

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

PHYSICAL SETTING
EARTH SCIENCE

Tuesday, August 13, 2002 — 12:30 to 3:30 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.

Your answer booklet for Part B–2 and Part C is stapled in the center of this examination booklet. Open the examination booklet, carefully remove your answer booklet, and close the examination booklet. Then fill in the heading 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 answer sheet and 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 your 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*.

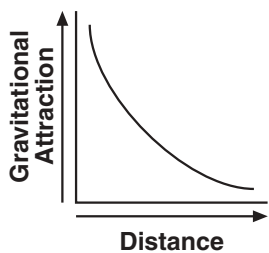
1 The apparent rising and setting of the Sun, as viewed from Earth, is caused by

- (1) Earth's rotation
- (2) Earth's revolution
- (3) the Sun's rotation
- (4) the Sun's revolution

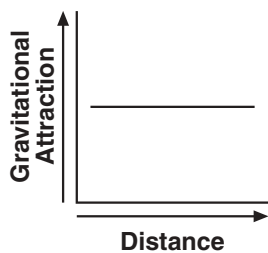
2 In which direction on the horizon does the Sun appear to rise on July 4 in New York State?

- (1) due north
- (2) due south
- (3) north of due east
- (4) south of due east

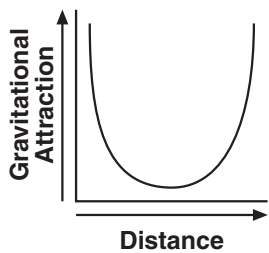
3 Which graph best represents the change in gravitational attraction between the Sun and a comet as the distance between them increases?



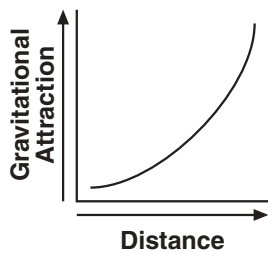
(1)



(3)



(2)



(4)

4 The best evidence that Earth spins on its axis is provided by

- (1) variations in atmospheric density
- (2) apparent shifts in the swing of a Foucault pendulum
- (3) changes in the position of sunspots on the Sun
- (4) eclipses of the Moon

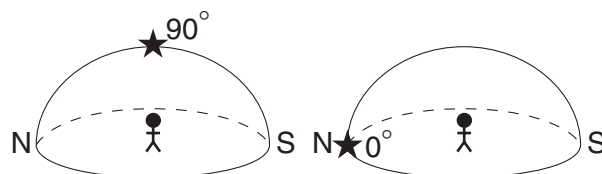
5 A major belt of asteroids is located between Mars and Jupiter. What is the approximate average distance between the Sun and this major asteroid belt?

- (1) 110 million kilometers
- (2) 220 million kilometers
- (3) 390 million kilometers
- (4) 850 million kilometers

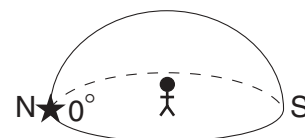
6 A cycle of Moon phases can be seen from Earth because the

- (1) Moon's distance from Earth changes at a predictable rate
- (2) Moon's axis is tilted
- (3) Moon spins on its axis
- (4) Moon revolves around Earth

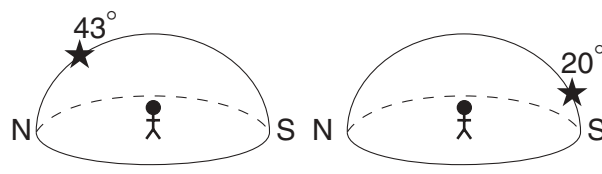
7 Which diagram represents the approximate altitude of *Polaris* as seen by an observer located in Syracuse, New York?



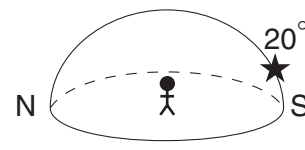
(1)



(3)



(2)

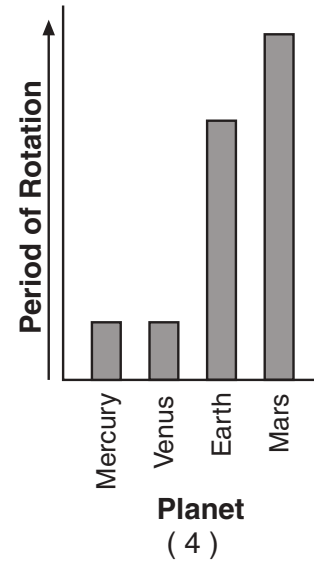
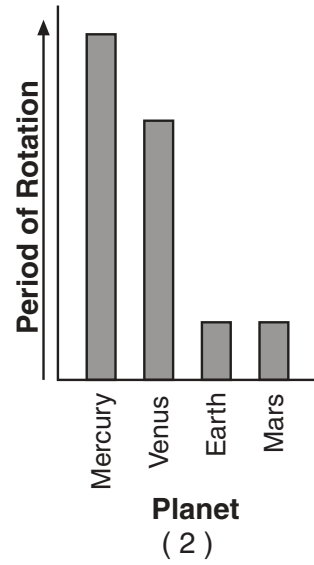
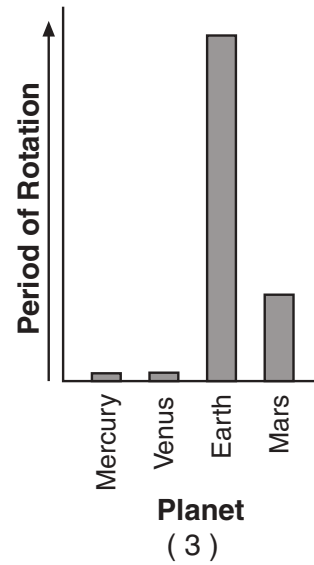
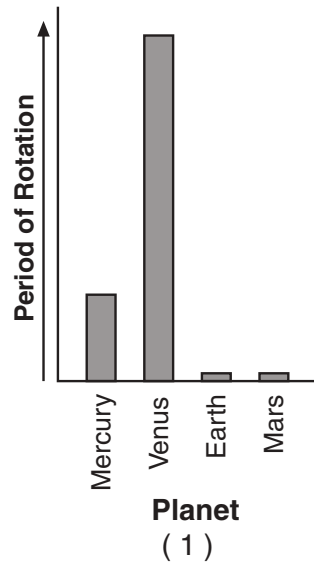


(4)

8 Compared to Earth's crust, Earth's core is believed to be

- (1) less dense, cooler, and composed of more iron
- (2) less dense, hotter, and composed of less iron
- (3) more dense, hotter, and composed of more iron
- (4) more dense, cooler, and composed of less iron

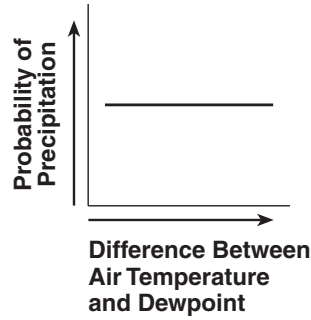
9 Which graph best represents the relative periods of rotation of Mercury, Venus, Earth, and Mars?



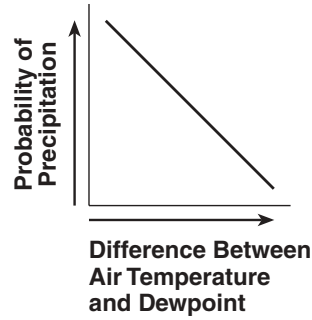
- 10 An environmental scientist needs to prepare a report on the potential effects that a proposed surface mine in New York State will have on the watershed where the mine will be located. In which reference materials will the scientist find the most useful data with which to determine the watershed's boundaries?
- (1) topographic maps
 - (2) geologic time scales
 - (3) tectonic plate maps
 - (4) planetary wind maps

- 11 Which two kinds of adjoining bedrock would most likely have a zone of contact metamorphism between them?
- (1) shale and conglomerate
 - (2) shale and sandstone
 - (3) limestone and sandstone
 - (4) limestone and granite

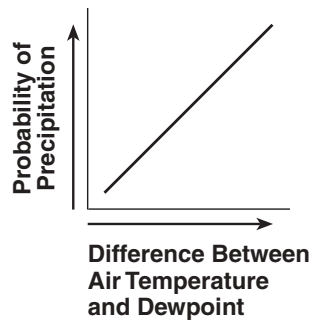
12 Which graph best shows the relationship between the probability of precipitation and the difference between air temperature and dewpoint?



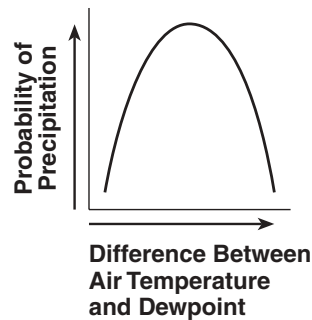
(1)



(3)



(2)



(4)

13 A high air-pressure, dry-climate belt is located at which Earth latitude?

- (1) 0°
- (2) 15° N
- (3) 30° N
- (4) 60° N

14 The Canaries Current along the west coast of Africa and the Peru Current along the west coast of South America are both

- (1) warm currents that flow away from the Equator
- (2) warm currents that flow toward the Equator
- (3) cool currents that flow away from the Equator
- (4) cool currents that flow toward the Equator

15 Which two gases in Earth's atmosphere are believed by scientists to be greenhouse gases that are major contributors to global warming?

