The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Wednesday, January 26, 2005 — 1:15 to 4:15 p.m., only

This is a test of your knowledge of Earth science. Use that knowledge to answer all questions in this examination. Some questions may require the use of the *Earth Science Reference Tables*. The *Earth Science Reference Tables* are supplied separately. Be certain you have a copy of the *2001 edition* of these reference tables before you begin the examination.

Your answer sheet for Part A and Part B–1 is the last page of this examination booklet. Turn to the last page and fold it along the perforations. Then, slowly and carefully, tear off your answer sheet and fill in the heading.

The answers to the questions in Part B–2 and Part C are to be written in your separate answer booklet. Be sure to fill in the heading on the front of your answer booklet.

You are to answer *all* questions in all parts of this examination according to the directions provided in the examination booklet. Record your answers to the Part A and Part B–1 multiple-choice questions on your separate answer sheet. Write your answers to the Part B–2 and Part C questions in your answer booklet. All work should be written in pen, except for graphs and drawings, which should be done in pencil. You may use scrap paper to work out the answers to the questions, but be sure to record all your answers on your separate answer sheet and in your answer booklet.

When you have completed the examination, you must sign the statement printed at the end of 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 *2001 Earth Science Reference Tables* 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, write on your separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the *Earth Science Reference Tables*.

1 Which planet's orbit around the Sun is most nearly circular?

(1) Mercury
(2) Neptune
(3) Pluto
(4) Venus

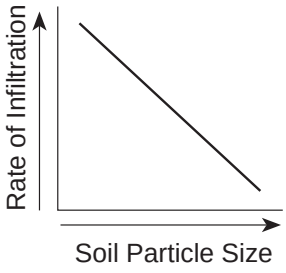
2 How many times will the Sun's perpendicular rays cross Earth's Equator between March 1 of one year and March 1 of the next year?

(1) 1
(2) 2
(3) 3
(4) 4

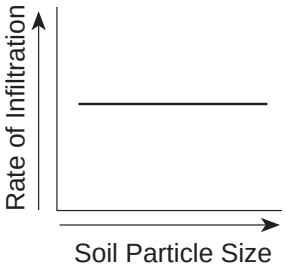
3 Which star's surface temperature is closest to the temperature at the boundary between Earth's mantle and core?

(1) *Sirius*
(2) *Rigel*
(3) the Sun
(4) *Betelgeuse*

4 Which graph best represents the relationship between soil particle size and the rate at which water infiltrates permeable soil?



(1)



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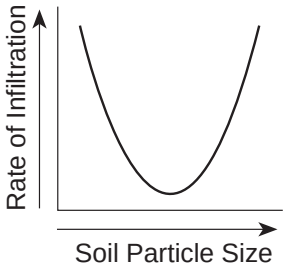

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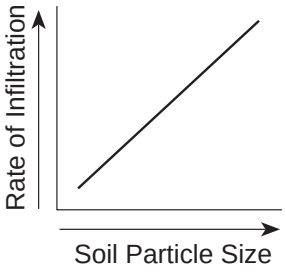
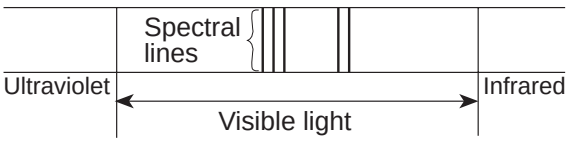


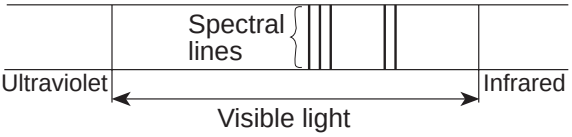
(4)

5 The diagram below shows a standard spectrum compared to a spectrum produced from a distant star.

Standard Spectrum



Spectrum from Distant Star



Which conclusion can be made by comparing the standard spectrum to the spectrum produced from this distant star?

(1) The star's spectral lines have shifted toward the ultraviolet end of the spectrum and the star is moving toward Earth.
(2) The star's spectral lines have shifted toward the ultraviolet end of the spectrum and the star is moving away from Earth.
(3) The star's spectral lines have shifted toward the infrared end of the spectrum and the star is moving toward Earth.
(4) The star's spectral lines have shifted toward the infrared end of the spectrum and the star is moving away from Earth.

6 Scientists are concerned about the decrease in ozone in the upper atmosphere primarily because ozone protects life on Earth by absorbing certain wavelengths of

(1) x-ray radiation
(2) ultraviolet radiation
(3) infrared radiation
(4) microwave radiation

7 It is inferred that during the early Archean Era the atmosphere of Earth contained water vapor, carbon dioxide, nitrogen, and other gases in small amounts. These gases probably came from

(1) precipitation of groundwater
(2) volcanic eruptions
(3) evaporation of Paleozoic oceans
(4) convection currents in the mantle

8 Which ocean current flows northeast along the eastern coast of North America?

(1) Gulf Stream
(2) North Equatorial
(3) California
(4) Labrador

9 Which type of land surface would probably reflect the most incoming solar radiation?

(1) light colored and smooth
(2) light colored and rough
(3) dark colored and smooth
(4) dark colored and rough

10 There is evidence that an asteroid or a comet crashed into the Gulf of Mexico at the end of the Mesozoic Era. Consequences of this impact event may explain the

(1) extinction of many kinds of marine animals, including trilobites
(2) extinction of ammonoids and dinosaurs
(3) appearance of the earliest birds and mammals
(4) appearance of great coal-forming forests and insects

11 What is the approximate location of the Canary Islands hot spot?

(1) 32° S 18° W
(2) 32° S 18° E
(3) 32° N 18° W
(4) 32° N 18° E

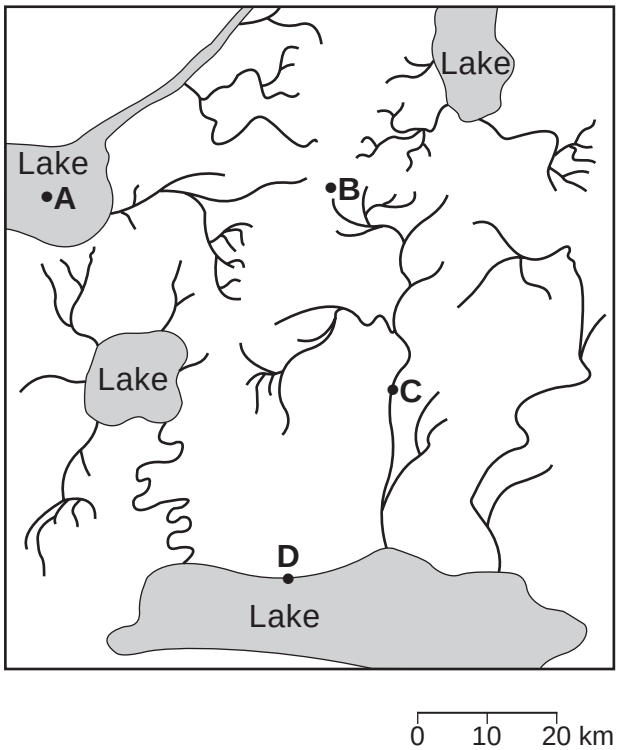
12 How long would it take for the first *S*-wave to arrive at a seismic station 4,000 kilometers away from the epicenter of an earthquake?

(1) 5 min 40 sec
(2) 7 min 0 sec
(3) 12 min 40 sec
(4) 13 min 20 sec

13 Which New York State river flows generally southward?

(1) St. Lawrence River
(2) Niagara River
(3) Genesee River
(4) Hudson River

14 The map below shows the stream drainage patterns for a region of Earth's surface. Points *A*, *B*, *C*, and *D* are locations in the region.



The highest elevation most likely exists at point

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

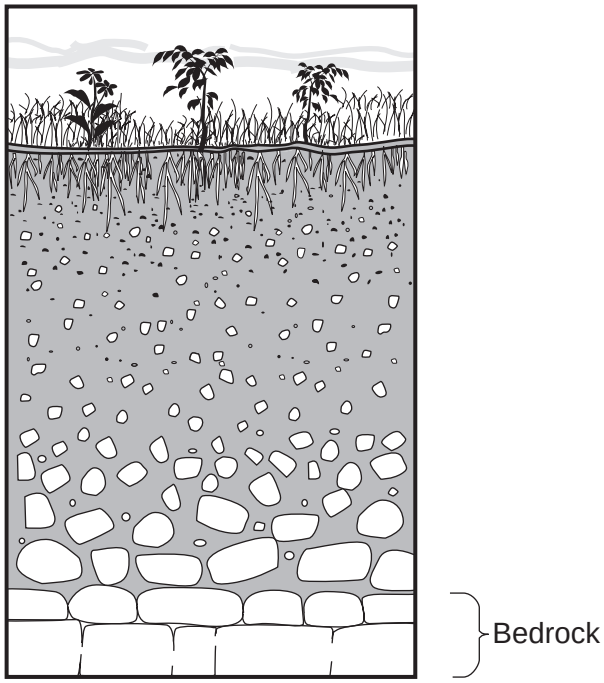
15 Outwash plains are formed as a result of deposition by

(1) landslides
(2) ocean waves
(3) winds from hurricanes
(4) meltwater from glaciers

16 A stream with a velocity of 100 centimeters per second flows into a lake. Which sediment-size particles would the stream most likely deposit first as it enters the lake?

(1) boulders
(2) cobbles
(3) pebbles
(4) sand

17 The cross section below shows a soil profile.



This soil was formed primarily by

(1) erosion by glaciers
(2) erosion by running water
(3) capillarity and human activity
(4) weathering and biological activity

18 Which type of rock most likely contains fossils?

(1) scoria
(2) gabbro
(3) schist
(4) shale

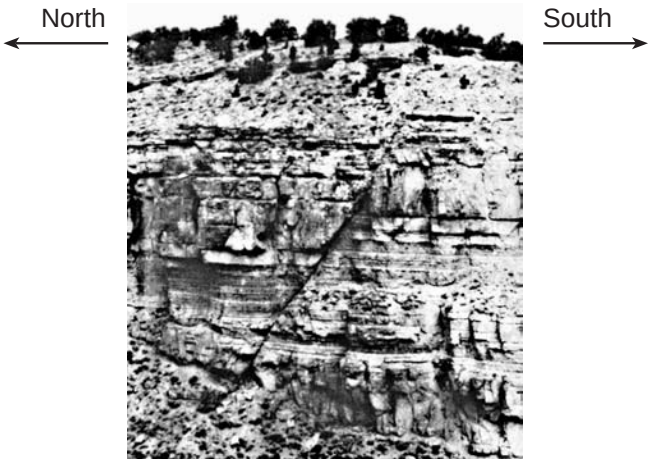
19 In which New York State landscape region is most of the surface bedrock composed of metamorphic rock?

(1) Adirondacks
(2) Catskills
(3) Erie-Ontario Lowlands
(4) Newark Lowlands

20 A human fingernail has a hardness of approximately 2.5. Which two minerals are *softer* than a human fingernail?

(1) calcite and halite
(2) sulfur and fluorite
(3) graphite and talc
(4) pyrite and magnetite

21 The photograph below shows an escarpment (cliff) located in the western United States. The directions for north and south are indicated by arrows. A fault in the sedimentary rocks is shown on the front of the escarpment.



The photograph shows that the fault most likely formed

(1) after the rock layers were deposited, when the north side moved downward
(2) after the rock layers were deposited, when the north side moved upward
(3) before the rock layers were deposited, when the south side moved downward
(4) before the rock layers were deposited, when the south side moved upward

22 Which mountain range resulted from the collision of North America and Africa, as parts of Pangea joined together in the late Pennsylvanian Period?

