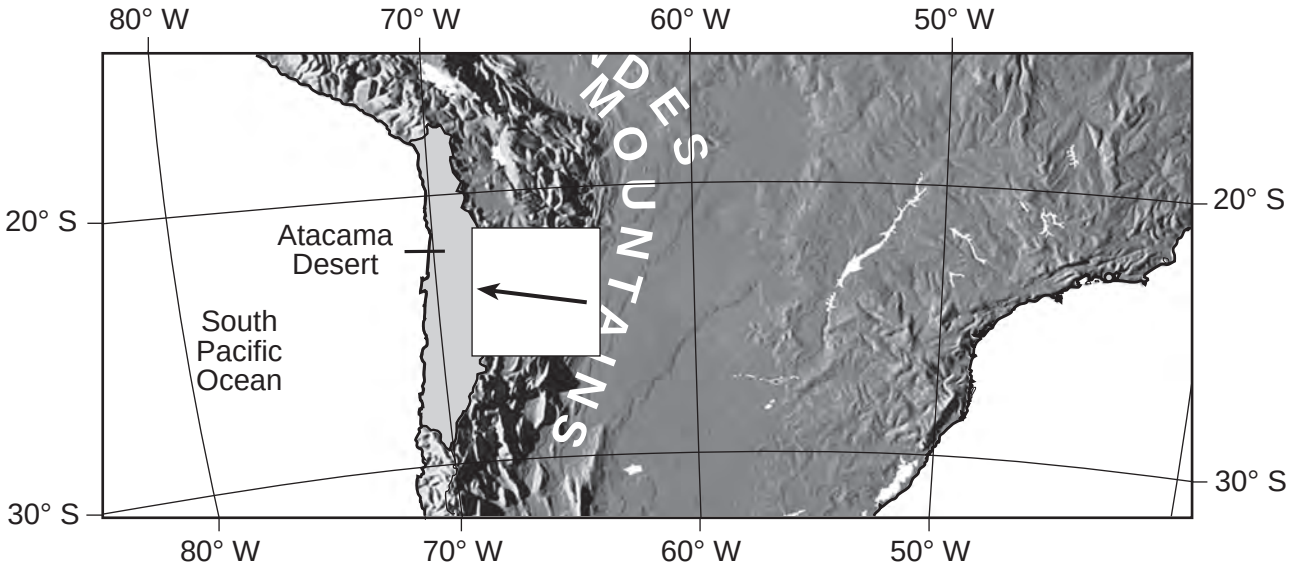
Note: Do *not* allow credit for "andesite" because this is an igneous rock, *not* a variety of feldspar.

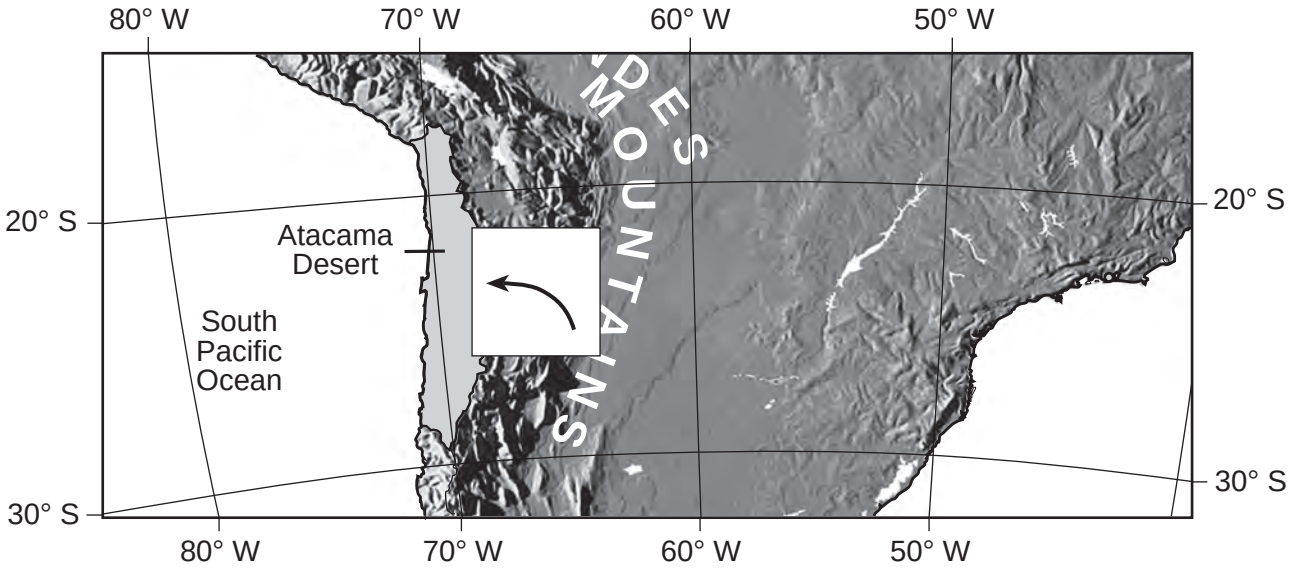
80 [1] Allow 1 credit for Nazca Plate *or* Antarctic Plate *or* Cocos Plate *or* Caribbean Plate.