- (1) carbon dioxide and methane
- (2) oxygen and nitrogen
- (3) hydrogen and helium
- (4) ozone and chlorine

16 The average temperature at Earth's North Pole is colder than the average temperature at the Equator because the Equator

- (1) receives less ultraviolet radiation
- (2) receives more intense insolation
- (3) has more cloud cover
- (4) has a thicker atmosphere

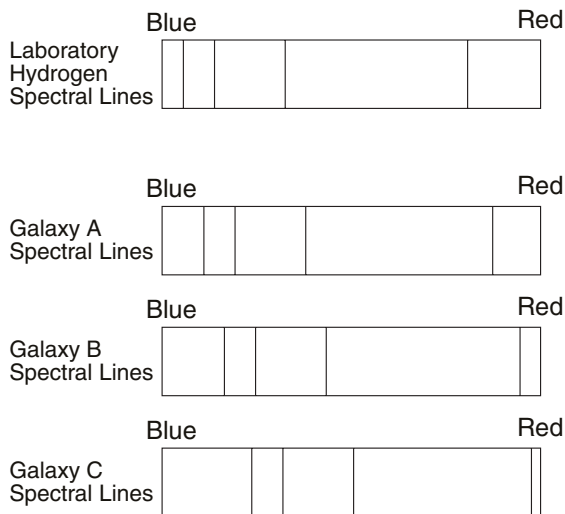
17 On a certain day, the isobars on a weather map are very close together over eastern New York State. To make the people of this area aware of possible risk to life and property in this situation, the National Weather Service should issue

- (1) a dense-fog warning
- (2) a high-wind advisory
- (3) a heat-index warning
- (4) an air-pollution advisory

18 During which geologic time period did the earliest reptiles and great coal-forming forests exist?

- (1) Devonian
- (2) Quaternary
- (3) Mississippian
- (4) Pennsylvanian

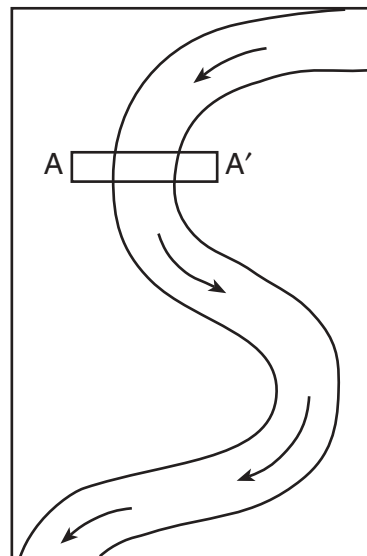
- 19 In the diagram below, the spectral lines of hydrogen gas from three galaxies, *A*, *B*, and *C*, are compared to the spectral lines of hydrogen gas observed in a laboratory.



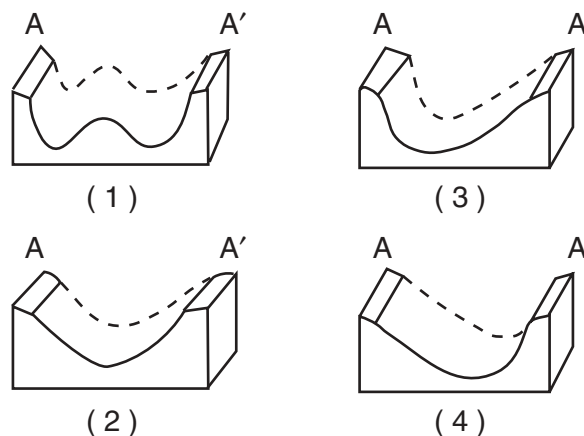
What is the best inference that can be made concerning the movement of galaxies *A*, *B*, and *C*?

- (1) Galaxy *A* is moving away from Earth, but galaxies *B* and *C* are moving toward Earth.
 - (2) Galaxy *B* is moving away from Earth, but galaxies *A* and *C* are moving toward Earth.
 - (3) Galaxies *A*, *B*, and *C* are all moving toward Earth.
 - (4) Galaxies *A*, *B*, and *C* are all moving away from Earth.
- 20 What is the dewpoint temperature when the dry-bulb temperature is 16°C and the wet-bulb temperature is 11°C ?
- (1) 5°C
 - (2) 7°C
 - (3) 9°C
 - (4) -17°C
- 21 A strong west wind steadily blew over Lake Ontario picking up moisture. As this moist air flowed over the Tug Hill Plateau, the plateau received a 36-inch snowfall. This snow fell from clouds that formed when rising air was
- (1) cooled by expansion, causing water vapor to condense
 - (2) cooled by compression, causing water vapor to condense
 - (3) warmed by expansion, causing water vapor to evaporate
 - (4) warmed by compression, causing water vapor to evaporate

- 22 The map below shows a meandering river. *A–A'* is the location of a cross section. The arrows show the direction of the riverflow.

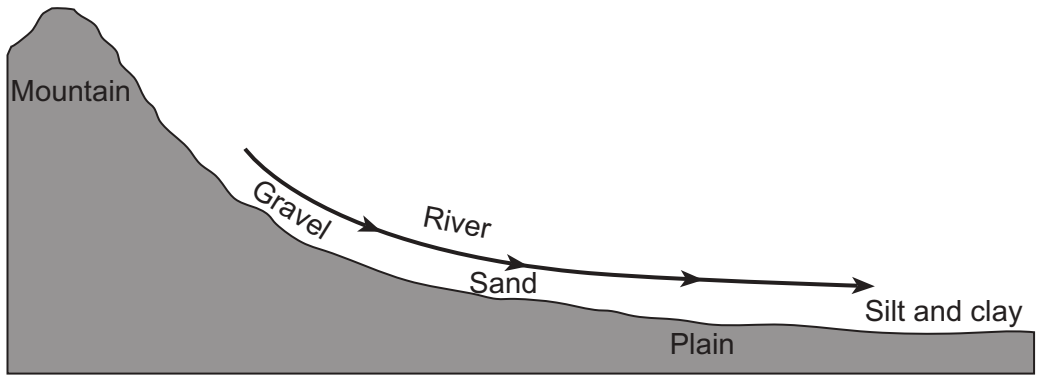


Which cross section best represents the shape of the river bottom at *A–A'*?



- 23 During which phase change of water is the most energy released into the environment?
- (1) water freezing
 - (2) ice melting
 - (3) water evaporating
 - (4) water vapor condensing
- 24 During a rainfall, surface runoff will probably be greatest in an area that has a
- (1) steep slope and a clay-covered surface
 - (2) steep slope and a gravel-covered surface
 - (3) gentle slope and a grass-covered surface
 - (4) gentle slope and a tree-covered surface

25 The cross section below illustrates the general sorting of sediment by a river as it flows from a mountain to a plain.

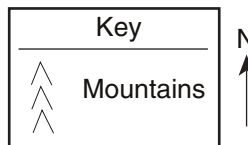
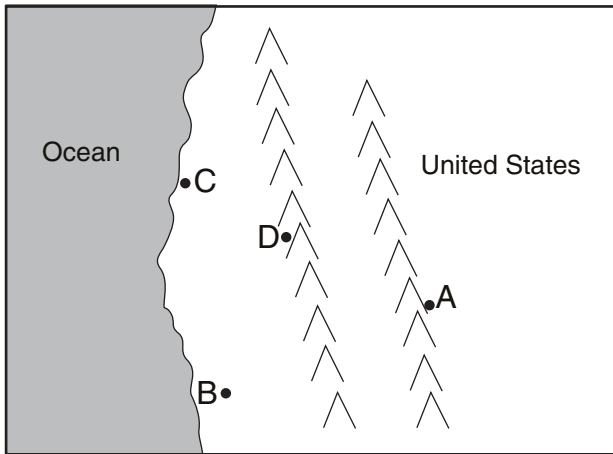


(Not drawn to scale)

Which factor most likely caused the sediment to be sorted in the pattern shown?

- (1) velocity of the river water
- (2) hardness of the surface bedrock
- (3) mineral composition of the sediment
- (4) temperature of the water

26 The map below shows the location of four cities, A, B, C, and D, in the western United States where prevailing winds are from the southwest.



Which city most likely receives the *least* amount of average yearly precipitation?

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

27 Earth's troposphere, hydrosphere, and lithosphere contain relatively large amounts of which element?

- (1) iron
- (2) oxygen
- (3) hydrogen
- (4) potassium

28 The long, sandy islands along the south shore of Long Island are composed mostly of sand and rounded pebbles arranged in sorted layers. The agent of erosion that most likely shaped and sorted the sand and pebbles while transporting them to their island location was

- (1) glaciers
- (2) landslides
- (3) wind
- (4) ocean waves

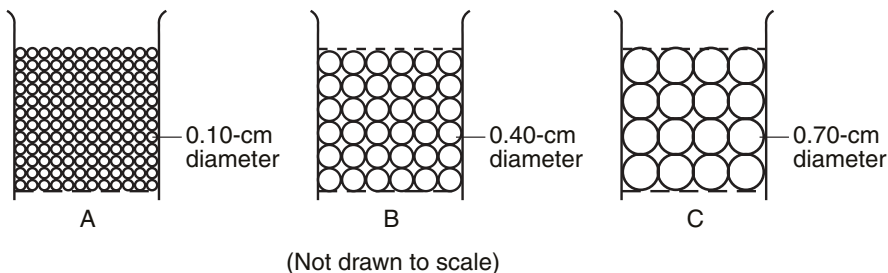
29 Which river is a tributary branch of the Hudson River?

- (1) Delaware River
- (2) Susquehanna River
- (3) Mohawk River
- (4) Genesee River

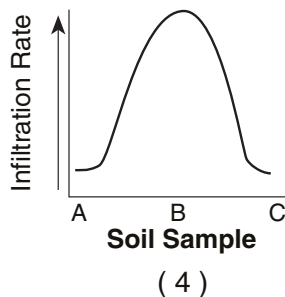
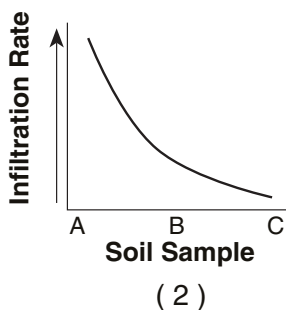
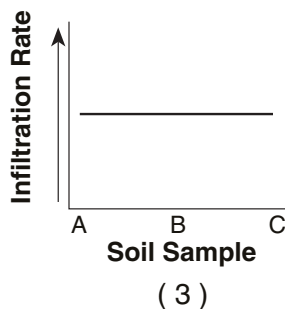
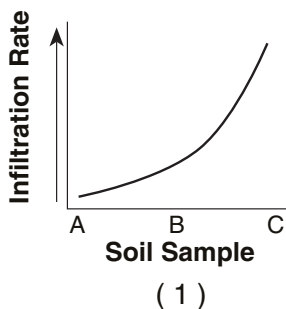
30 What are the largest particles that a stream can transport when its velocity is 200 centimeters per second?

- (1) silt
- (2) sand
- (3) pebbles
- (4) cobbles

- 31 The diagrams below show the relative sizes of particles from soil samples A, B, and C. Equal volumes of each soil sample were placed in separate containers. Each container has a screen at the bottom. Water was poured through each sample to determine the infiltration rate.



Which graph best shows how the infiltration rates of the three soil samples would compare?



- 32 Which common rock is formed from the solidification of molten material?