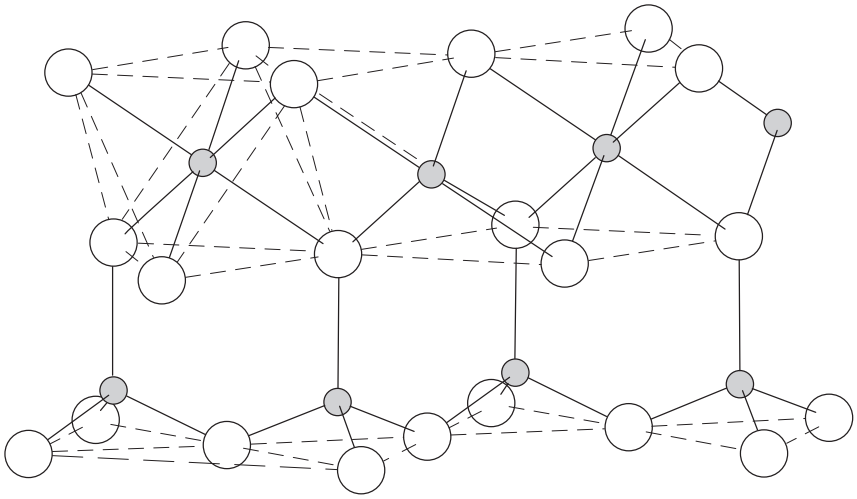
(1) Appalachian Mountains
(2) Acadian Mountains
(3) Taconic Mountains
(4) Grenville Mountains

23 Which physical characteristic best describes the rock phyllite?

(1) glassy texture with gas pockets
(2) clastic texture with angular fragments
(3) bioclastic texture with cemented shell fragments
(4) foliated texture with microscopic mica crystals

24 The diagram below represents a part of the crystal structure of the mineral kaolinite.

Structure of Kaolinite



An arrangement of atoms such as the one shown in the diagram determines a mineral's

(1) age of formation
(2) infiltration rate
(3) physical properties
(4) temperature of formation

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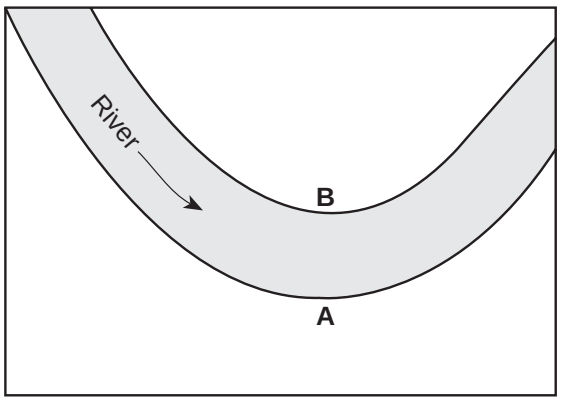
25 The map below shows the path of a river. The arrow shows the direction the river is flowing. Letters *A* and *B* identify the banks of the river.



The water depth is greater near bank *A* than bank *B* because the water velocity near bank *A* is

(1) faster, causing deposition to occur
(2) faster, causing erosion to occur
(3) slower, causing deposition to occur
(4) slower, causing erosion to occur

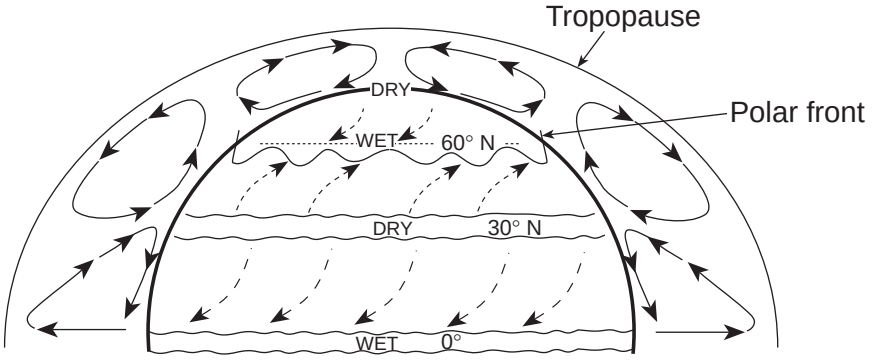
26 Which home-building material is made mostly from the mineral gypsum?

(1) plastic pipes
(2) window glass
(3) drywall panels
(4) iron nails

27 The two most abundant elements by mass in Earth's crust are oxygen and

(1) potassium
(2) hydrogen
(3) nitrogen
(4) silicon

Base your answers to questions 28 through 30 on the diagram below, which represents the planetary wind and moisture belts in Earth's Northern Hemisphere.



(Not drawn to scale)

28 The climate at 90° north latitude is dry because the air at that location is usually

(1) warm and rising
(2) warm and sinking
(3) cool and rising
(4) cool and sinking

29 The paths of the surface planetary winds are curved due to Earth's

(1) revolution
(2) rotation
(3) circumference
(4) size

30 The tropopause is approximately how far above sea level?

(1) 12 mi
(2) 12 km
(3) 60 mi
(4) 60 km

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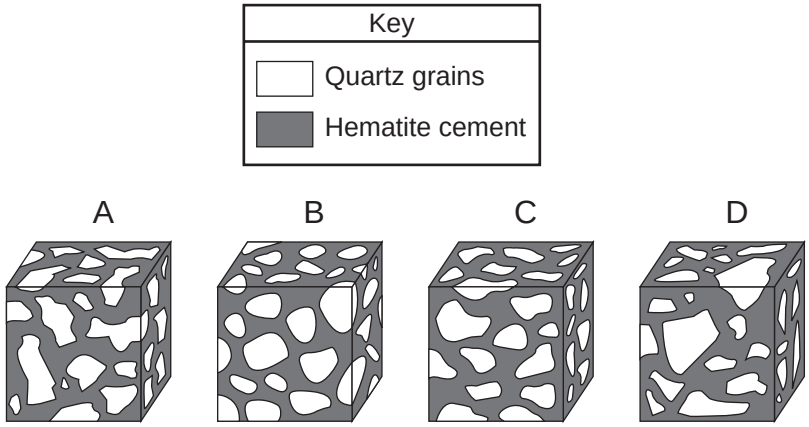
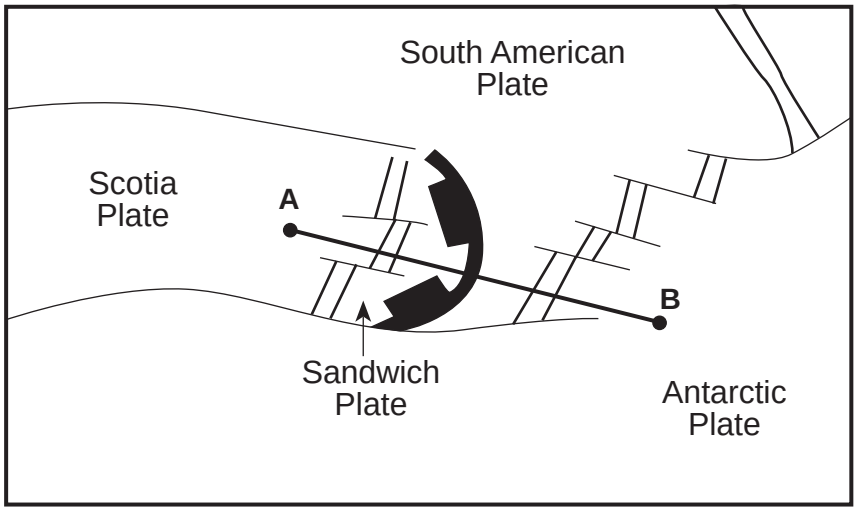
31 The diagram below shows four magnified block-shaped sandstone samples labeled *A*, *B*, *C*, and *D*. Each sandstone sample contains quartz grains of different shapes and sizes. The quartz grains are held together by hematite cement.



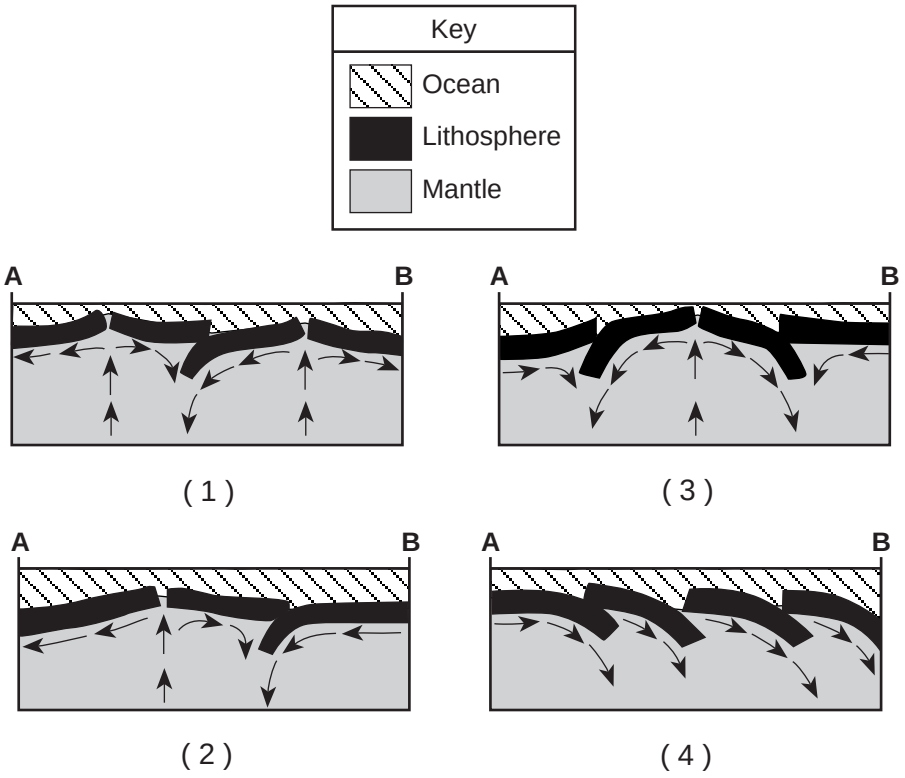
In which sample did the quartz grains undergo the most abrasion during erosional transport?

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

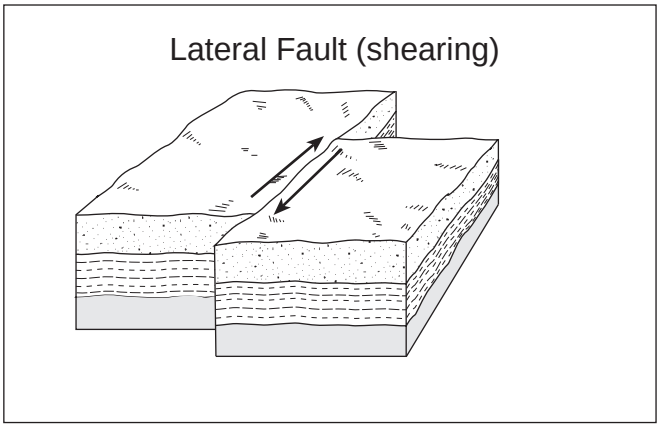
32 On the map below, line *AB* is drawn across several of Earth's tectonic plates in the South Atlantic Ocean.



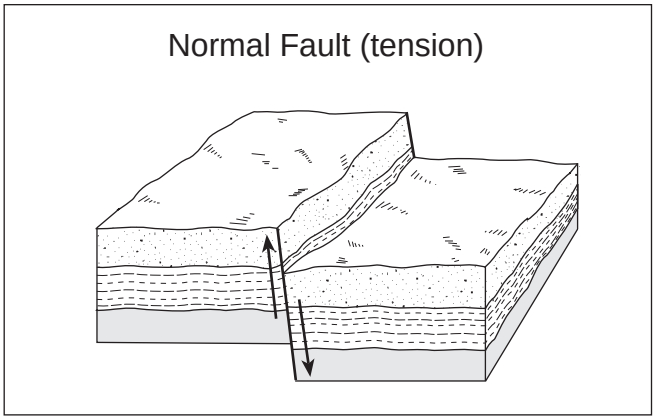
Which cross section best represents the plate boundaries and mantle movement beneath line *AB*?



33 The diagrams below show four major types of fault motion occurring in Earth's crust. Which type of fault motion best matches the general pattern of crustal movement at California's San Andreas fault?



(1)



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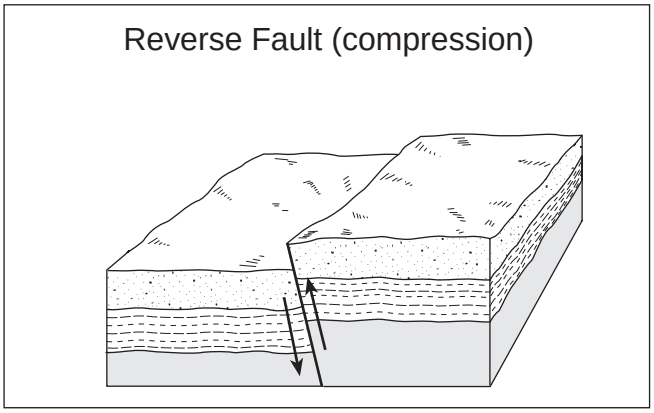
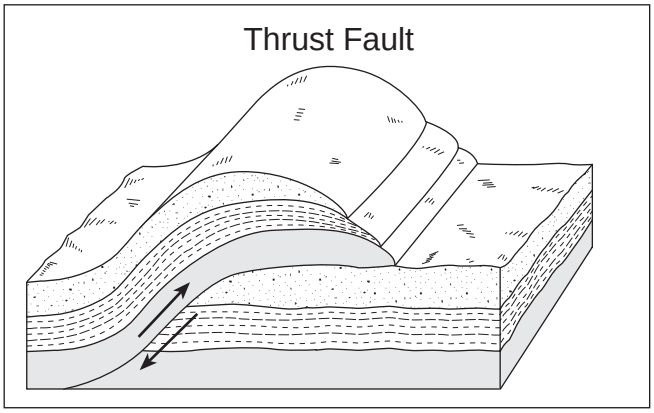
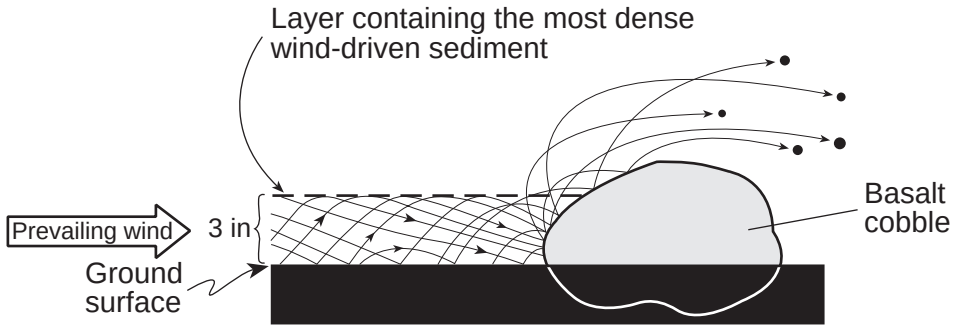