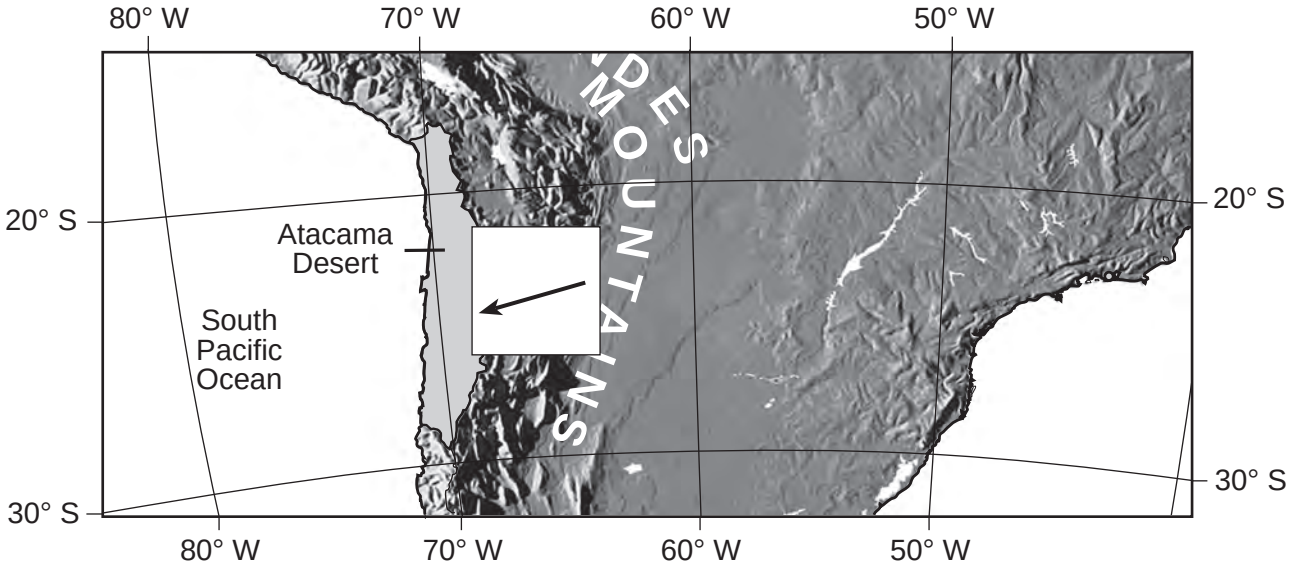
81 [1] Allow 1 credit for a straight or curved arrow drawn generally pointing toward the west or northwest.

Note: If more than one arrow is drawn, all must be correct to receive credit.