- (1) rock gypsum (3) rhyolite
(2) slate (4) coal

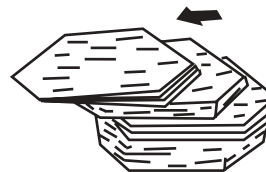
- 33 Rocks can be classified as sedimentary, igneous, or metamorphic based primarily upon differences in their

- (1) color (3) origin
(2) density (4) age

- 34 Buffalo, New York, and Plattsburgh, New York, are both located in landscape regions called

- (1) mountains (3) plateaus
(2) highlands (4) lowlands

- 35 The diagram below shows how a sample of the mineral mica breaks when hit with a rock hammer.



This mineral breaks in smooth, flat surfaces because it

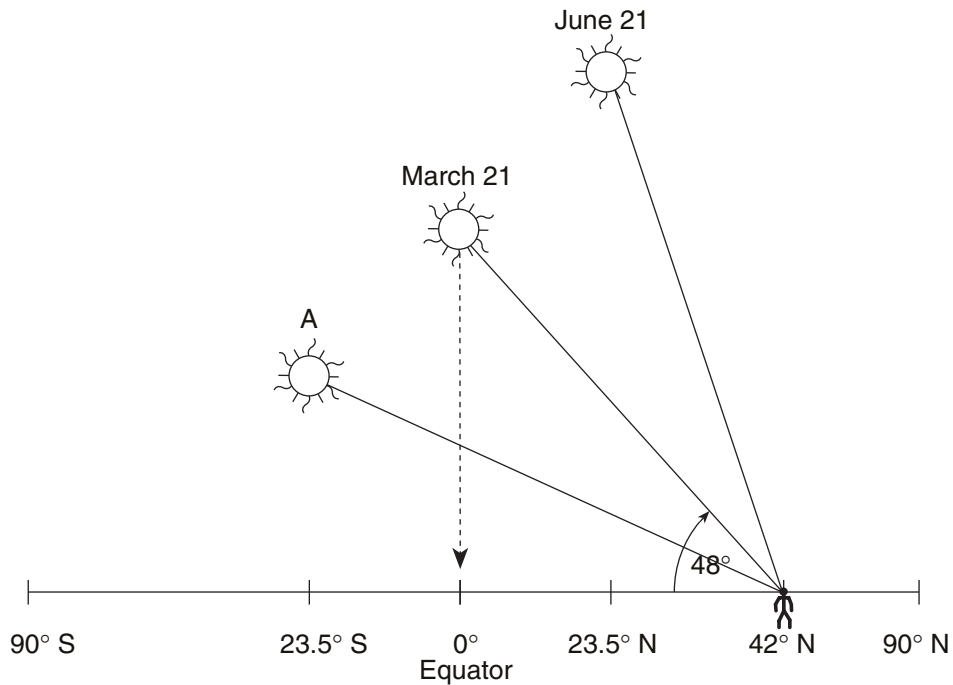
- (1) is very hard
(2) is very dense
(3) contains large amounts of iron
(4) has a regular arrangement of atoms

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 the position of the Sun with respect to Earth's surface at solar noon on certain dates. The latitudes of six locations on the same line of longitude are shown. The observer is located at 42° N in New York State. The date for the Sun at position A has been deliberately left blank.



36 At which New York State location could the observer be located?

- (1) Plattsburgh
- (2) Mount Marcy
- (3) New York City
- (4) Slide Mountain

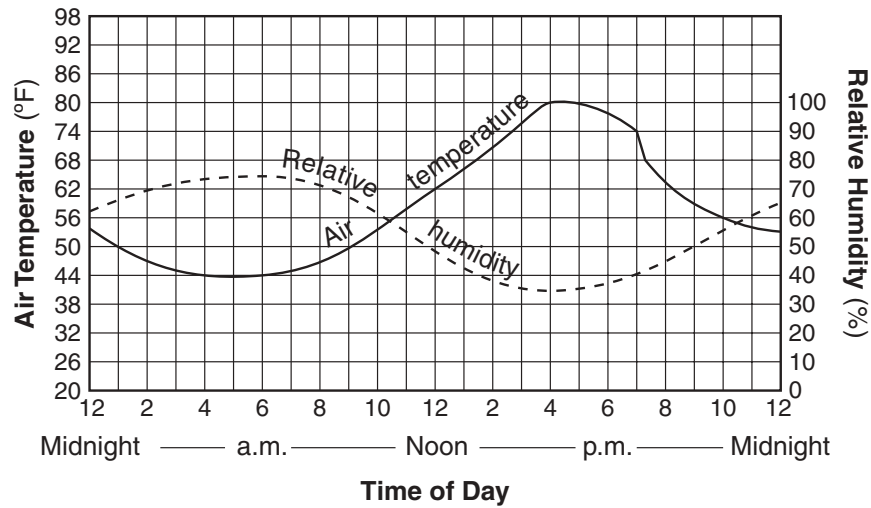
37 When the Sun is at position A, which latitude receives the most direct rays of the Sun?

- (1) Tropic of Cancer (23.5° N)
- (2) Tropic of Capricorn (23.5° S)
- (3) Equator (0°)
- (4) Antarctic Circle (66.5° S)

38 When the Sun is at the March 21 position, New York State will usually have

- (1) longer days than nights
- (2) 12 hours of daylight and 12 hours of darkness
- (3) the lowest annual altitude of the Sun at solar noon
- (4) the highest annual altitude of the Sun at solar noon

Base your answers to questions 39 and 40 on the graph below. The graph shows air temperature and relative humidity at a single location during a 24-hour period.



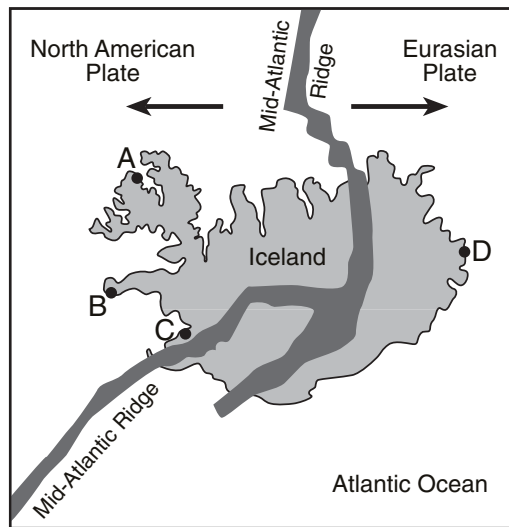
39 What was the approximate change in relative humidity from 12 noon to 4 p.m.?

- (1) 10%
- (2) 15%
- (3) 20%
- (4) 30%

40 At which time would the rate of evaporation most likely be greatest?

- (1) 11 p.m.
- (2) 6 a.m.
- (3) 10 a.m.
- (4) 4 p.m.

Base your answers to questions 41 and 42 on the map below of Iceland, a country located on the Mid-Atlantic Ridge. Four locations are represented by the letters A through D.



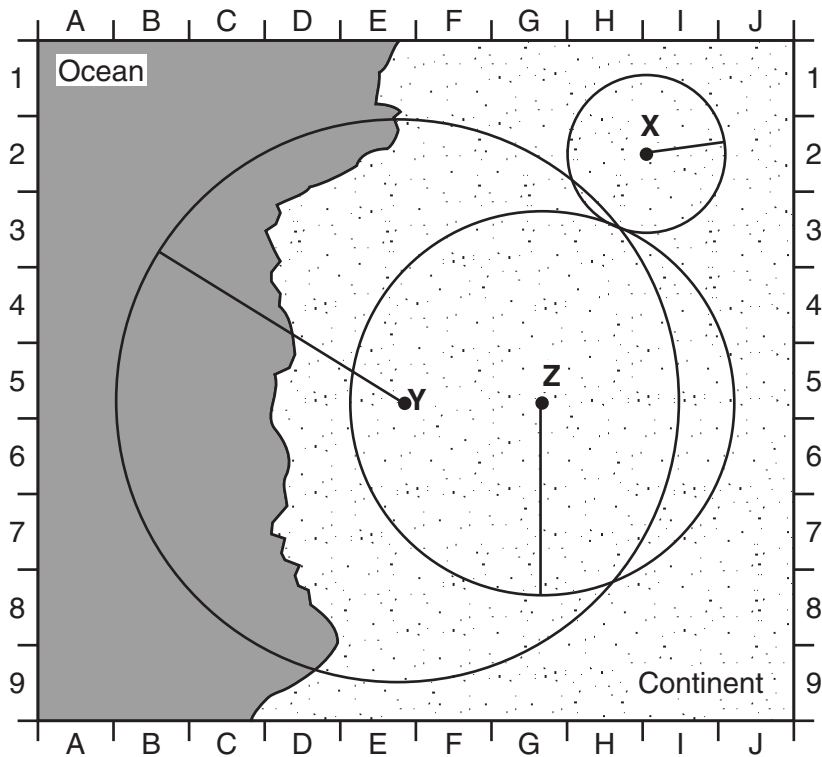
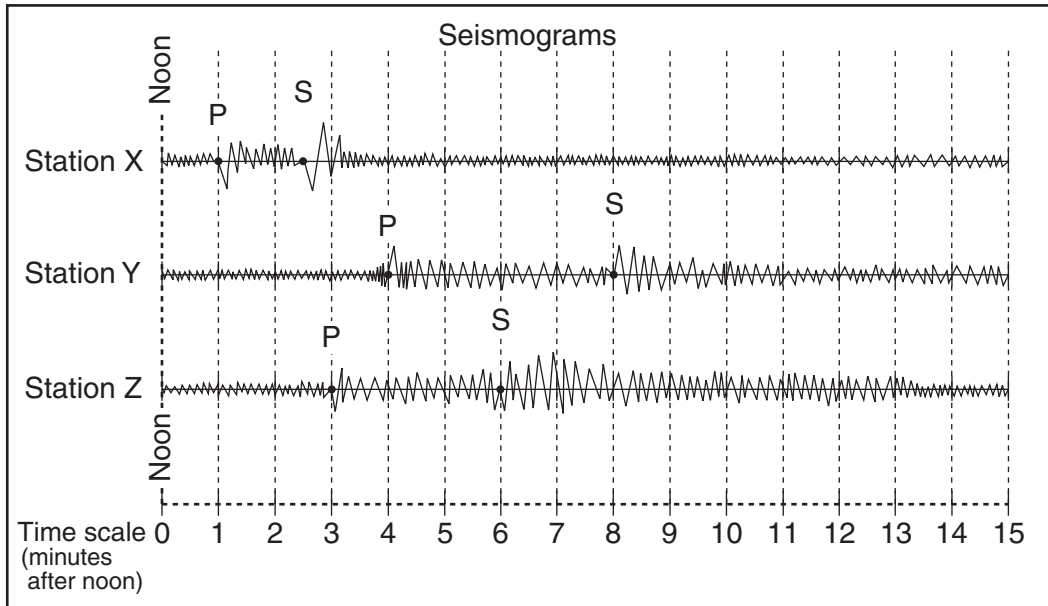
41 The fine-grained texture of most of the igneous rock formed on the surface of Iceland is due to