(2)

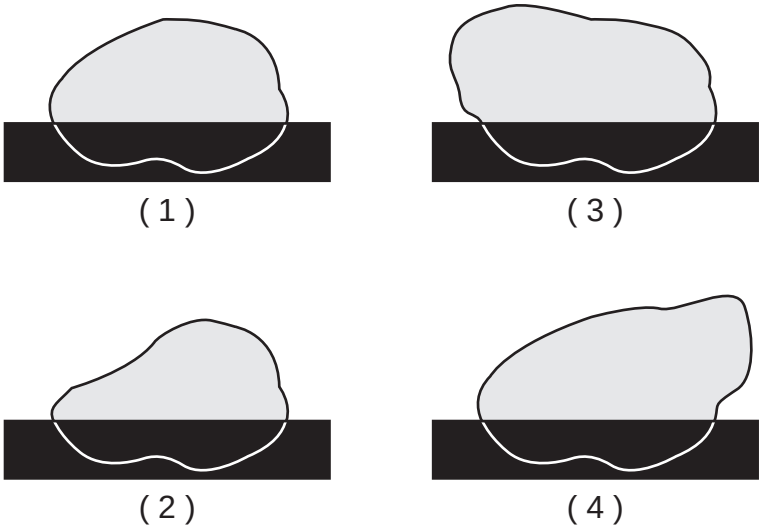


(4)

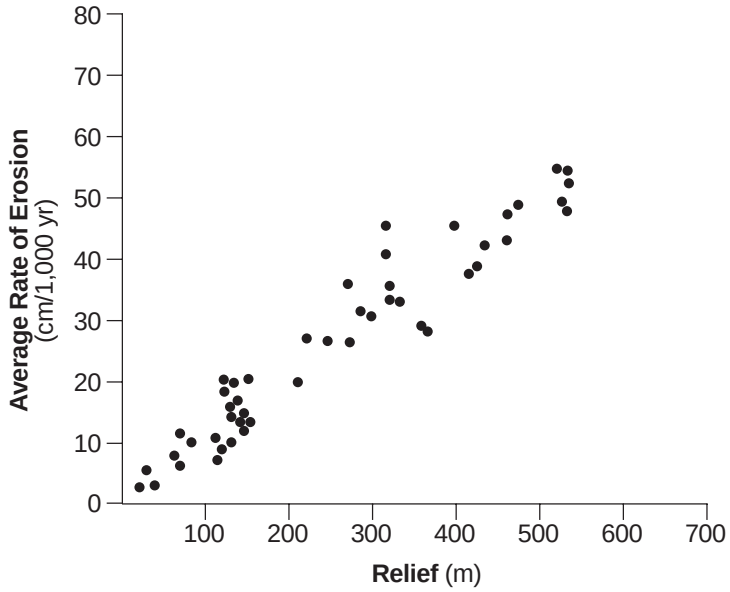
34 The cross section below shows the movement of wind-driven sand particles that strike a partly exposed basalt cobble located at the surface of a windy desert.



Which cross section best represents the appearance of this cobble after many years of exposure to the wind-driven sand?



35 Each dot on the graph below shows the result of separate scientific studies of the relationship between the rates of erosion in regions of different relief. Relief is the local difference between the highest and the lowest elevations.



The results of these combined studies indicate that with each 100-meter increase in relief, the rate of erosion generally

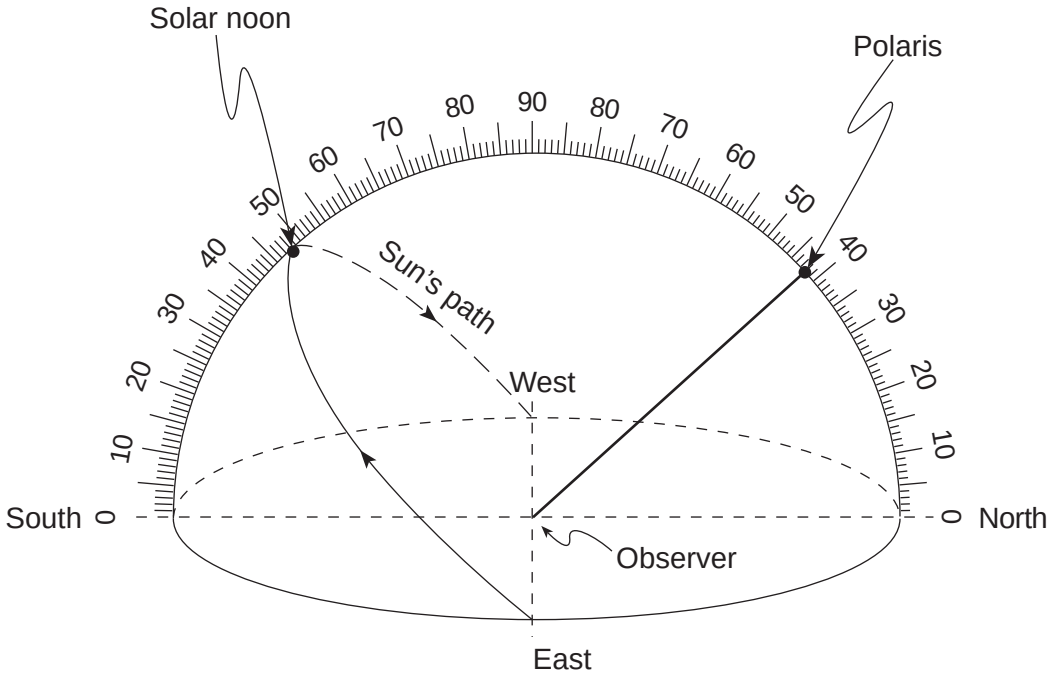
(1) decreases at a rate of 10 cm/1,000 years
(2) decreases at a rate of 20 cm/1,000 years
(3) increases at a rate of 10 cm/1,000 years
(4) increases at a rate of 20 cm/1,000 years

Part B–1

Answer all questions in this part.

Directions (36–50): For *each* statement or question, write on your separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the *Earth Science Reference Tables*.

Base your answers to questions 36 through 38 on the diagram below, which represents a model of the sky (celestial sphere) for an observer in New York State. The curved arrow represents the Sun's apparent path for part of one day. The altitude of *Polaris* is also indicated.



36 According to this diagram, what is the Sun's altitude at solar noon?

(1) 23.5°
(2) 42°
(3) 48°
(4) 90°

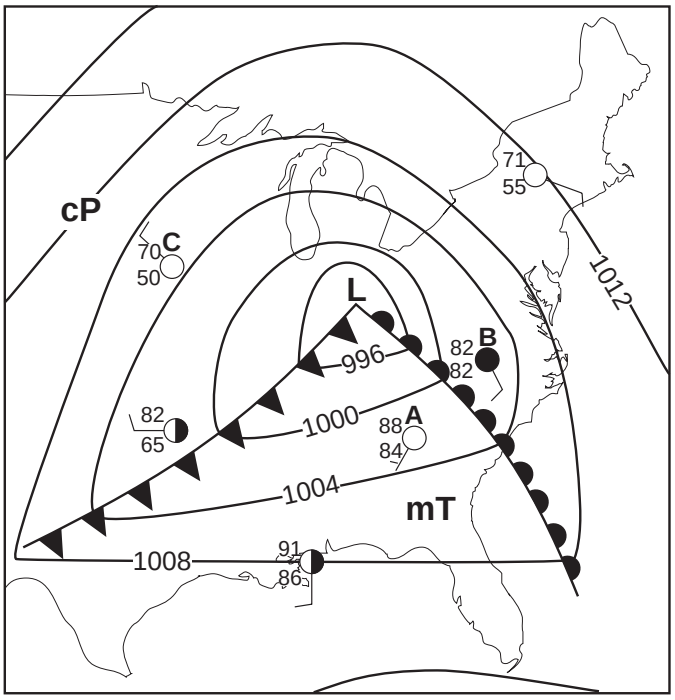
37 Where is this observer most likely located?

(1) Massena
(2) Oswego
(3) Slide Mountain
(4) Mt. Marcy

38 On which date could this observation of the Sun's apparent path have been made?

(1) March 21
(2) July 21
(3) October 21
(4) December 21

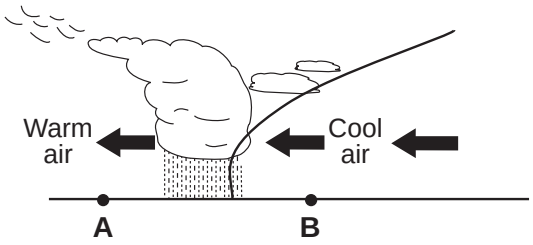
Base your answers to questions 39 through 42 on the weather map below. The map shows a low-pressure system and some atmospheric conditions at weather stations *A*, *B*, and *C*.



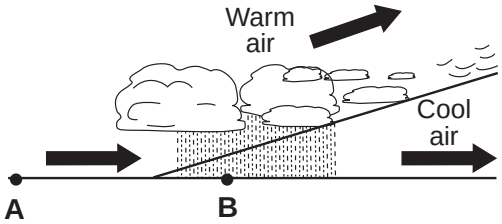
39 Which type of weather is usually associated with a cP air mass, as shown near weather station *C*?

(1) moist and cool
(2) moist and warm
(3) dry and cool
(4) dry and warm

40 Which cross section best represents the air masses, air movement, clouds, and precipitation occurring behind and ahead of the warm front located between stations *A* and *B*?



(1)



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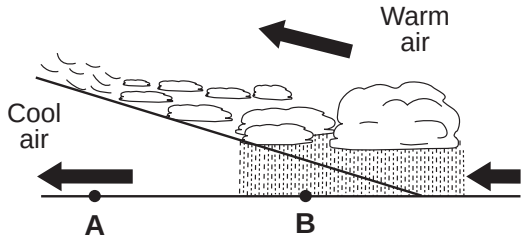

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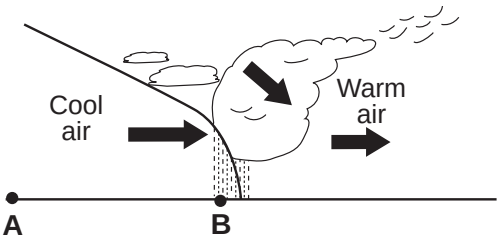
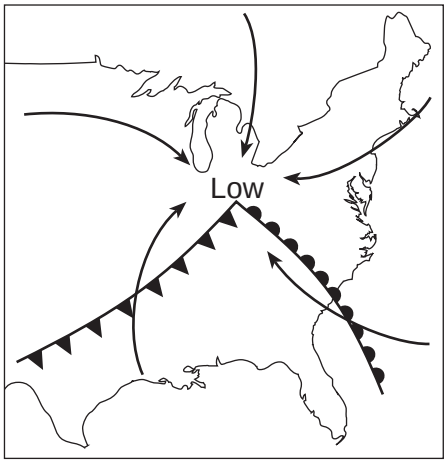
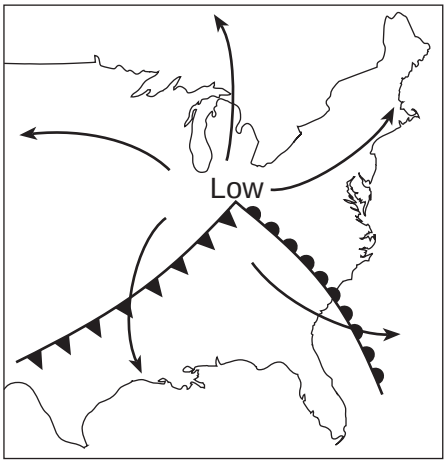


(4)

41 The arrows on which map best represent the direction of surface winds associated with this low-pressure system?



(1)



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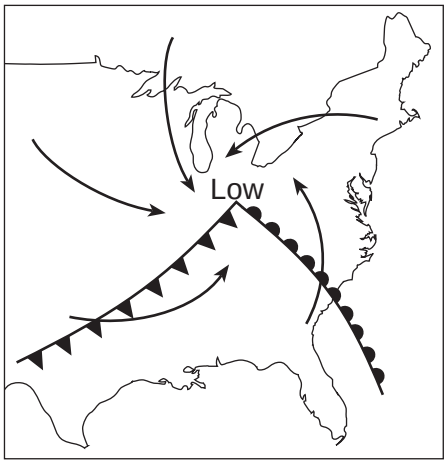

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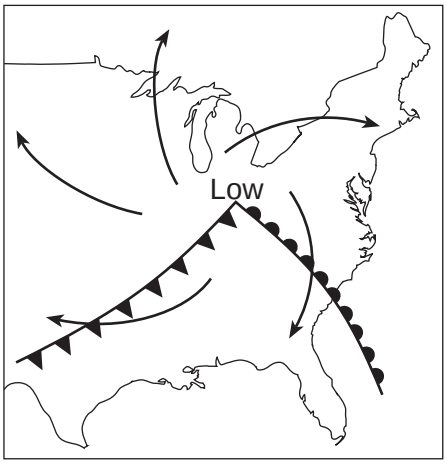
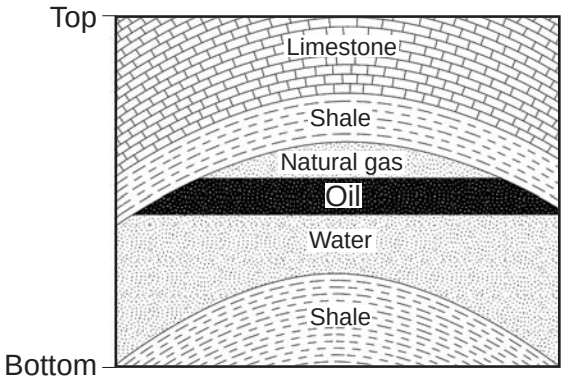


(4)

42 If this weather system follows a normal storm track, the low-pressure center (L) will generally move toward the

(1) northeast
(2) northwest
(3) southeast
(4) southwest

Base your answers to questions 43 and 44 on the bedrock cross section below. The cross section represents part of Earth's crust where natural gas, oil, and water have moved upward through a layer of folded sandstone and filled the pore spaces at the top of the sandstone layer.