Examples of 1-credit responses:







82 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— elevation/high elevation

— altitude

— height above sea level

83 [1] Allow 1 credit for *three* correct minerals. Acceptable responses include, but are not limited to:

— plagioclase feldspar *or* plagioclase

— biotite *or* biotite mica

— amphibole *or* hornblende

— pyroxene *or* augite

— quartz

Note: Do *not* allow quartz as a correct mineral with either pyroxene or augite because a single andesite rock cannot contain both pyroxene and quartz.

84 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Evidence:

— The stream at *A* shows a narrow V-shaped valley.

— The stream at *C* shows more meandering.

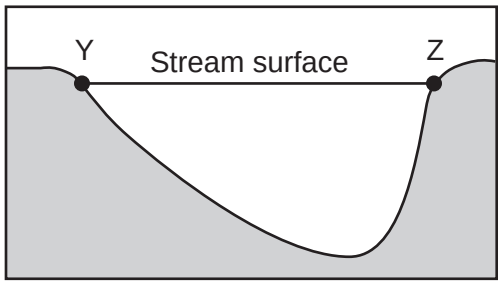
— A wider floodplain is found at *C*.

— The stream at *A* is straighter.

— It has no floodplain.

85 [1] Allow 1 credit if the student's line is drawn from point *Y* to point *Z* and shows that the stream channel is deepest near side *Z*.

Example of 1-credit response:



Regents Examination in Physical Setting/Earth Science

June 2017

Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

The *Chart for Determining the Final Examination Score for the June 2017 Regents Examination in Physical Setting/Earth Science* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Thursday, June 15, 2017. Conversion charts provided for previous administrations of the Regents Examination in Physical Setting/Earth Science must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the **SUBMIT** button at the bottom of the page to submit the completed form.

Map to Core Curriculum

June 2017 Physical Setting/Earth Science			
	Question Numbers		
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	34	55, 64	74, 76, 78
Math Key Idea 2	8, 28	49, 50	77
Math Key Idea 3		44, 63, 64	69, 72
Science Inquiry Key Idea 1	19, 23, 30, 35	38, 50, 53, 56, 59	68, 75, 82
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3	1, 5, 6, 10, 12, 15, 16, 17, 21, 24, 25, 28, 29, 33, 34	39, 41, 43, 45, 46, 47, 48, 52, 54, 57, 58, 59, 60, 61, 62	68, 70, 71, 77, 78, 79, 80, 81, 83
Engineering Design Key Idea 1			72
Standard 2			
Key Idea 1			69
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1	35	40	84, 85
Key Idea 2	5, 11, 14, 15, 16, 19, 25, 27, 30, 31, 32, 33, 35	36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 51, 53, 54, 55, 57, 60, 61, 63	66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 78, 81, 84, 85
Key Idea 3			73
Key Idea 4		53	
Key Idea 5	7, 8, 9, 19, 22, 32, 33	36, 42, 46, 49, 55, 61	66, 67, 84, 85
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2		65	
Standard 4			
Key Idea 1	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 14, 24, 26, 32, 33, 34	36, 37, 38, 39, 41, 42, 45, 47, 51, 52, 53, 54, 55, 56, 57, 58, 59	66, 67, 68
Key Idea 2	10, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 27, 28, 30, 31, 35	40, 43, 44, 46, 47, 48, 49, 50, 60, 62, 63, 64, 65	69, 70, 71, 72, 73, 74, 75, 80, 81, 82, 84, 85
Key Idea 3	29	61	76, 77, 78, 79, 83
Reference Tables			
ESRT 2011 Edition (Revised)	1, 5, 6, 10, 12, 15, 16, 17, 21, 24, 25, 28, 29, 33, 34	39, 43, 45, 47, 52, 57, 58, 59, 60, 61, 62, 64	68, 70, 71, 78, 79, 80, 81, 83

The State Education Department / The University of the State of New York

Regents Examination in Physical Setting/Earth Science – June 2017

Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

(Not to be used for the Braille Edition)

To determine the student's final score, locate the student's Total Performance Test Score across the top of the chart and the Total Written Test Score down the side of the chart. The point where the two scores intersect is the student's final examination score. For example, a student receiving a Total Performance Test Score of 10 and Total Written Test Score of 66 would receive a final examination score of 85.