- (1) rapid cooling of the molten rock
- (2) high density of the molten rock
- (3) numerous faults in the island's bedrock
- (4) high pressure under the island

42 The youngest bedrock is most likely found at which location?

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

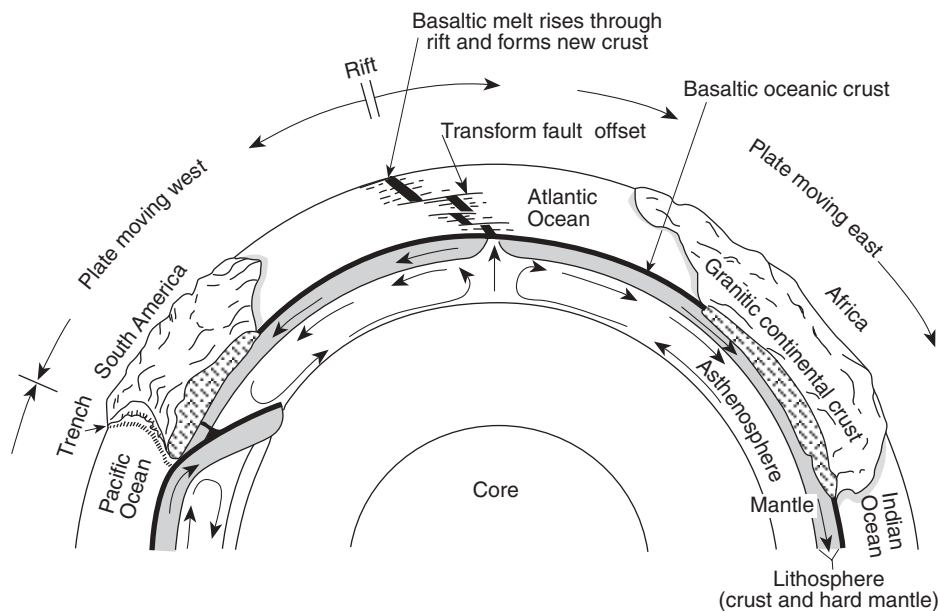
Base your answers to questions 43 through 46 on the diagram and map below. The diagram shows three seismograms of the same earthquake recorded at three different seismic stations, X, Y, and Z. The distances from each seismic station to the earthquake epicenter have been drawn on the map. A coordinate system has been placed on the map to describe locations. The map scale has not been included.



- 43 Approximately how far away from station Y is the epicenter?
(1) 1,300 km (3) 3,900 km
(2) 2,600 km (4) 5,200 km
- 44 The S-waves from this earthquake that travel toward Earth's center will
(1) be deflected by Earth's magnetic field
(2) be totally reflected off the crust-mantle interface
(3) be absorbed by the liquid outer core
(4) reach the other side of Earth faster than those that travel around Earth in the crust
- 45 Seismic station Z is 1,700 kilometers from the epicenter. Approximately how long did it take the P-wave to travel to station Z?
(1) 1 min 50 sec (3) 3 min 30 sec
(2) 2 min 50 sec (4) 6 min 30 sec
- 46 On the map, which location is closest to the epicenter of the earthquake?
(1) E-5 (3) H-3
(2) G-1 (4) H-8
-

GO RIGHT ON TO THE NEXT PAGE 

Base your answers to questions 47 through 49 on the diagram below. The diagram shows a model of the relationship between Earth's surface and its interior.



(Not drawn to scale)

47 Mid-ocean ridges (rifts) normally form where tectonic plates are

- (1) converging
- (2) diverging
- (3) stationary
- (4) sliding past each other

48 The motion of the convection currents in the mantle beneath the Atlantic Ocean appears to be mainly making this ocean basin

- (1) deeper
- (2) shallower
- (3) wider
- (4) narrower

49 According to the diagram, the deep trench along the west coast of South America is caused by movement of the oceanic crust that is

- (1) sinking beneath the continental crust
- (2) uplifting over the continental crust
- (3) sinking at the Mid-Atlantic ridge
- (4) colliding with the Atlantic oceanic crust

50 A student incorrectly measured the volume of a mineral sample as 63 cubic centimeters. The actual volume was 72 cubic centimeters. What was the student's approximate percent deviation (percentage of error)?

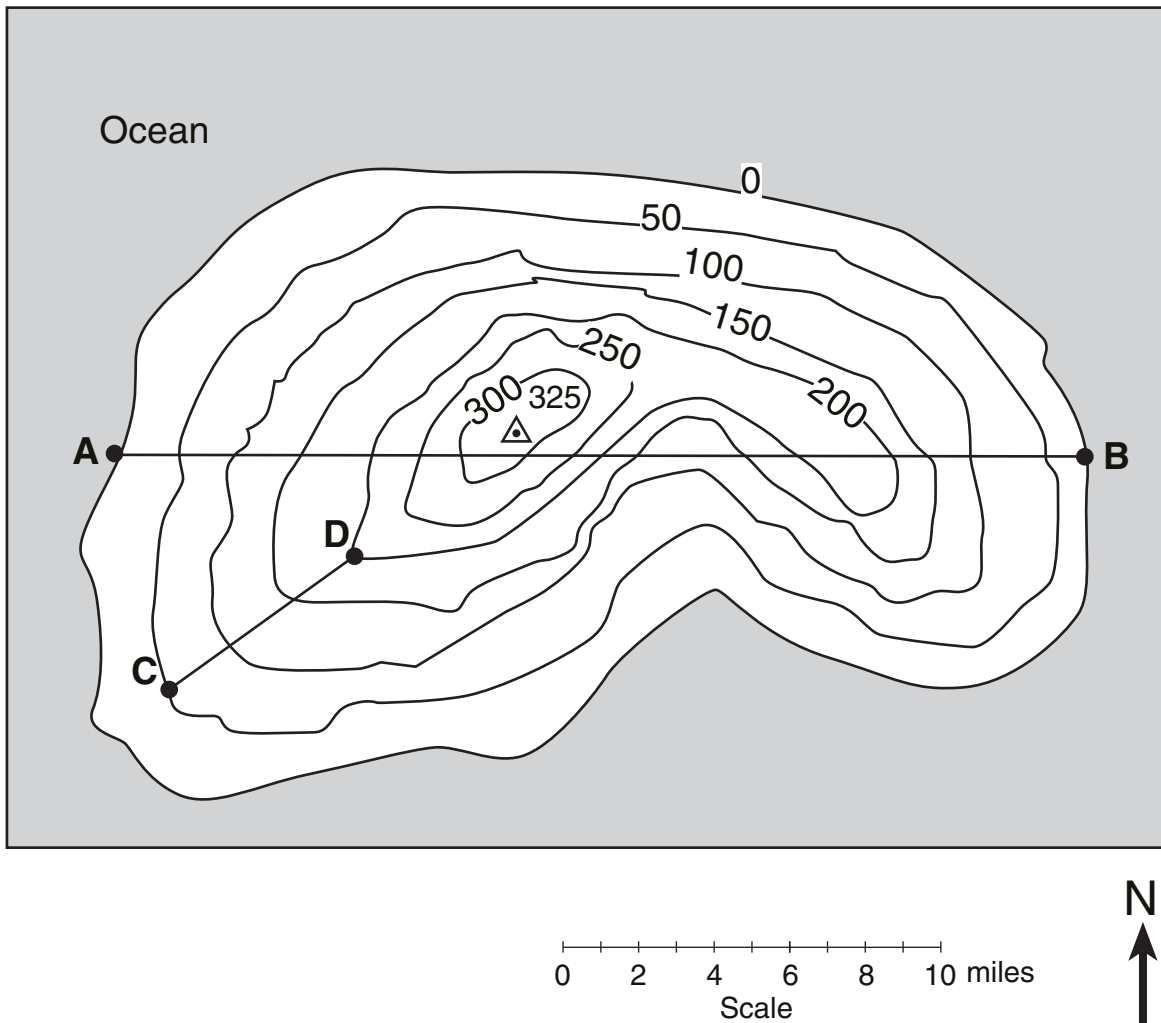
- (1) 9.0%
 - (2) 12.5%
 - (3) 14.2%
 - (4) 15.3%
-

Part B-2

Answer all questions in this part.

Directions (51–59): 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 topographic map of an island shown below. Elevations are expressed in feet. Points A, B, C, and D are locations on the island. A triangulation point shows the highest elevation on the island.



- 51 On the grid provided *in your answer booklet*, construct a topographic profile representing the cross-sectional view between point A and point B, following the directions below.
- a Plot the elevation of the land along line AB by marking, with a dot, the elevation of *each* point where a contour line is crossed by line AB. [2]
 - b Connect the dots with a smooth, curved line to complete the topographic profile. [1]
- 52 What is the average gradient, in feet per mile, along the straight line from point C to point D? [1]

- 53 The photograph below shows an impact crater approximately 1 mile wide located in Diablo Canyon, Arizona. Describe the event that produced this crater. [1]

Barringer Crater, Arizona, U.S.A. (photo courtesy of NASA)



- 54 A weather station records the following data:

Air pressure is 1,001.0 millibars.

Wind is from the south.

Wind speed is 25 knots.

Using the proper weather map symbols, place this information in the correct locations on the weather station model provided in *your answer booklet*. [3]

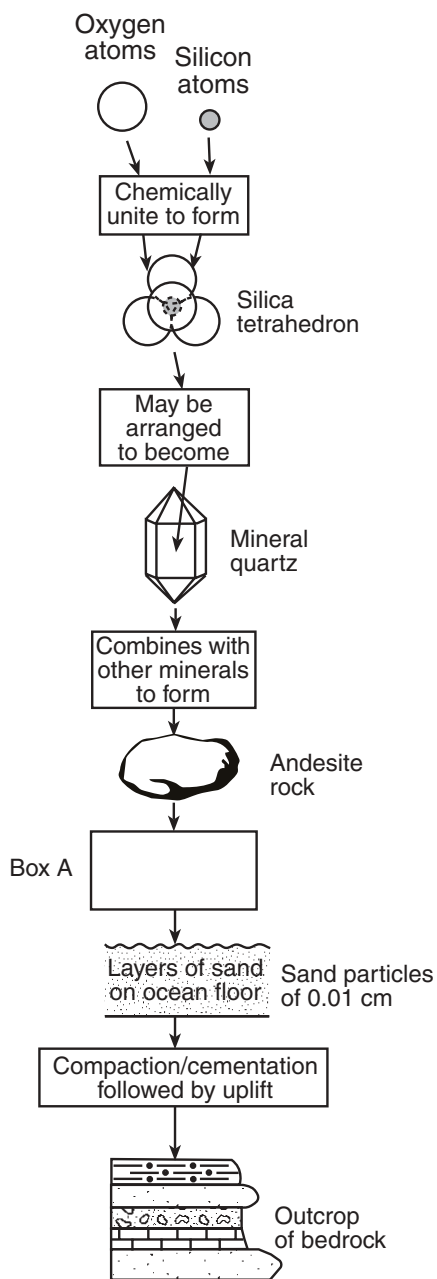
- 55 On the United States time zone map provided in *your answer booklet*, indicate the standard time in *each* time zone when it is 9 a.m. in the Central Time Zone. The dashed lines represent the standard-time meridians for each time zone. Be sure to indicate the time for all *three* zones. [1]

- 56 The weather map below shows a typical midlatitude low-pressure system centered in Illinois.