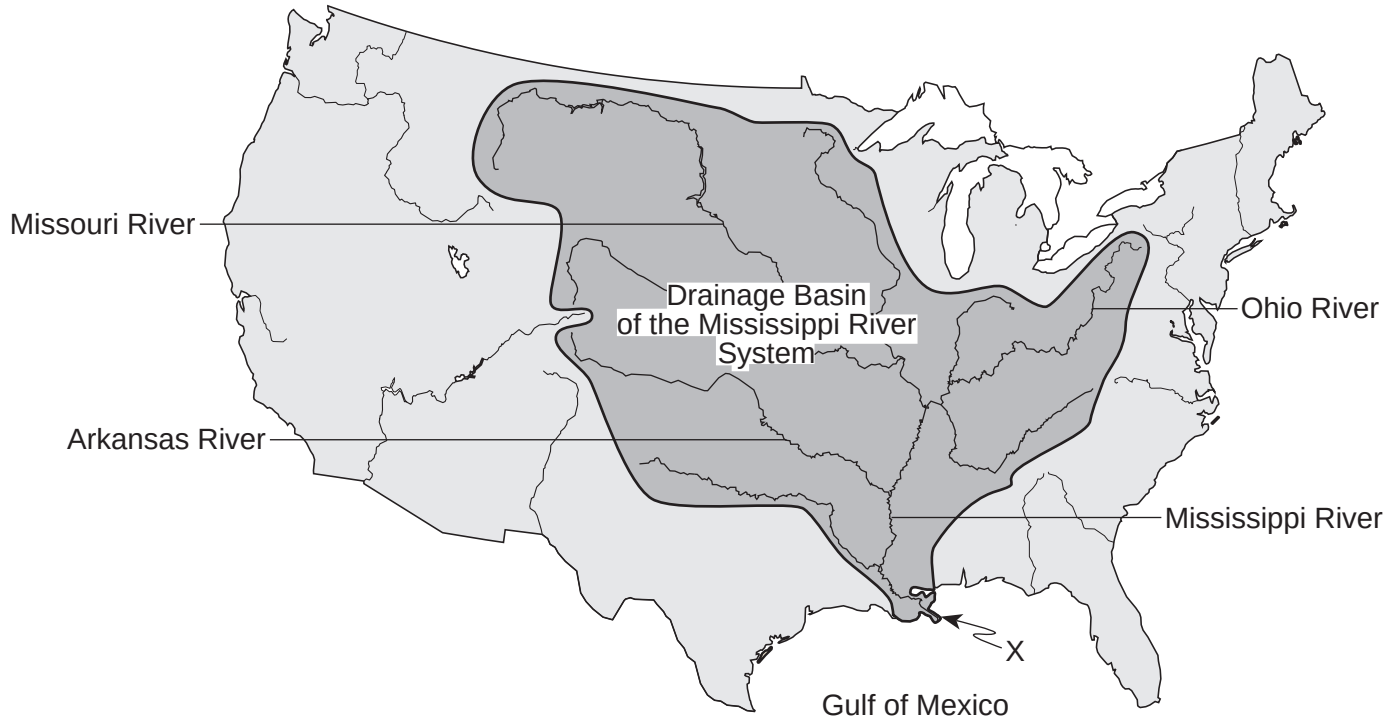
43 The final arrangement of the natural gas, oil, and water within the sandstone was caused by differences in their

(1) density
(2) specific heat
(3) relative age
(4) radioactive half-life

44 The natural gas, oil, and water are trapped within the top of the sandstone and do not move upward through the shale because, compared to the sandstone, the shale has

(1) lower permeability
(2) less foliation
(3) larger pore spaces
(4) larger particles

Base your answers to questions 45 through 47 on the map below, which shows the drainage basin of the Mississippi River system. Several rivers that flow into the Mississippi River are labeled. The arrow at location *X* shows where the Mississippi River enters the Gulf of Mexico.



45 The entire land area drained by the Mississippi River system is referred to as a

(1) levee
(2) watershed
(3) meander belt
(4) floodplain

46 Sediments deposited at location *X* by the Missisippi River most likely have which characteristics?

(1) angular fragments arranged as mixtures
(2) rock particles arranged in sorted beds
(3) rocks with parallel scratches and grooves
(4) high-density minerals with hexagonal crystals

47 The structure formed by the deposition of sediments at location *X* is best described as a

(1) moraine
(2) tributary
(3) delta
(4) drumlin

Base your answers to questions 48 through 50 on the reading passage and the drawing below and on your knowledge of Earth science.

Fossil With Signs of Feathers Is Cited as Bird-Dinosaur Link

Paleontologists have discovered in China a fossil dinosaur with what are reported to be clear traces of feathers from head to tail, the most persuasive evidence so far, scientists say, that feathers predated the origin of birds and that modern birds are descendants of dinosaurs.

Entombed in fine-grained rock, the unusually well-preserved skeleton resembles that of a duck with a reptilian tail, altogether about three feet in length. Its head and tail are edged with the imprint of downy fibers. The rest of the body, except for bare lower legs, shows distinct traces of tufts and filaments that appear to have been primitive feathers. On the backs of its short forelimbs are patterns of what look like modern bird feathers.

Other dinosaur remains with what appear to be featherlike traces have been unearthed in recent years, but nothing as complete as this specimen, paleontologists said. Etched in the rock like a filigree decoration surrounding the skeleton are imprints of where the down and feathers appear to have been.

The 130-million-year-old fossils were found a year ago by farmers in Liaoning Province in northeastern China. After an analysis by Chinese and American researchers, the fossil animal was identified as a dromaeosaur, a small fast-running dinosaur related to velociraptor. The dinosaurs belonged to a group of two-legged predators known as advanced theropods . . .

excerpted from "Fossil With Signs of Feathers Is Cited as Bird-Dinosaur Link"
John Noble Wilford
New York Times, April 26, 2001

The drawing below shows an artist's view of the dinosaur, based on the fossilized remains.

48 During which period of geologic time have paleontologists inferred that the feathered dinosaur mentioned in the passage existed?

(1) Cambrian
(2) Cretaceous
(3) Paleogene
(4) Permian

49 This feathered dinosaur is not considered an index fossil because it

(1) existed too long ago
(2) was preserved in ash
(3) was a land-dwelling animal
(4) was found in only one area

50 The reference to the bird-dinosaur link is most likely referring to the concept of

(1) plate tectonics
(2) evolution
(3) dynamic equilibrium
(4) recycling

Part B–2

Answer all questions in this part.

Directions (51–62): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables.*

Base your answers to questions 51 and 52 on the diagram provided *in your answer booklet.* The diagram shows a model of Earth's orbit around the Sun. Two motions of Earth are indicated. Distances to the Sun are given for two positions of Earth in its orbit.

51 On the diagram provided *in your answer booklet*, place an **X** on Earth's orbit to indicate Earth's position on May 21. [1]

52 Explain why New York State experiences summer when Earth is at its greatest distance from the Sun. [1]

Base your answers to questions 53 through 55 on the field map provided *in your answer booklet*. The map shows elevations, measured in feet, of a number of points in a certain geographic region. Contour lines have been drawn for the 100-foot and 120-foot elevations. Points *A* and *B* represent two spot elevations on the map.

53 On the map provided *in your answer booklet,* draw the 60-foot contour line. Make sure that the contour line extends to the edges of the map. [1]

54 Toward which general compass direction does Elma Creek flow? [1]

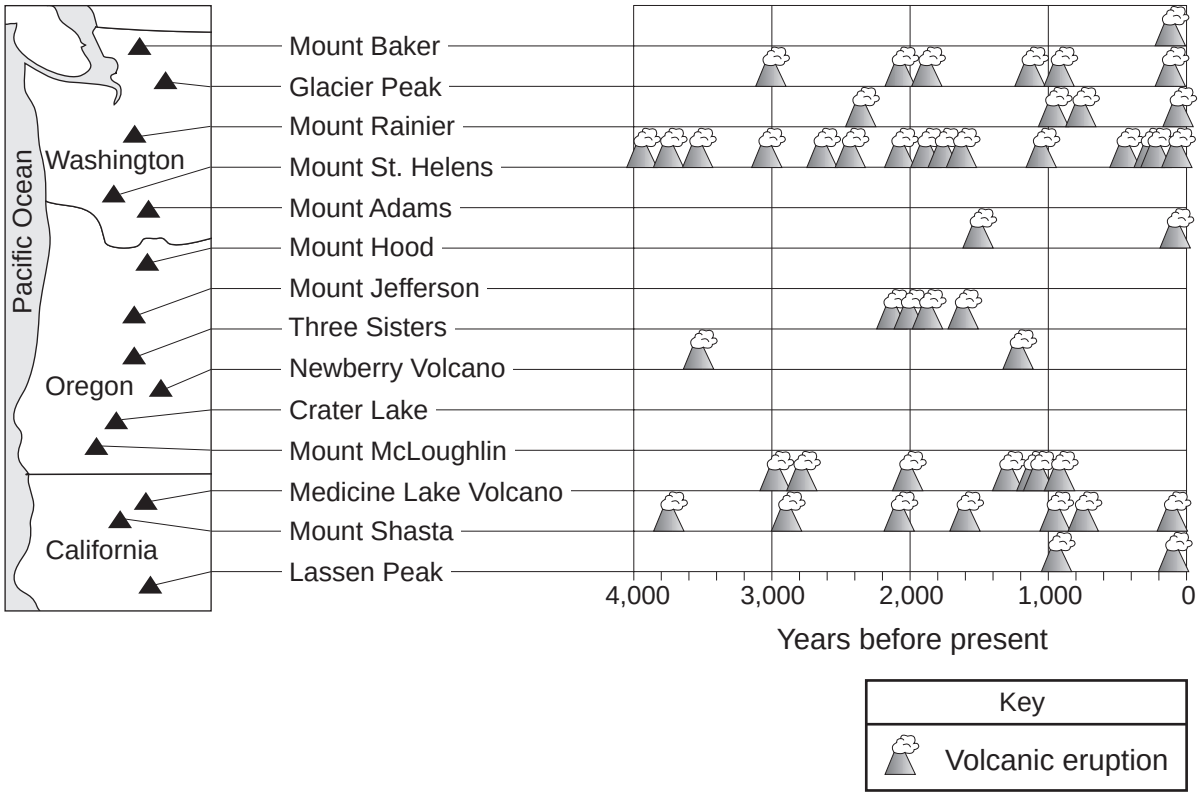
55 Calculate the gradient between points *A* and *B*. Label the answer with the correct units. [2]

---

56 On the weather map station model provided *in your answer booklet*, using the proper format, record the *six* weather conditions shown below. [2]

Wind: from the northwest
Wind speed: 10 knots
Barometric pressure: 1022.0 mb
Cloud cover: 50%
Visibility: 5 mi
Precipitation (in the past 6 hours): .45 in

Base your answers to questions 57 and 58 on the map and table below. The map shows the name and location of the volcanic peaks in the Cascade Mountain Range of the northwestern United States west of the Yellowstone Hot Spot. The table shows the major eruptions of each peak over the past 4,000 years.