Total Performance Test Score

Total Written Test Score	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
85	100	99	99	99	98	98	97	96	96	95	94	93	91	90	88	87	85
84	99	99	98	98	98	97	96	96	95	94	93	92	91	89	88	86	84
83	99	99	98	98	98	97	96	96	95	94	93	92	91	89	88	86	84
82	98	98	98	97	97	96	95	95	94	93	92	91	90	88	87	85	83
81	97	97	97	96	96	95	95	94	93	92	91	90	89	88	86	84	82
80	97	97	97	96	96	95	95	94	93	92	91	90	89	88	86	84	82
79	97	96	96	95	95	94	94	93	92	91	90	89	88	87	85	83	82
78	96	95	95	95	94	94	93	92	91	91	89	88	87	86	84	83	81
77	96	95	95	95	94	94	93	92	91	91	89	88	87	86	84	83	81
76	95	95	94	94	93	93	92	91	91	90	89	88	86	85	83	82	80
75	94	94	93	93	92	92	91	90	90	89	88	87	86	84	83	81	79
74	93	93	92	92	92	91	90	90	89	88	87	86	85	83	82	80	78
73	93	93	92	92	92	91	90	90	89	88	87	86	85	83	82	80	78
72	92	92	92	91	91	90	90	89	88	87	86	85	84	82	81	79	77
71	92	91	91	90	90	89	89	88	87	86	85	84	83	82	80	78	77
70	91	90	90	89	89	88	88	87	86	85	84	83	82	81	79	77	76
69	90	90	89	89	88	88	87	86	85	85	84	82	81	80	78	77	75
68	90	90	89	89	88	88	87	86	85	85	84	82	81	80	78	77	75
67	89	89	88	88	87	87	86	85	85	84	83	82	80	79	77	76	74
66	88	88	87	87	86	86	85	85	84	83	82	81	80	78	77	75	73
65	87	87	87	86	86	85	84	84	83	82	81	80	79	77	76	74	72
64	86	86	86	85	85	84	84	83	82	81	80	79	78	77	75	73	71
63	86	86	86	85	85	84	84	83	82	81	80	79	78	77	75	73	71
62	86	85	85	84	84	83	83	82	81	80	79	78	77	76	74	72	71
61	85	84	84	84	83	82	82	81	80	79	78	77	76	75	73	72	70
60	84	84	83	83	82	82	81	80	80	79	78	77	75	74	72	71	69
59	83	83	82	82	81	81	80	79	79	78	77	76	74	73	71	70	68
58	82	82	81	81	81	80	79	79	78	77	76	75	74	72	71	69	67
57	81	81	81	80	80	79	78	78	77	76	75	74	73	71	70	68	66
56	80	80	80	79	79	78	78	77	76	75	74	73	72	71	69	67	65
55	80	79	79	78	78	77	77	76	75	74	73	72	71	70	68	66	65
54	79	78	78	78	77	77	76	75	74	74	72	71	70	69	67	66	64
53	78	78	77	77	76	76	75	74	74	73	72	71	69	68	66	65	63
52	77	77	76	76	75	75	74	73	73	72	71	70	69	67	66	64	62
51	76	76	75	75	75	74	73	73	72	71	70	69	68	66	65	63	61
50	75	75	75	74	74	73	73	72	71	70	69	68	67	65	64	62	60
49	75	74	74	73	73	72	72	71	70	69	68	67	66	65	63	61	60
48	74	73	73	72	72	71	71	70	69	68	67	66	65	64	62	60	59
47	73	73	72	72	71	71	70	69	68	68	67	65	64	63	61	60	58
46	72	72	71	71	70	70	69	68	68	67	66	65	63	62	60	59	57
45	71	71	70	70	69	69	68	68	67	66	65	64	63	61	60	58	56

Final Examination Scores
Regents Examination in Physical Setting/Earth Science – June 2017 – continued