- a* On the weather map provided in *your answer booklet*, indicate which boxed area has the highest surface air temperatures by marking an **X** in one of the four boxes on the map. [1]
- b* On the weather map provided in *your answer booklet*, draw an arrow to predict the normal storm track that this low-pressure center would be expected to follow. [1]

Base your answers to questions 57 through 59 on the flowchart below, which shows a sequence of geologic processes at or near Earth's surface. Box A has been deliberately left blank. The diagrams are not drawn to scale.



57 Identify the *three* minerals that are normally found with quartz in samples of andesite rock. [2]

58 State one geologic process represented by box A. [1]

59 Identify by name one type of rock layer, other than sandstone, shown in the outcrop. [1]

Part C

Answer all questions in this part.

Directions (60–75): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables*.

- 60 A family wants to use rock materials as flooring in the entrance of their new house. They have narrowed their choice to granite or marble. Which of these rocks is more resistant to the physical wear of foot traffic and explain why this rock is more resistant. [2]

Base your answers to questions 61 and 62 in part on the newspaper article below.

Ancient human footprints found

PARIS — In the darkness of an underground cave lined with prehistoric paintings, French scientists believe they have discovered the oldest footprints of humans in Europe.

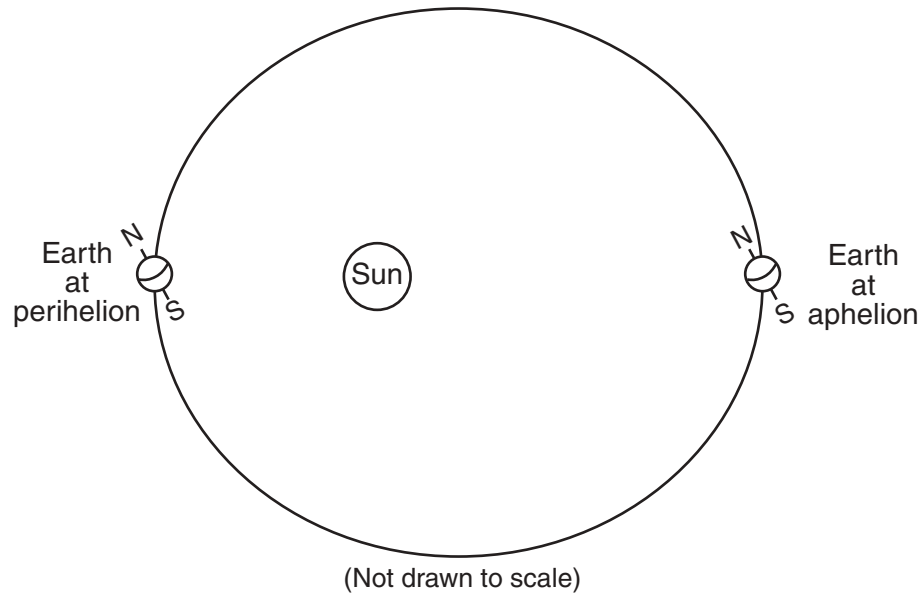
Embedded in damp clay, the imprints, slightly more than 8 inches long, appear to be those of a boy, 8 or 10 years old, who was walking barefoot between 25,000 and 30,000 years ago, prehistorians said Wednesday.

They said the dates are only hypothetical because there is no precise way to determine when the markings were made. But Michel-Andre Garcia, one prehistorian who has studied the site, said that the carbon datings in the cave and the context make this “a very strong hypothesis.” The four footprints were found in the Ardeche region of southern France, deep inside the Chauvet cave.

— *Times Union*, June 10, 1999

- 61 Scientists have inferred that these “oldest” European human footprints were made during which geologic epoch? [1]
- 62 Which characteristic of the radioactive isotope carbon-14 explains why carbon-14, rather than the radioactive isotope uranium-238, was used by archeologists in dating the age of their findings? [1]
-

Base your answers to questions 63 through 66 on the diagram below, which represents an exaggerated model of Earth's orbital shape. Earth is closest to the Sun at one time of year (perihelion) and farthest from the Sun at another time of year (aphelion).



- 63 State the actual geometric shape of Earth's orbit. [1]
- 64 Identify the season in the Northern Hemisphere when Earth is at perihelion. [1]
- 65 Describe the change that takes place in the apparent size of the Sun, as viewed from Earth, as Earth moves from perihelion to aphelion. [1]
- 66 State the relationship between Earth's distance from the Sun and Earth's orbital velocity. [1]
-

Base your answers to questions 67 and 68 on the cross section provided in your answer booklet, which represents a house at an ocean shoreline at night. Smoke from the chimney is blowing out to sea.

- 67 Label the *two* lines provided on the cross section *in your answer booklet* to show where air pressure is relatively “high” and where it is relatively “low.” [1]
- 68 Assume that the wind blowing out to sea on this night is caused by local air-temperature conditions. Label the *two* lines provided on the cross section *in your answer booklet* to show where Earth’s surface air temperature is relatively “warm” and where it is relatively “cool.” [1]
-


GO RIGHT ON TO THE NEXT PAGE 

Base your answers to questions 69 through 71 on data tables I and II and on the Hurricane Tracking Map below. Table I represents the storm track data for an Atlantic hurricane. Location, wind velocity, air pressure, and storm strength are shown for the storm's center at 3 p.m. Greenwich time each day. Table II shows a scale of relative storm strength. The map shows the hurricane's path.

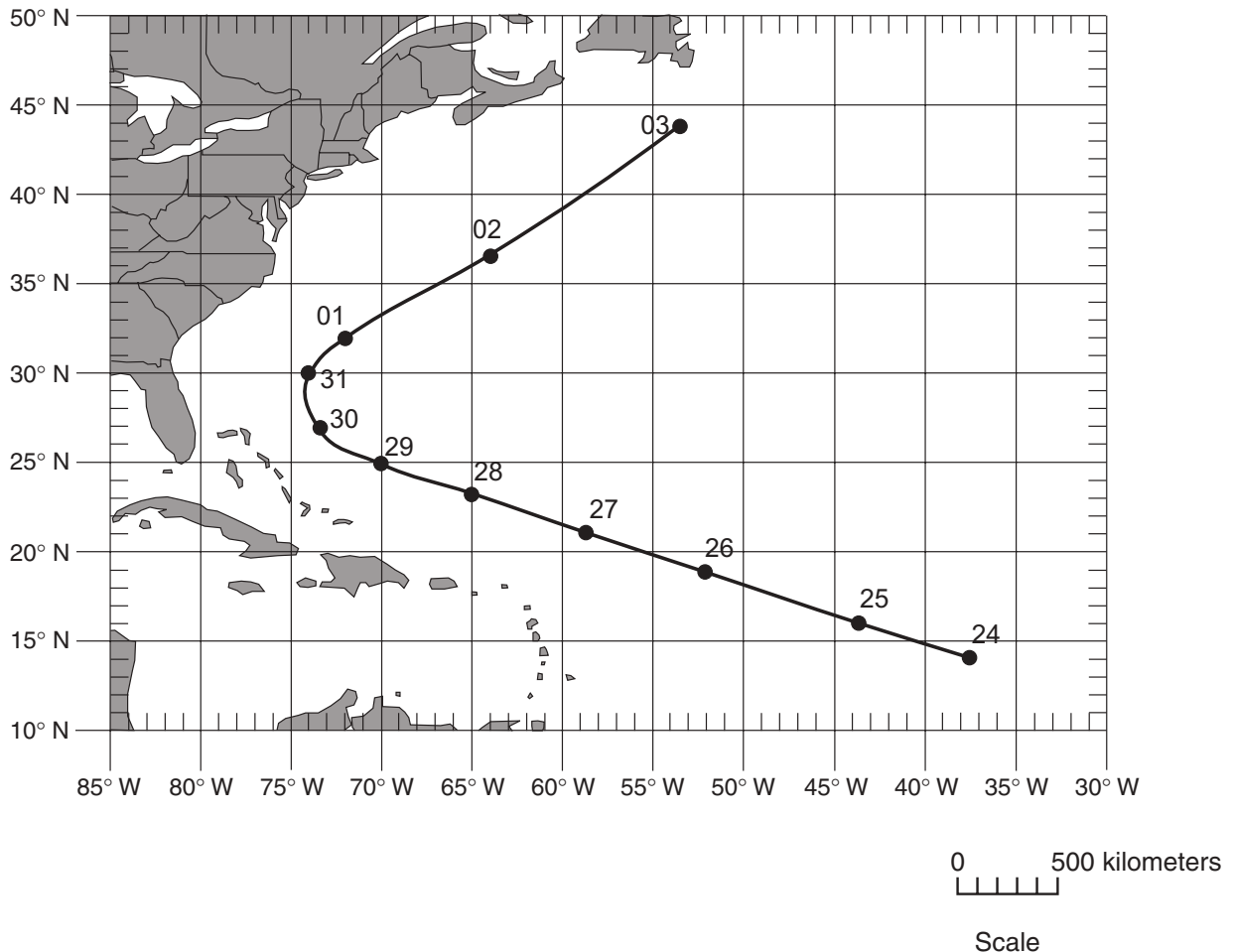
Data Table I

Latitude (°N)	Longitude (°W)	Date	Wind Velocity (knots)	Air Pressure (millibars)	Storm Strength
14	37	Aug. 24	30	1006	Tropical depression
16	44	Aug. 25	70	987	Category-1 hurricane
19	52	Aug. 26	90	970	Category-2 hurricane
21	59	Aug. 27	80	997	Category-1 hurricane
23	65	Aug. 28	80	988	Category-1 hurricane
25	70	Aug. 29	80	988	Category-1 hurricane
27	73	Aug. 30	65	988	Category-1 hurricane
30	74	Aug. 31	85	976	Category-2 hurricane
32	72	Sept. 01	85	968	Category-2 hurricane
37	64	Sept. 02	70	975	Category-1 hurricane
44	53	Sept. 03	65	955	Category-1 hurricane