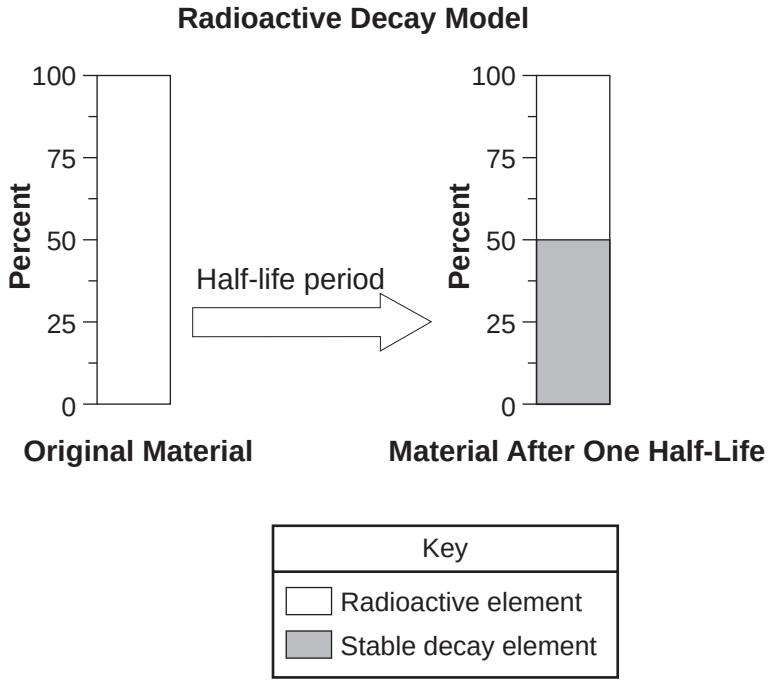


57 During which geologic epoch did the volcanic activity shown on the table occur? [1]

58 On the cross section provided *in your answer booklet,* place an arrow in the continental crust and an arrow in the oceanic crust to show the relative directions of plate movement. [1]

59 Which layer of Earth is composed of both the crust and the rigid mantle? [1]

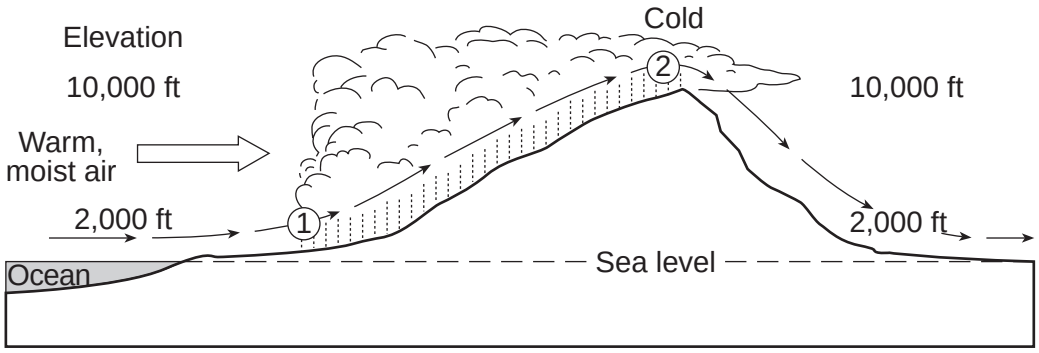
Base your answers to questions 60 and 61 on the diagram below, which represents a model of the radioactive decay of a particular element. The diagram shows the decay of a radioactive element ( ) into the stable decay element ( ) after one half-life period.



60 On the diagram provided *in your answer booklet*, shade in the amount of stable decay element present after the second half-life period. [1]

61 If the radioactive element in this model is carbon-14, how much time will have passed after one half-life? [1]

62 The diagram below shows warm, moist air moving off the ocean and over a mountain, causing precipitation between points 1 and 2.



Describe *two* changes that occur to the warm, moist air between points 1 and 2 that would cause cloud formation. [2]

Part C

Answer all questions in this part.

Directions (63–80): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables.*

Base your answers to questions 63 through 65 on the reading passage below and on your knowledge of Earth science.

The Blue Moon

A "Blue Moon" is the name given to the second full moon in a calendar month. Because there are roughly 29.5 days between full moons, it is unusual for two full moons to "fit" into a 30 or 31 day month (and impossible to fit into a 28 or 29 day month, so February can never have a Blue Moon). The saying "Once in a Blue Moon" means a rare occurrence, and predates the current astronomical use of the term, which is quite recent. In fact, Blue Moons are not all that rare, on average there will be one Blue Moon every 2.5 years. After 1999, the next Blue Moons will be in November 2001; July 2004; and June 2007. The last one before 1999 was in July 1996.

The term Blue Moon is believed to have originated in 1883 after the eruption of Krakatoa. The volcano put so much dust in the atmosphere that the Moon actually looked blue in color. This was so unusual that the term "once in a Blue Moon" was coined.

"The Blue Moon"
David R. Williams
nssdc.gsfc.nasa.gov/planetary/lunar/blue_moon.html

63 Explain why a Blue Moon never occurs during the month of February. [1]

64 What is the greatest number of full-Moon phases, visible from Earth, that are possible in a span of 1 year? [1]

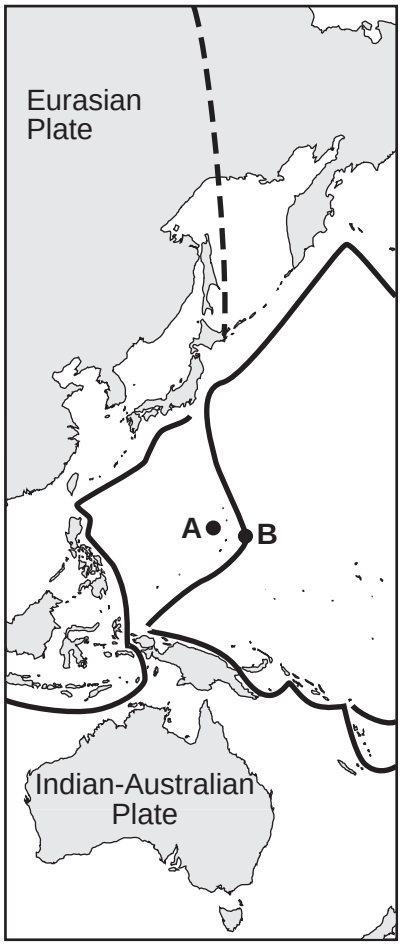
65 In the space provided *in your answer booklet,* draw the relative positions of Earth, the Moon, and the Sun, as viewed from space, so that a full-Moon phase would be visible to an observer on Earth. Label Earth, the Moon, and the Sun in your drawing. [1]

---

66 The Moon has many more impact craters visible on its surface than Earth has on its surface. State *two* reasons that Earth has so few visible impact craters. [2]

Base your answers to questions 67 and 68 on the map and data table shown below. The map shows some tectonic plates and the boundaries between them. Letters *A* and *B* are locations on Earth's surface. The data table shows the depth below Earth's surface of five earthquakes measured from location *A* toward location *B*.

Map



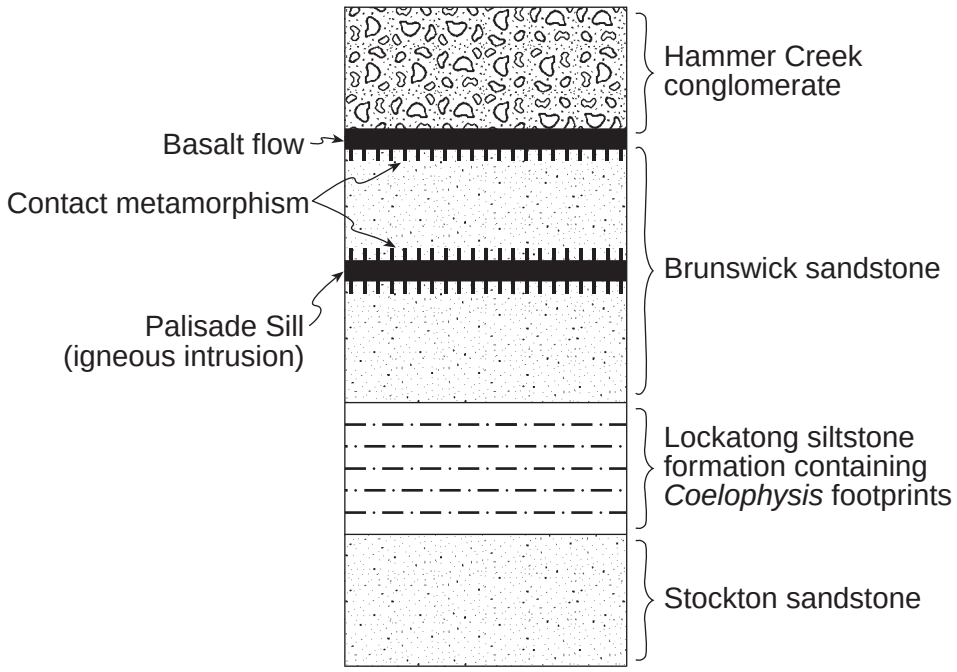
Data Table

Earthquake	Distance from Location *A* Toward Location *B* (km)	Depth Below Earth's Surface (km)
1	100	600
2	200	400
3	250	300
4	300	250
5	400	60

67 On the grid provided *in your answer booklet,* plot the depths of the *five* earthquakes from location *A* toward location *B*. [1]

68 Identify the type of plate boundary or geologic feature found at location *B*. [1]

Base your answers to questions 69 through 71 on the cross section below, which shows several rock formations found in New York State. The rock layers have not been overturned.



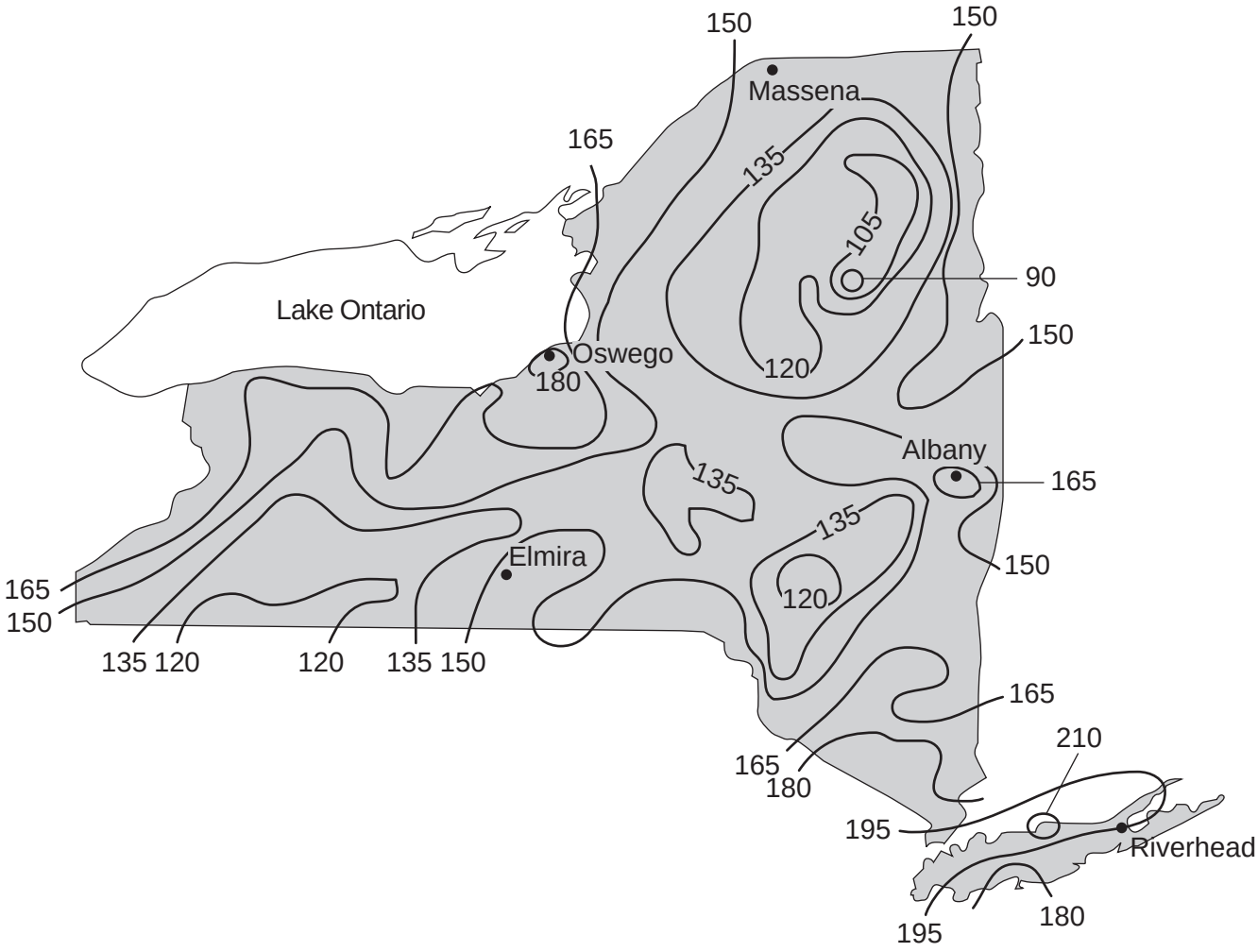
69 How does this cross section indicate that the Stockton sandstone is the oldest rock layer? [1]