Total Written Test Score	Total Performance Test Score																
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
44	70	70	70	69	69	68	67	67	66	65	64	63	62	60	59	57	55
43	69	69	69	68	68	67	67	66	65	64	63	62	61	60	58	56	54
42	69	68	68	67	67	66	66	65	64	63	62	61	60	59	57	55	54
41	68	67	67	67	66	65	65	64	63	62	61	60	59	58	56	55	53
40	67	67	66	66	65	65	64	63	63	62	61	60	58	57	55	54	52
39	66	66	65	65	64	64	63	62	62	61	60	59	57	56	54	53	51
38	64	64	64	63	63	62	61	61	60	59	58	57	56	54	53	51	49
37	63	63	63	62	62	61	61	60	59	58	57	56	55	54	52	50	48
36	63	62	62	61	61	60	60	59	58	57	56	55	54	53	51	49	48
35	62	61	61	61	60	60	59	58	57	57	55	54	53	52	50	49	47
34	61	61	60	60	59	59	58	57	57	56	55	54	52	51	49	48	46
33	59	59	58	58	58	57	56	56	55	54	53	52	51	49	48	46	44
32	58	58	58	57	57	56	56	55	54	53	52	51	50	48	47	45	43
31	58	57	57	56	56	55	55	54	53	52	51	50	49	48	46	44	43
30	57	56	56	55	55	54	54	53	52	51	50	49	48	47	45	43	42
29	55	55	54	54	53	53	52	51	51	50	49	48	46	45	43	42	40
28	54	54	53	53	52	52	51	51	50	49	48	47	46	44	43	41	39
27	53	53	53	52	52	51	50	50	49	48	47	46	45	43	42	40	38
26	52	51	51	50	50	49	49	48	47	46	45	44	43	42	40	38	37
25	51	50	50	50	49	48	48	47	46	45	44	43	42	41	39	38	36
24	49	49	48	48	47	47	46	45	45	44	43	42	40	39	37	36	34
23	48	48	47	47	47	46	45	45	44	43	42	41	40	38	37	35	33
22	47	47	47	46	46	45	44	44	43	42	41	40	39	37	36	34	32
21	46	45	45	44	44	43	43	42	41	40	39	38	37	36	34	32	31
20	45	44	44	44	43	43	42	41	40	40	38	37	36	35	33	32	30
19	43	43	42	42	41	41	40	39	39	38	37	36	35	33	32	30	28
18	42	42	41	41	41	40	39	39	38	37	36	35	34	32	31	29	27
17	41	40	40	39	39	38	38	37	36	35	34	33	32	31	29	27	26
16	40	39	39	38	38	37	37	36	35	34	33	32	31	30	28	26	25
15	38	38	37	37	36	36	35	34	34	33	32	31	29	28	26	25	23
14	36	36	36	35	35	34	33	33	32	31	30	29	28	26	25	23	21
13	35	35	35	34	34	33	33	32	31	30	29	28	27	26	24	22	20
12	34	33	33	33	32	31	31	30	29	28	27	26	25	24	22	21	19
11	32	32	31	31	30	30	29	28	28	27	26	25	23	22	20	19	17
10	31	31	30	30	30	29	28	28	27	26	25	24	23	21	20	18	16
9	29	29	29	28	28	27	27	26	25	24	23	22	21	20	18	16	14
8	28	27	27	27	26	26	25	24	23	23	21	20	19	18	16	15	13
7	26	26	25	25	24	24	23	22	22	21	20	19	18	16	15	13	11
6	25	25	24	24	24	23	22	22	21	20	19	18	17	15	14	12	10
5	24	23	23	22	22	21	21	20	19	18	17	16	15	14	12	10	9
4	22	22	21	21	20	20	19	18	17	17	16	14	13	12	10	9	7
3	20	20	19	19	18	18	17	17	16	15	14	13	12	10	9	7	5
2	18	18	18	17	17	16	16	15	14	13	12	11	10	9	7	5	3
1	17	16	16	16	15	14	14	13	12	11	10	9	8	7	5	4	2
0	15	15	14	14	13	13	12	11	11	10	9	8	6	5	3	2	0