Data Table II

Storm Strength Scale	Relative Strength
Tropical depression	Weakest
Tropical storm	
Category 1	
Category 2	
Category 3	
Category 4	
Category 5	Strongest


Hurricane Tracking Map



- 69 Describe *two* characteristics of the circulation pattern of the surface winds around the center (eye) of a Northern Hemisphere low-pressure hurricane. [2]
- 70 The hurricane did not continue moving toward the same compass direction during the entire period shown by the data table. Explain why the hurricane changed direction. [1]
- 71 In the space provided *in your answer booklet*, calculate the average daily rate of movement of the hurricane during the period from 3 p.m. August 24 to 3 p.m. August 28. The hurricane traveled 2,600 kilometers during this 4-day period. Follow the directions given below.
- a Write the equation used to determine the rate of change.
 - b Substitute data into the equation. [1]
 - c Calculate the rate and label it with the proper units. [1]
-

Base your answers to questions 72 through 74 on the cross section provided in your answer booklet. The cross section represents a portion of Earth's crust. Letters *A*, *B*, *C*, and *D* are rock units.

- 72 Igneous rock *B* was formed after rock layer *D* was deposited but before rock layer *A* was deposited. Using the contact metamorphism symbol shown in the key, draw that symbol in the proper locations on the cross section provided *in your answer booklet* to indicate those rocks that underwent contact metamorphism when igneous rock *B* was molten. [1]
- 73 In relation to rock units *A* and *B* in the cross section, when was igneous rock *C* formed? [1]
- 74 Describe one observable characteristic of rock *A* that indicates that rock *A* is sedimentary. [1]
-

- 75 The diagram provided in your answer booklet represents the Sun and Earth as viewed from space on a certain date.
- a Using a symbol for the Moon of approximately this size () , draw the position of the Moon on the diagram provided *in your answer booklet* at the time when the full-Moon phase is observed from Earth. [1]
 - b Draw an arrow on the diagram provided *in your answer booklet* that shows the Earth motion that causes surface ocean currents and surface winds to curve (Coriolis effect). [1]
-

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Tuesday, August 13, 2002 — 12:30 to 3:30 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

**PHYSICAL SETTING
 EARTH SCIENCE**

Tuesday, August 13, 2002 — 12:30 to 3:30 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.

<input type="text"/> 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)		<input type="text"/>
Final Score (from conversion chart)		<input type="text"/>
.....		
Raters' Initials:		
Rater 1	Rater 2

Part B-2

51 a and b

For Raters Only

51 a

b

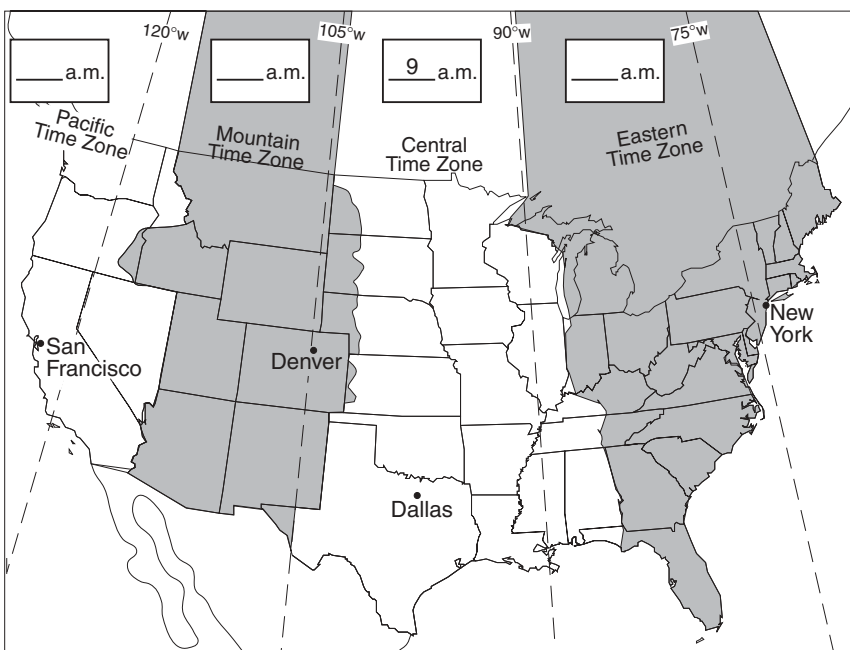
52 _____ ft/mi

53 _____

54

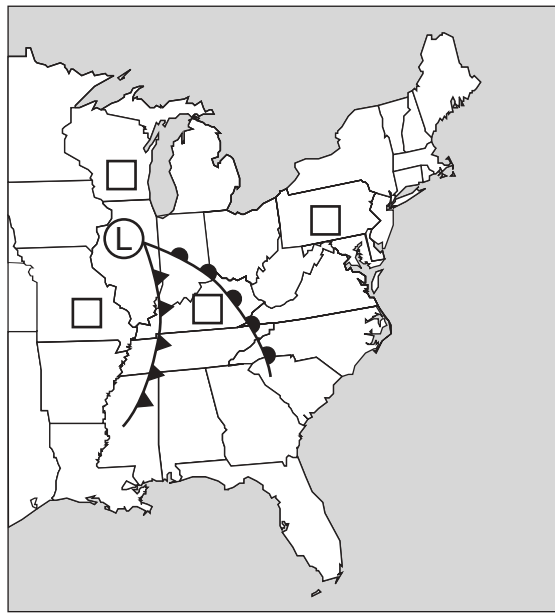
For Raters Only

55



55

56 a and b



56 a

b

57 (1) _____

(2) _____

(3) _____

57

58 _____

58

59 _____

59

[b]

Total Score for Part B-2

Part C

For Raters Only

60 Rock: _____

Reason: _____

61 _____ epoch

62 _____

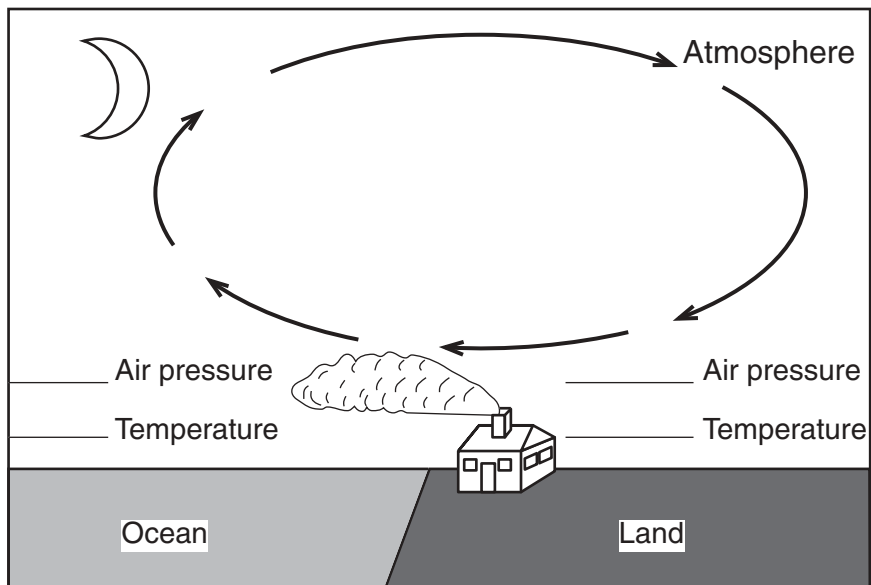
63 _____

64 _____

65 _____

66 _____

67 and 68



69 _____ and _____

70 _____

60

61

62

63

64

65

66

67

68

69

70

For Raters Only

71

a

Rate of change =

b

Rate of change =

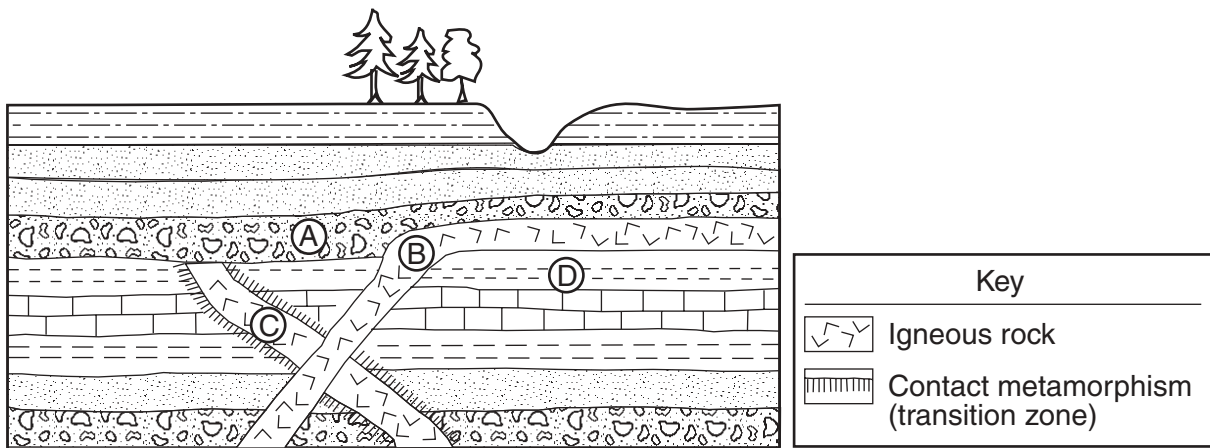
c

Rate of change =

71b

c

72



72

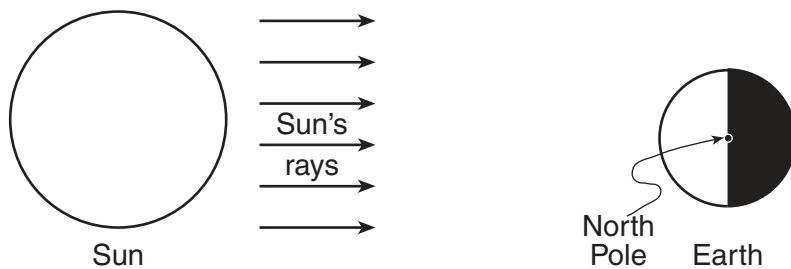
73

73

74

74

75 a and b



(Not drawn to scale)

75a

b

[d]

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

Tuesday, August 13, 2002 — 12:30 to 3:30 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 3 before rating student papers.