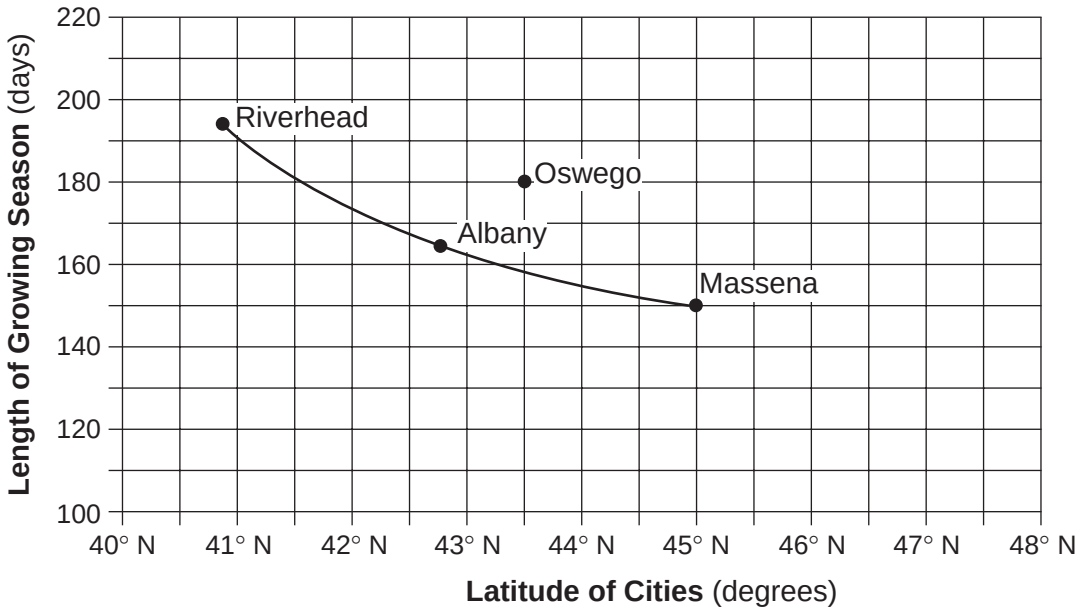
70 State one piece of evidence that supports the fact that the Palisade Sill is younger than the Brunswick sandstone. [1]

71 State one tectonic event affecting North America that occurred at the same time as the Palisade Sill intrusion. [1]

Base your answers to questions 72 through 74 on the map below, the graph on the next page, and your knowledge of Earth science. The map shows the length of the growing season in New York State, expressed in days. The growing season is the average number of days between the last frost in spring and the first frost in fall. The graph line shows the relationship between the latitudes of Riverhead, New York; Albany, New York; and Massena, New York; and the length of the growing season at these three locations.

Length of Growing Season (in days)



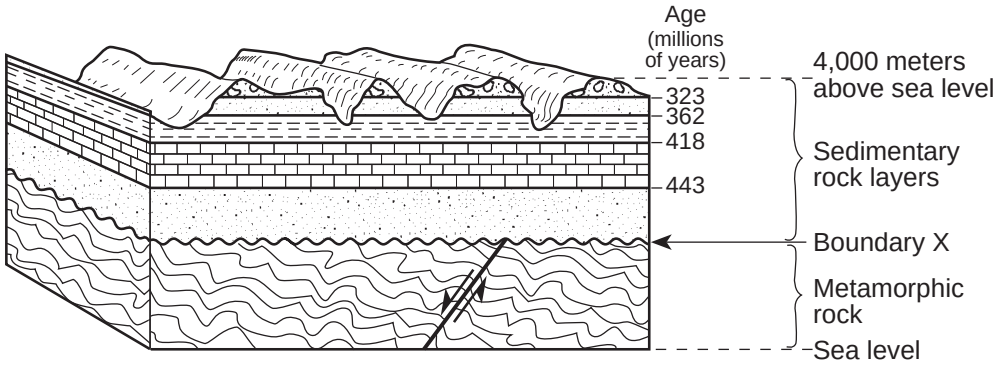


72 For Riverhead, Albany, and Massena, state the relationship between latitude and the length of the growing season shown by the graph. [1]

73 The data for Oswego, New York, have been plotted separately on the graph. Explain why the location of Oswego causes it to have a growing season longer than other cities at the same latitude. [1]

74 Compare the length of the growing season in a lowland region with the length of the growing season in a mountain region at approximately the same latitude. [1]

Base your answers to questions 75 through 77 on the cross section below and on your knowledge of Earth science. The cross section shows a portion of Earth's crust. The age, in millions of years, of each boundary between the different sedimentary rock layers is shown. The age of boundary *X* between the sedimentary rock and the metamorphic rock is not shown. Assume no overturning has occurred.

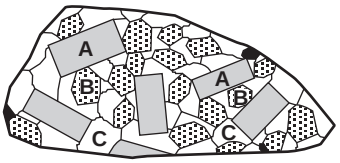


75 Identify the geologic feature represented by boundary *X*. [1]

76 Describe how the rock type below boundary *X* was formed. [1]

77 Identify by name one index fossil that existed when the limestone rock shown in the cross section was being formed. [1]

Base your answers to questions 78 through 80 on the diagram and table below. The diagram represents a felsic igneous rock. Letters *A*, *B*, and *C* represent three different minerals in the rock sample. The table describes the physical properties of minerals *A*, *B*, and *C* found in the igneous rock sample.



(Actual size)

Mineral	Key	Physical Properties
A		pink, cleaves in two directions at 90°
B		white, cleaves in two directions, striations visible
C		colorless or clear with a glassy luster

78 State the texture of this igneous rock. [1]

79 On the table provided *in your answer booklet*, state the names of minerals *A*, *B*, and *C*. [2]

80 State *two* processes responsible for the formation of an igneous rock. [1]

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Wednesday, January 26, 2005 — 1:15 to 4:15 p.m., only

ANSWER SHEET

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

Teacher ..... School .....

Record your answers to Part A and Part B–1 on this answer sheet.

Part A

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

Part A Score

Part B–1

36	44 .....
37	45 .....
38	46 .....
39	47 .....
40	48 .....
41	49 .....
42	50 .....
43	

Part B–1 Score

Write your answers to Part B–2 and Part C in your answer booklet.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Wednesday, January 26, 2005 — 1:15 to 4:15 p.m., only

ANSWER BOOKLET

☐ Male

Student . . . . . Sex: ☐ Female

Teacher . . . . . .

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

Answer all questions in Part B–2 and Part C. Record your answers in this booklet.

	Performance Test Score (Maximum Score: 23)

Part	Maximum Score	Student's Score
A	35	
B–1	15	
B–2	15	
C	20	

Total Written Test Score (Maximum Raw Score: 85)

Final Score (from conversion chart)

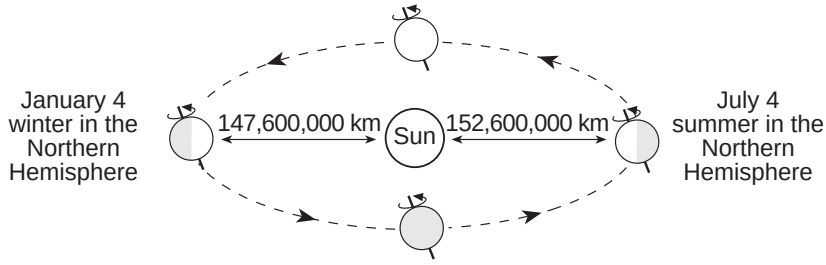
Raters' Initials:

Rater 1 . . . . . **Rater 2** . . . . . .

For Raters Only

Part B–2

51



(Not drawn to scale)

Key
Earth motions
Revolution
Rotation

51 ☐

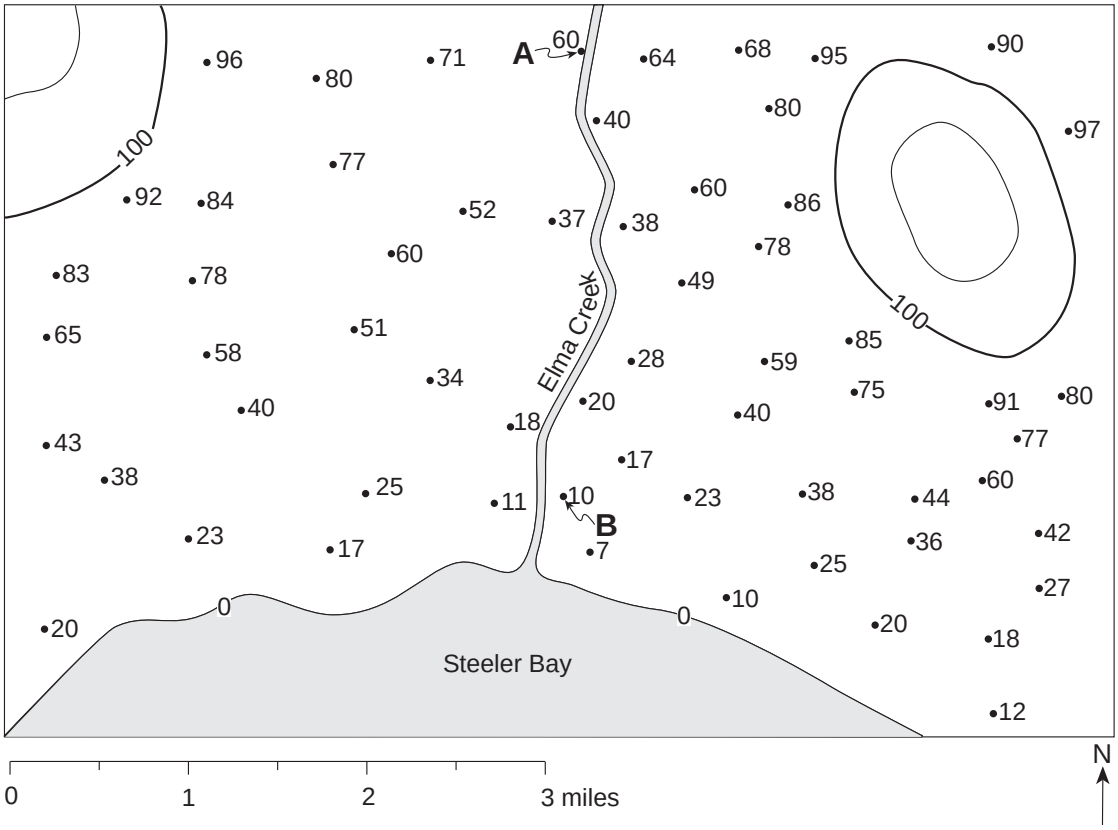
52 _____

_____ **52** ☐

_____

For Raters Only

53



53 ☐

54 _____

54 ☐

55 Gradient = _____

55 ☐

56

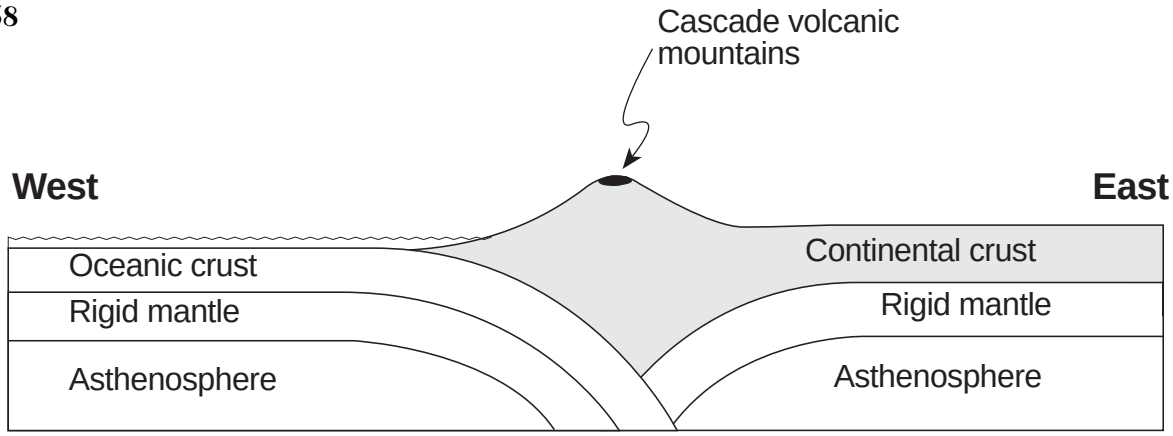
56 ☐

57 _____ **Epoch**

57 ☐

For Raters Only

58



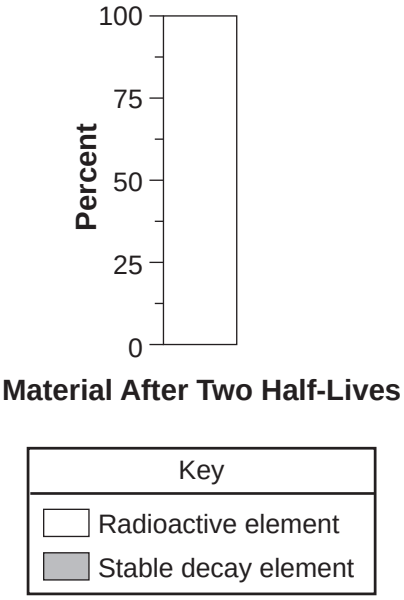
(Not drawn to scale)