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

Part A			Part B-1	
1 1	13 3	25 1	36 4	44 3
2 3	14 4	26 1	37 2	45 3
3 1	15 1	27 2	38 2	46 3
4 2	16 2	28 4	39 2	47 2
5 3	17 2	29 3	40 4	48 3
6 4	18 4	30 4	41 1	49 1
7 2	19 4	31 1	42 3	50 2
8 3	20 2	32 3	43 2	
9 1	21 1	33 3		
10 1	22 3	34 4		
11 4	23 4	35 4		
12 3	24 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 printed at the end of this Scoring Key and Rating Guide. 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.

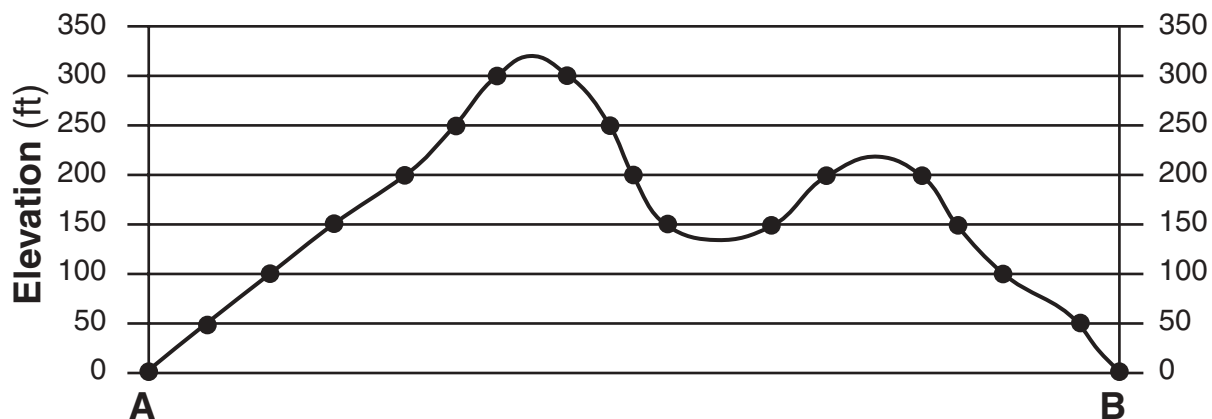
All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions 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 provided in the scoring key for that administration be used to determine the student's final score. The chart in this scoring key is usable only for this administration of the examination.

Part B–2

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

51 [3]



a Allow 2 credits if 15 to 18 points are plotted correctly on the elevation line (within ± 2.5 mm horizontally).

Allow only 1 credit if only 7 to 14 points are plotted correctly on the elevation line (within ± 2.5 mm horizontally).

Note: Allow credit if the student uses some other symbol instead of dots.

b Allow 1 credit for drawing a smooth, curved line that shows hilltops above the horizontal elevation lines and valleys extending below the horizontal elevation lines. Do *not* allow credit for flat hilltops or flat valleys drawn exactly on the horizontal elevation line.

Hilltops' elevations should be between 300 and 325, and 200 and 250. The valley-bottom elevation should be between 100 and 150.

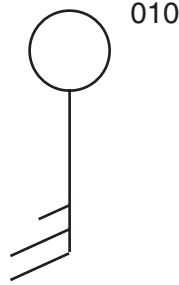
or

If the points have been plotted incorrectly, the hilltops should be drawn so that the peaks are within the interval above the highest plotted elevations and the valley is within the interval below the lowest plotted valley elevation.

52 [1] Allow 1 credit for **25** ft/mi (± 1).

53 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:
Barringer Crater was caused by the impact of a meteorite (or meteor or comet or asteroid).

54 [3]



Allow 1 credit if the student places the correct symbol for air pressure in the appropriate position. Do *not* allow this credit if the decimal point or units are given.

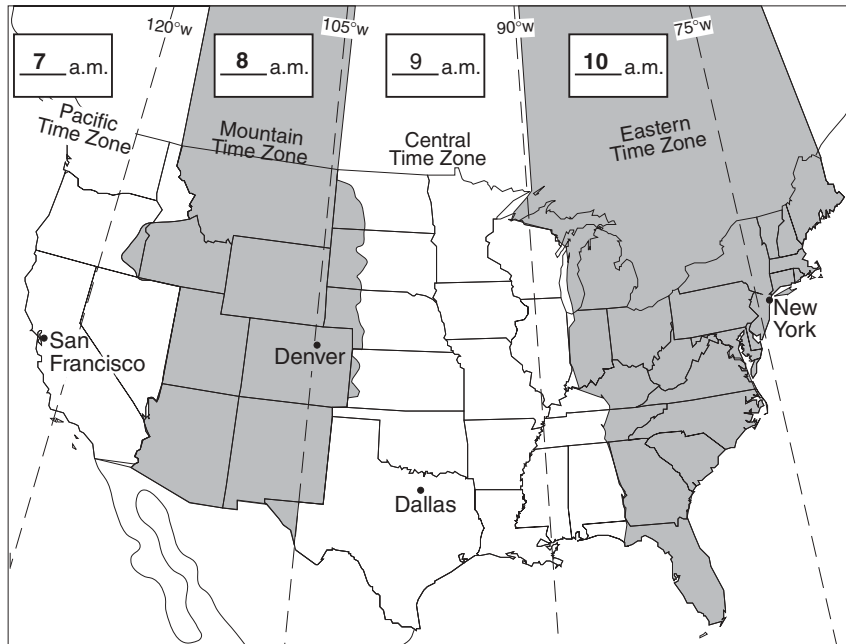
and

Allow 1 credit if the student draws the correct symbol for wind direction.

and

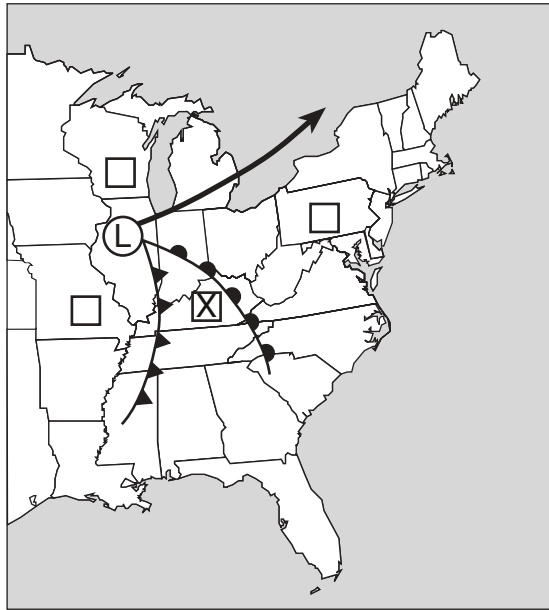
Allow 1 credit for the correct symbol for wind speed. Feathers may be placed on either side of the staff.

55 [1]



Allow 1 credit for all three times indicated correctly. Pacific is 7 a.m.; Mountain is 8 a.m.; and Eastern is 10 a.m.

56 [2]



- a** Allow 1 credit if the **X** is located in the area behind the warm front but ahead of the cold front even if the **X** is not placed in the box.
- b** Allow 1 credit if the arrow indicates the normal storm track to be toward the northeast. Allow credit if the arrow points to any compass direction in between east and north-northeast.

57 [2] Allow 2 credits for correctly identifying all three minerals: **plagioclase feldspar**, **biotite**, and **amphibole**.

Allow only 1 credit for correctly identifying only two of the three minerals.

Note: Do *not* accept pyroxene because it is not found with quartz.

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

- weathering
- erosion
- deposition

59 [1] Allow 1 credit for **siltstone** or **conglomerate** or **limestone**.

Part C

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

- 60** [2] Allow 2 credits for **granite** and for an answer describing the greater hardness of the minerals found in granite. Acceptable responses include, but are not limited to, this example:

Granite is composed mainly of quartz and feldspar that are resistant to abrasion because of their hardness (7 and 6, respectively), while marble is made of calcite, which is softer (hardness of 3).

Allow only 1 credit if granite is chosen but the explanation is not acceptable.

Allow no credit if the student chooses marble.

- 61** [1] Allow 1 credit for **Pleistocene** epoch.

- 62** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The half-life of radioactive carbon is shorter.

Radioactive carbon-14 is found in recent organic remains.

- 63** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

ellipse

oval

elliptical with the Sun at one focus

Note: Do *not* accept circle, sphere, or egg shaped.

- 64** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

early winter

winter

Note: Do *not* accept January or any other month.

- 65** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

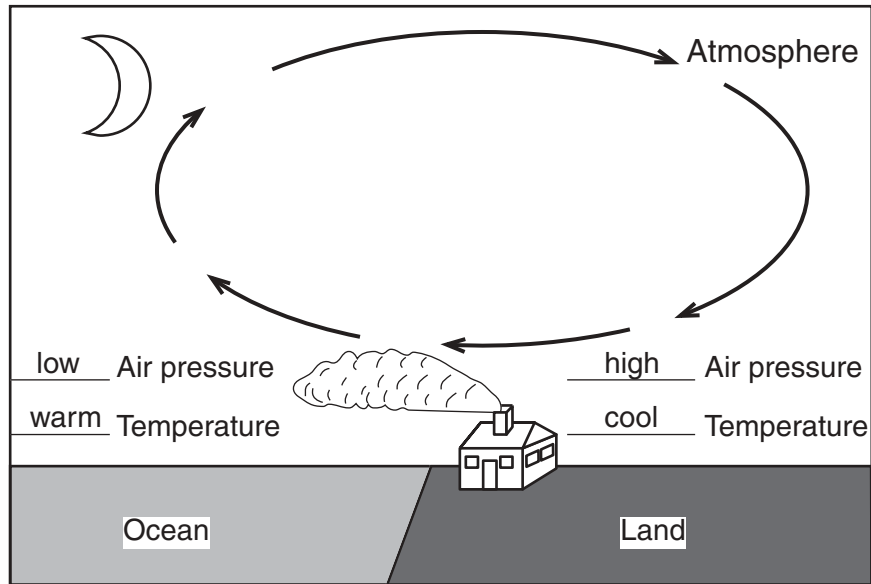
As Earth moves from perihelion to aphelion, the apparent size decreases.

The Sun appears smaller.

- 66** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

As Earth moves from perihelion to aphelion, the orbital velocity decreases.
 As distance of Earth from the Sun increases, orbital velocity decreases.
 an inverse relationship

- 67 and 68**



- 67** [1] Allow 1 credit for showing “high” air pressure over the land and “low” air pressure over the ocean.
- 68** [1] Allow 1 credit for showing “warm” air temperature over the ocean and “cool” air temperature over the land.
- 69** [2] Allow 1 credit for a correct response describing the general direction of circulation. Acceptable responses include, but are not limited to, this example:

counterclockwise

and

Allow 1 credit for a correct response describing the inward movement toward the eye. Acceptable responses include, but are not limited to, this example:

spirals toward the eye

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

The storm entered the prevailing southwesterly wind belt north of 30° N, which pushed it to the northeast.

The hurricane moved into a different wind belt.

71 [2] **a** Allow no credit for writing the equation.

b Allow 1 credit for correctly substituting both acceptable values into the equation given in part *a*. The student need not record the units. Acceptable responses include, but are not limited to, these examples:

$$\text{rate of change} = \frac{2,600 \text{ km}}{4 \text{ days}}$$

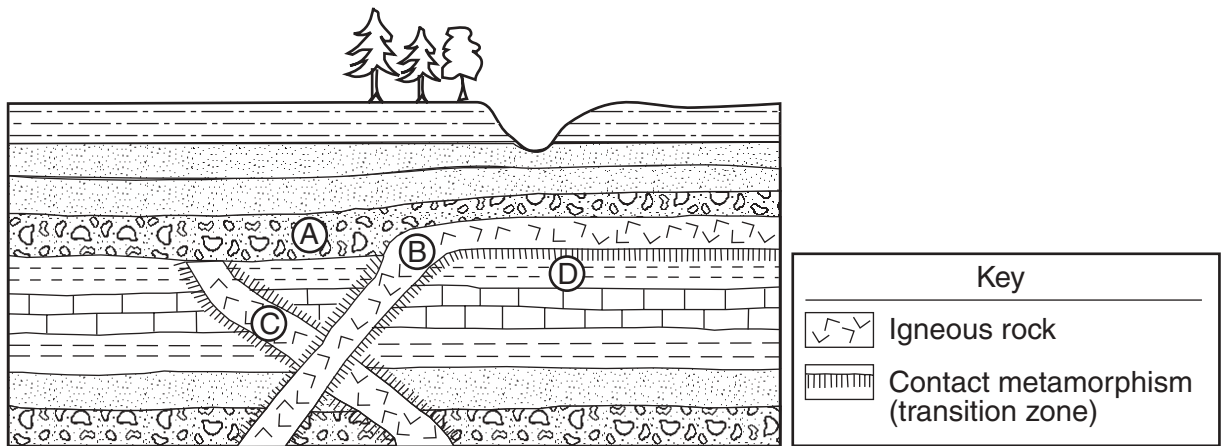
$$r = \frac{2,600 \text{ km}}{96 \text{ hr}}$$

c Allow 1 credit for correctly calculating the rate, based on the student’s answer in part *b*. Correct units must be given. Acceptable responses include, but are not limited to, these examples:

$$\text{rate of change} = 650 \frac{\text{km}}{\text{day}}$$

$$r = 27 \text{ km/hr}$$

72 [1]



Allow 1 credit for the correct placement of contact metamorphism symbols above and below *B* as shown in the diagram above.

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

C was formed before both *B* and *A*.

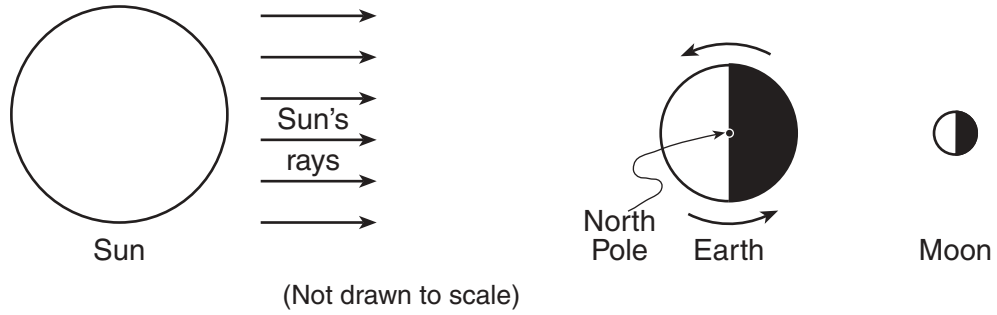
C is older than both *B* and *A*.

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

Rock *A* is a mixture of rounded rock fragments of different sizes connected together.

Rock *A* is a horizontal layer.

75 [2]



- a** Allow 1 credit for the Moon drawn on the night side of Earth directly opposite the Sun. Allow credit even if the size of the Moon is not drawn proportionally or if the Moon is not shaded or is shaded incorrectly.
- b** Allow 1 credit if the arrow or arrows clearly show Earth rotating counterclockwise.

Regents Examination in Physical Setting/Earth Science — August 2002

Chart for Determining the Final Examination Score

(Use for August 2002 examination only.)

To determine the student's final examination score, locate the student's total performance test score across the top of the chart and the student's total written test score down the side of the chart. The point where those two scores intersect is the student's final examination score. For example, a student receiving a total performance test score of 14 and a total written test score of 68 would receive a final examination score of 86.

Total Performance 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	
Total Written Test Score	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	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83	
	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	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	83	82	
	77	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81	
	76	95	94	93	92	92	92	91	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
	75	95	94	93	92	92	92	91	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
	74	94	93	92	92	91	91	91	90	90	89	89	88	88	87	86	86	85	84	84	84	83	82	81	80	79
	73	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78	78
	72	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78	78
	71	92	91	90	90	90	89	89	88	88	88	87	87	86	85	85	84	83	83	82	81	80	79	78	77	77
	70	92	90	89	89	89	88	88	88	87	87	86	86	85	85	84	83	83	82	81	80	79	78	77	77	77
	69	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76	76
	68	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76	76
	67	90	89	88	87	87	87	86	86	86	85	85	84	83	83	82	82	81	80	79	78	78	77	76	75	75
	66	89	88	87	86	86	86	85	85	85	84	84	83	83	82	81	81	80	79	78	78	77	76	75	74	74
	65	88	87	86	86	85	85	85	84	84	83	83	82	82	81	80	80	79	78	78	77	76	75	74	73	73
	64	87	86	85	85	84	84	84	83	83	83	82	82	81	81	80	80	79	78	78	77	76	75	74	73	72
	63	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71	71
	62	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71	71
	61	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	71	70	71
60	85	84	82	82	82	82	81	81	80	80	79	79	78	78	77	76	76	75	74	73	72	71	70	70	69	
59	84	83	82	81	81	81	81	80	80	79	79	78	77	77	76	76	75	74	73	72	71	70	69	68	69	
58	83	82	81	80	80	80	80	79	79	78	78	77	77	76	75	75	74	73	72	71	70	69	68	67	68	
57	82	81	80	80	79	79	79	78	78	77	77	76	76	75	75	74	73	72	71	70	69	68	67	66	67	
56	81	80	79	79	78	78	77	77	77	76	76	75	74	74	73	72	72	71	70	69	68	67	66	65	66	
55	80	79	78	78	78	77	77	77	76	76	75	75	74	73	72	71	71	70	69	68	67	66	65	64	65	
54	80	79	77	77	77	76	76	76	75	75	74	74	73	73	72	71	71	70	69	68	67	66	65	64	65	
53	79	78	77	76	76	76	75	75	74	74	74	73	72	72	71	70	70	69	68	67	66	65	64	63	64	
52	78	77	76	75	75	75	74	74	74	73	73	72	72	71	70	69	69	68	67	66	65	64	63	62	63	
51	77	76	75	75	74	74	74	73	73	72	72	71	71	70	69	69	68	67	66	65	64	63	62	61	62	
50	76	75	74	74	73	73	73	72	72	71	71	70	70	69	69	68	67	66	66	65	64	63	62	61	61	
49	75	74	73	73	73	72	72	71	71	71	70	70	69	68	68	67	66	66	65	64	63	62	61	60	60	
48	75	73	72	72	72	71	71	71	70	70	69	69	68	68	67	66	66	65	64	63	62	61	60	60	59	
47	74	73	71	71	71	71	70	70	69	69	68	68	67	67	66	65	65	64	63	62	61	60	59	58	59	
46	73	72	71	70	70	70	69	69	69	68	68	67	66	66	65	65	64	63	62	61	61	60	59	58	58	
45	72	71	70	69	69	69	68	68	68	67	67	66	66	65	64	64	63	62	61	61	60	59	58	57	57	
44	71	70	69	69	68	68	68	67	67	66	66	65	65	64	63	63	62	61	61	60	59	58	57	56	56	

Regents Examination in Physical Setting/Earth Science — August 2002
Chart for Determining the Final Examination Score
(Use for August 2002 examination only.)

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

Map to Core Curriculum

August 2002 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	3, 9, 12	39, 50, 52, 53	71
Math Key Idea 2	9	40	65
Math Key Idea 3	12	43	62
Sci. Inq. Key Idea 1			64, 72, 73, 74
Sci. Inq. Key Idea 2			
Sci. Inq. Key Idea 3			
Eng. Des. Key Idea 1	22		60
Standard 2			
Key Idea 1	17		
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1	21, 27		67, 68, 69, 70
Key Idea 2	7, 10	43, 46, 47, 51, 54, 55, 56a, 57, 58, 59	61, 63, 75ab
Key Idea 3			
Key Idea 4	3		66
Key Idea 5	2, 3	39, 40, 42, 56b	
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2	17		
Standard 4			
Performance Indicator 1	1, 2, 3, 4, 5, 6, 7, 8, 9, 18, 19, 31	36, 37, 38, 40, 53, 55	61, 62, 63, 64, 65, 66, 72, 73, 75ab
Performance Indicator 2	8, 10, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 34	39, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 54, 55ab, 58	67, 68, 69, 70, 71
Performance Indicator 3	11, 32, 33, 35	41, 57, 59	60, 74
Reference Tables			
ESRT 2001 edition	5, 7, 8, 9, 11, 13, 14, 18, 19, 20, 21, 23, 25, 27, 29, 30, 32, 33, 34, 35	36, 41, 43, 44, 45, 47, 48, 49, 50, 52, 54, 56, 57, 58, 59	61, 62, 70, 71, 74