58 ☐

59 _____

59 ☐

60



60 ☐

61 _____ **years**

61 ☐

62 (1) _____

(2) _____

62 ☐

Total Score for Part B–2

For Raters Only

Part C

63 _____

_____

63 ☐

64 _____ **64** ☐

65

65 ☐

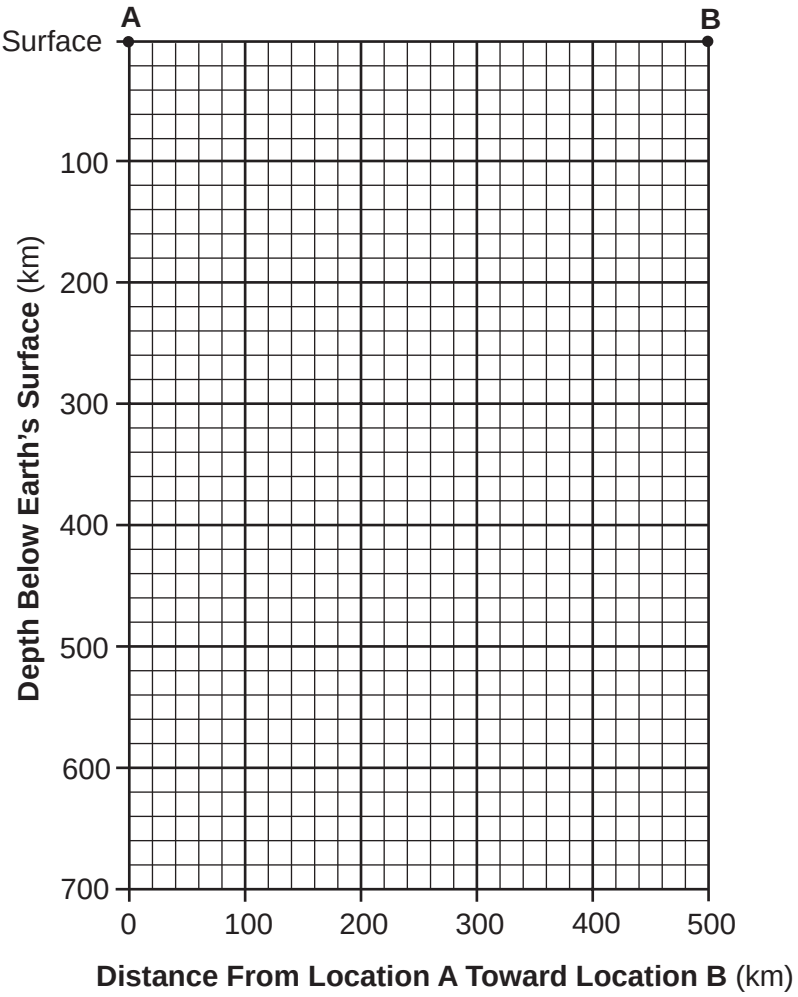
66 (1) _____

66 ☐

(2) _____

For Raters Only

67 Earth's Surface



67 ☐

68 _____

68 ☐

69 _____

_____

69 ☐

70 _____

_____

70 ☐

71 _____

71 ☐

For Raters Only

72 _____

_____

72 ☐

73 _____

_____

73 ☐

74 _____

_____

74 ☐

75 _____ **75** ☐

76 _____

_____

76 ☐

77 _____ **77** ☐

78 _____ **78** ☐

79

Mineral	Name of Mineral
A	
B	
C	

79 ☐

80 _____ and _____ **80** ☐

☐

Total Score for Part C

FOR TEACHERS ONLY

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

PS–ES PHYSICAL SETTING/EARTH SCIENCE

Wednesday, January 26, 2005 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 3 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. Visit the site http://www.emsc.nysed.gov/osa/ and select the link "Latest Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

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

Part A

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

Part B–1

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

Directions to the Teacher

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

Use only *red* ink or *red* pencil in rating Regents papers. Do *not* correct the student's work by making insertions or changes of any kind.

On the detachable answer sheet for Part A and Part B–1, indicate by means of a checkmark each incorrect or omitted answer. In the box provided at the end of each part, record the number of questions the student answered correctly for that part.

At least two science teachers must participate in the scoring of each student's responses to the Part B–2 and Part C open-ended questions. 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 all the open-ended questions on a student's answer paper.

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. In the student's answer booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

Fractional credit is *not* allowed. Only whole-number credit may be given to a response. Units need not be given when the wording of the questions allows such omissions.

Raters should enter the scores earned for Part A, Part B–1, Part B–2, and Part C on the appropriate lines in the box printed on the answer booklet and then should add these four scores and enter the total in the box labeled "Total Written Test Score." The student's score for the Earth Science Performance Test should be entered in the space provided. Then, the student's raw scores on the performance test and written test should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Wednesday, January 26, 2005. The student's scaled score should be entered in the labeled box on the student's answer booklet. The scaled score is the student's final examination score.

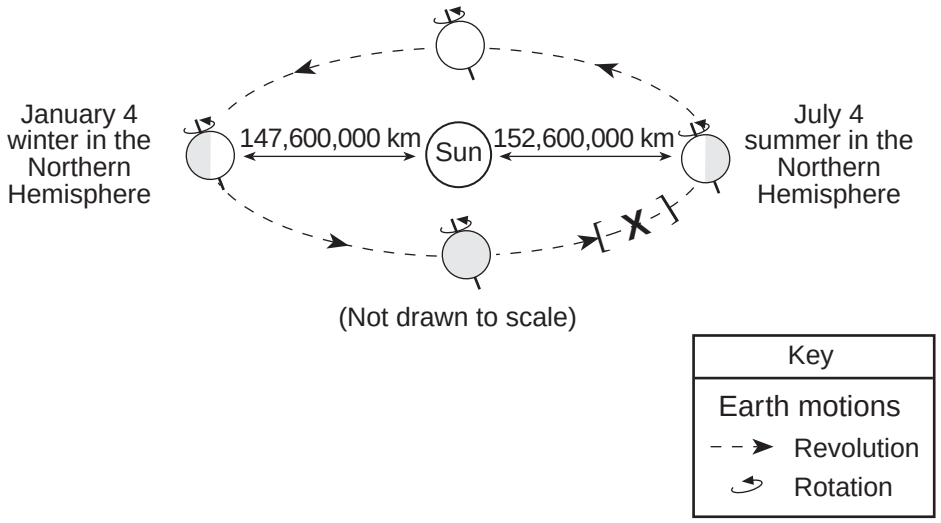
All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

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

Part B–2

Allow a total of 15 credits for this part. The student must answer all questions in this part.

51 [1] Allow 1 credit for the correct placement of the **X** on the diagram. The center of the **X** must be between the brackets indicated on Earth's orbit, as shown in the diagram below.



52 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The North Pole is tilted toward the Sun in the summer.

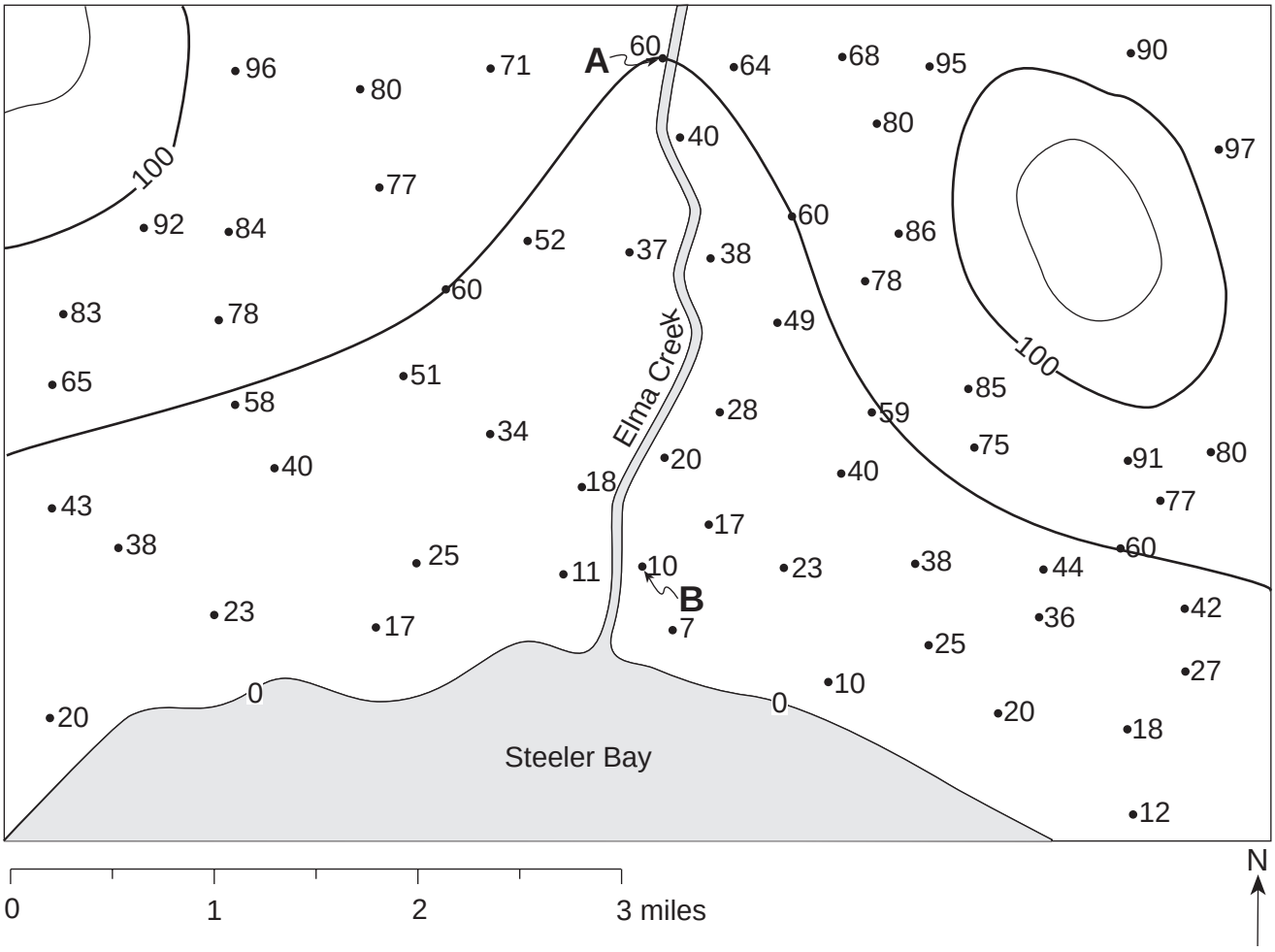
In summer, the Sun is higher in the sky due to the tilt of Earth's axis.

New York State receives higher angles of insolation in summer when Earth is farthest from the Sun.

New York State receives lower angles of insolation in winter when Earth is closest to the Sun.

greater duration of insolation

53 [1] Allow 1 credit for correctly drawing the 60-foot contour line. It must extend to the edges of the map to receive credit. If other contour lines are drawn, all lines must be correct to receive credit. Acceptable responses include, but are not limited to, this example:



54 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

south

southerly direction

north to south

55 [2] Allow 1 credit for the value of **20** (±1).

and

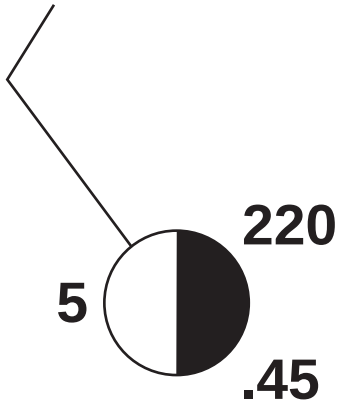
Allow 1 credit for correct units. Acceptable responses include, but are not limited to, these examples:

feet/mile

ft/mi

feet per mile

56 [2] An example of a correct response is shown below.



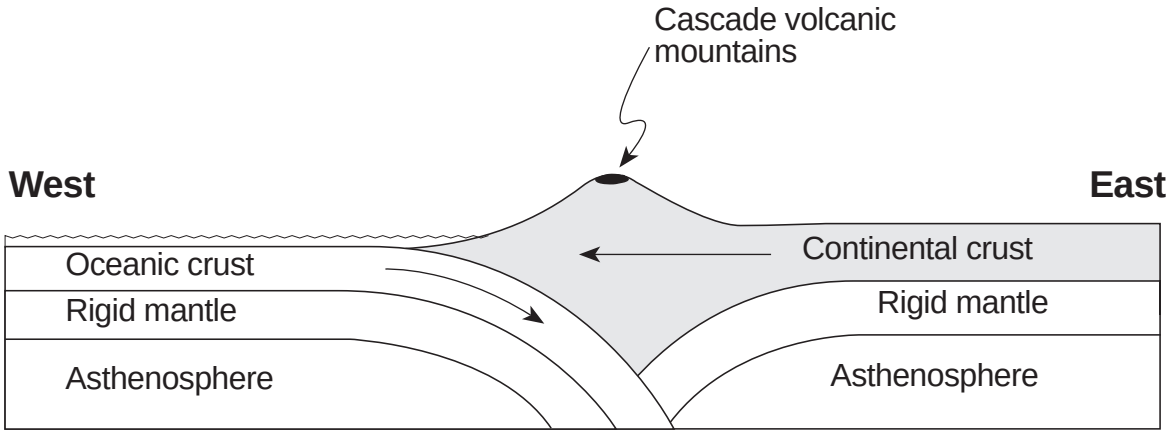
Allow 2 credits if five or six variables are correctly plotted. The feather for wind speed may be on either side of the staff. Allow credit for any overcast indication that shades half of the circle.

Allow only 1 credit if only three or four variables are correctly plotted.

Note: Do *not* allow credit for 1022.2 or 22.0 or 220 mb; 5 mi; .45 inches or 45.

57 [1] Allow 1 credit for **Holocene** Epoch.

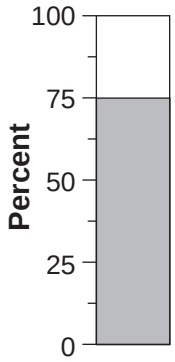
58 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:



(Not drawn to scale)

59 [1] Allow 1 credit for **lithosphere**.

60 [1] Allow 1 credit for the correct response shown below.



61 [1] Allow 1 credit for $\mathbf{5.7 \times 10^3}$ years or **5,700** years.

62 [2] Allow 2 credits, 1 credit for *each* of two correct responses. Acceptable responses include, but are not limited to, these examples:

Air rises.

Air expands.

Air cools.

The temperature reaches the dewpoint.

Water vapor condenses.

Part C

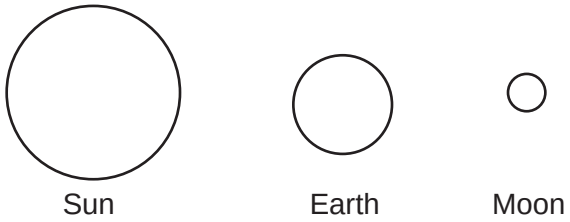
Allow a total of 20 credits for this part. The student must answer all questions in this part.

63 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

February has only 28 or 29 days and a complete cycle of the Moon phases takes $29\frac{1}{2}$ days.

64 [1] Allow 1 credit for **13**.

65 [1] Allow 1 credit for Earth being located between the Sun and the Moon. Shading of Earth and the Moon is *not* necessary. The Sun, the Moon, and Earth must be identified but do *not* need to be drawn to scale. Acceptable responses include, but are not limited to, this example:



66 [2] Allow 2 credits, 1 credit for *each* of two correct responses. Acceptable responses include, but are not limited to, these examples:

Friction from Earth's atmosphere causes many meteors to burn up.

Many meteors fall into the ocean so craters aren't visible.

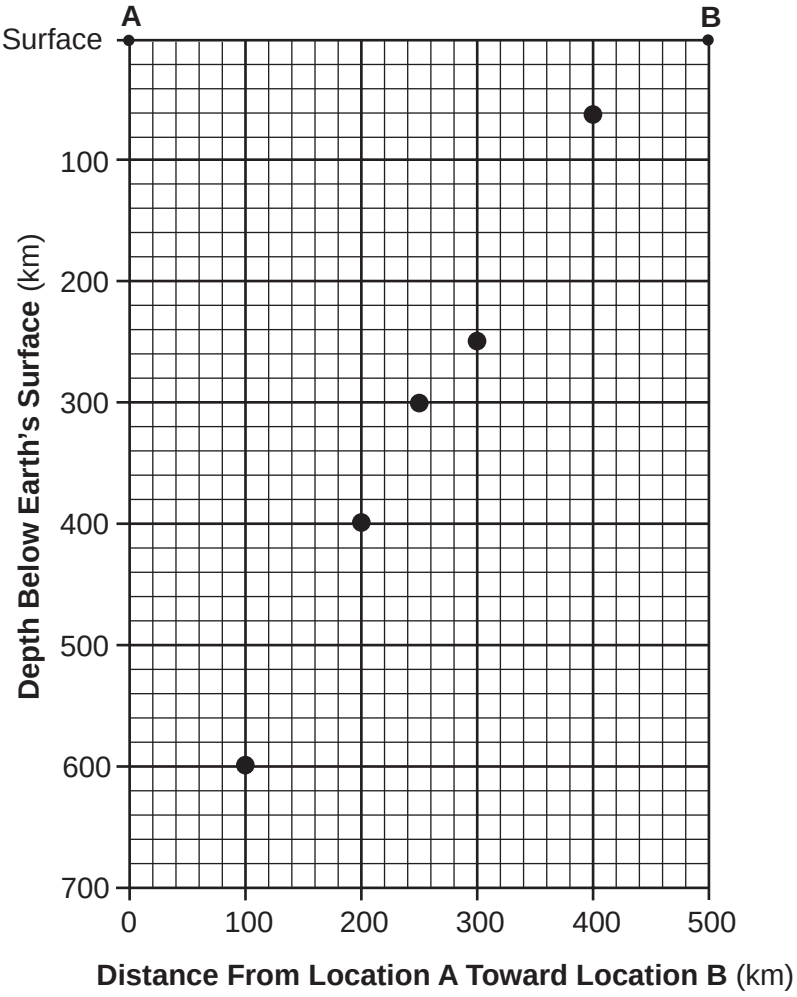
Old craters are eroded away.

Vegetative growth may hide evidence of a crater.

Plate tectonics has destroyed some craters.

Deposition has buried some craters.

67 [1] Allow 1 credit if four or five points are correctly plotted (±10 km). Acceptable responses include, but are not limited to, this example:



68 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Mariana Trench

trench

convergent plate boundary

subduction zone

overriding plate

subduction plate

69 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Stockton sandstone is on the bottom.

Law of Superposition

70 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Contact metamorphism can be found on both sides of the Palisade Sill within the Brunswick sandstone.

An intrusion is younger than the rock it intrudes.

71 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

earthquakes

volcanic eruptions

The rifting of North America occurred.

Pangea began to break up.

North America and Africa began to separate.

72 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The lower latitudes have longer growing seasons.

As latitude increases, the length of the growing season decreases.

73 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

modifying influence of a large body of water

Prevailing winds off the lake keep temperatures warmer.

nearness to a large body of water

74 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

As elevation increases, the growing season is shorter.

The growing season is shorter in the mountain region than in the lowland region.

75 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

unconformity

nonconformity

time gap in the rock record

buried erosional surface

76 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

heat and pressure

recrystallizing of preexisting rock

metamorphism

77 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Hexameroceras

Eucalyptocrinus

Eurypterus

Cooksonia

Cystiphyllum

Eospirifer

78 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

coarse

nonvesicular

large grains

big crystals

79 [2] Examples of correct responses are shown below.

Mineral *A* — potassium feldspar *or* orthoclase

Mineral *B* — plagioclase feldspar *or* Na–Ca feldspar

Mineral *C* — quartz

Allow 2 credits if all three minerals are correctly identified.

Allow only 1 credit if only one or two minerals are correctly identified.

80 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

melting and solidification

melting and crystallization

cooling and crystallization

Map to Core Curriculum

January 2005 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		55	67
Math Key Idea 2	16,35		72,74
Math Key Idea 3			
Science Inquiry Key Idea 1	28	38,43,44,49,52	63,66,68,70,73
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3	1,3,8,10,11,12, 18,20,22,23,26, 27,30	48,59,61	71,77,79,80
English Description Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2		41,42	
Key Idea 3			
Standard 6			
Key Idea 1	17,21,34	50,57,62	
Key Idea 2	13,14,19,24,25, 28,31,32,33	16,37,38,39,42, 43,45,47,51,53, 54,56	65,69,70,73,74, 75,78
Key Idea 3		53	
Key Idea 4			
Key Idea 5	25	40,41,46,58,60, 62,64,76	
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4			
Performance Indicator 1	1,2,3,4,5,7,10, 11,21,22,29	36,37,38,44,48, 49,50,51,52,57, 60,61	63,64,64,66,69, 70,71,75,76,77
Performance Indicator 2	6,8,9,12,13,14, 15,16,17,18,19, 25,28,29,30,31, 32,33,34,35	39,40,41,42,43, 45,46,47,53,54, 55,56,57,58,59, 62	66,67,68,71,72, 73,74
Performance Indicator 3	18,20,23,24,26, 27		76,78,79,80
Reference Tables			
ESRT 2001 Edition	1,3,8,10,11,12, 13,16,18,19,20, 22,23,26,27,30, 32,33	37,39,40,41,42, 48,55,56,57,59, 61	68,71,76,77,78, 79,80

University of the State of New York
State Education Department

Regents Examination in Earth Science – January 2005

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

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 72 would receive a final examination score of 85.

Test Performance Test Score

Total Written Test Score

	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
85	100	99	98	97	97	97	97	96	96	95	95	94	94	93	92	92	91	90	89	89	88	87	86	85
84	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
83	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
82	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
81	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
80	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
79	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	83	82
78	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
77	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
76	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
75	94	93	92	92	91	91	91	90	90	89	89	88	88	87	86	86	85	84	84	83	82	81	80	79
74	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
73	92	91	90	90	90	89	89	88	88	88	87	87	86	85	85	84	83	83	82	81	80	79	78	77
72	92	90	89	89	89	88	88	88	87	87	86	86	85	85	84	83	83	82	81	80	79	78	77	77
71	92	90	89	89	89	88	88	88	87	87	86	86	85	85	84	83	83	82	81	80	79	78	77	77
70	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
69	90	89	88	87	87	87	86	86	86	85	85	84	83	83	82	82	81	80	79	78	78	77	76	75
68	89	88	87	86	86	86	85	85	85	84	84	83	83	82	81	81	80	79	78	78	77	76	75	74
67	88	87	86	86	85	85	85	84	84	83	83	82	82	81	80	80	79	78	78	77	76	75	74	73
66	87	86	85	85	84	84	84	83	83	82	82	81	81	80	80	79	78	78	77	76	75	74	73	72
65	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71
64	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71
63	85	84	82	82	82	82	81	81	80	80	79	79	78	78	77	76	76	75	74	73	72	72	71	70
62	84	83	82	81	81	81	80	80	80	79	79	78	77	77	76	76	75	74	73	72	72	71	70	69
61	83	82	81	80	80	80	80	79	79	78	78	77	77	76	75	75	74	73	72	72	71	70	69	68
60	82	81	80	80	79	79	79	78	78	77	77	76	76	75	75	74	73	72	72	71	70	69	68	67
59	81	80	79	79	79	78	78	77	77	77	76	76	75	74	74	73	72	72	71	70	69	68	67	66
58	80	79	78	78	78	77	77	77	76	76	75	75	74	73	73	72	71	71	70	69	68	67	66	65
57	80	79	77	77	77	76	76	76	75	75	74	74	73	73	72	71	71	70	69	68	67	66	66	65
56	79	78	77	76	76	76	75	75	74	74	74	73	72	72	71	70	70	69	68	67	67	66	65	64
55	78	77	76	75	75	75	74	74	74	73	73	72	72	71	70	70	69	68	67	67	66	65	64	63
54	77	76	75	75	74	74	74	73	73	72	72	71	71	70	69	69	68	67	67	66	65	64	63	62
53	76	75	74	74	73	73	73	72	72	71	71	70	70	69	69	68	67	66	66	65	64	63	62	61
52	75	74	73	73	73	72	72	71	71	71	70	70	69	68	68	67	66	66	65	64	63	62	61	60
51	75	73	72	72	72	71	71	71	70	70	69	69	68	68	67	66	66	65	64	63	62	61	60	60
50	74	73	71	71	71	71	70	70	69	69	68	68	67	67	66	65	65	64	63	62	61	61	60	59
49	73	72	71	70	70	70	69	69	69	68	68	67	66	66	65	65	64	63	62	61	61	60	59	58
48	72	71	70	69	69	69	68	68	68	67	67	66	66	65	64	64	63	62	61	61	60	59	58	57
47	71	70	69	69	68	68	68	67	67	66	66	65	65	64	63	63	62	61	61	60	59	58	57	56
46	69	68	67	67	67	66	66	66	65	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54
45	69	68	66	66	66	65	65	65	64	64	63	63	62	62	61	60	60	59	58	57	56	55	55	54
44	68	67	65	65	65	65	64	64	63	63	62	62	61	61	60	59	59	58	57	56	55	55	54	53
43	67	66	65	64	64	64	63	63	63	62	62	61	60	60	59	59	58	57	56	55	55	54	53	52
42	66	65	64	63	63	63	63	62	62	61	61	60	60	59	58	58	57	56	55	55	54	53	52	51

Total Performance Test Score

January Regents 2005 Examination in Earth Science – continued

Test Performance Test Score

Total Written Test Score

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