

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

PHYSICAL SETTING
EARTH SCIENCE

Tuesday, January 28, 2003 — 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.

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 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 your use while taking this examination.

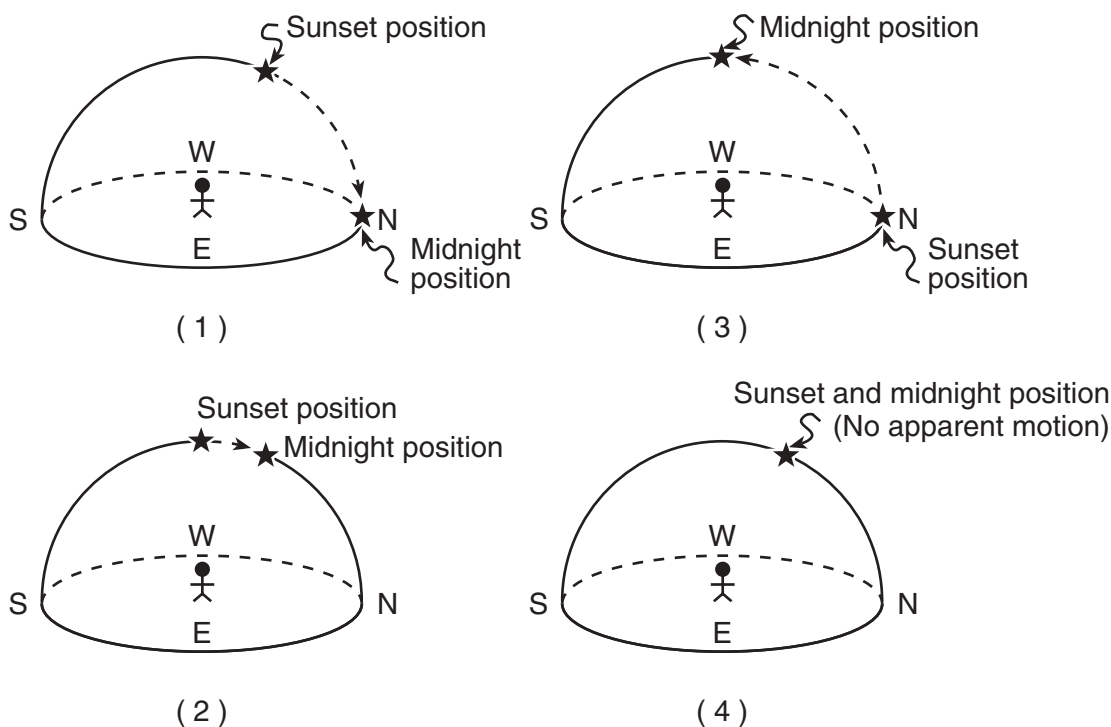
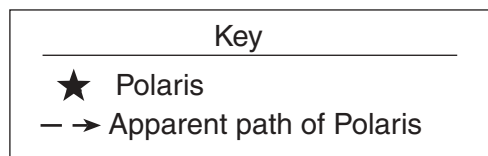
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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 Which diagram correctly shows the apparent motion of *Polaris* from sunset to midnight for an observer in northern Canada?



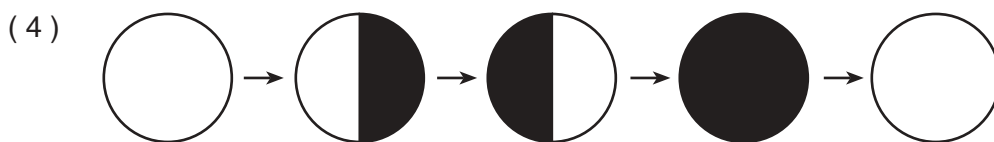
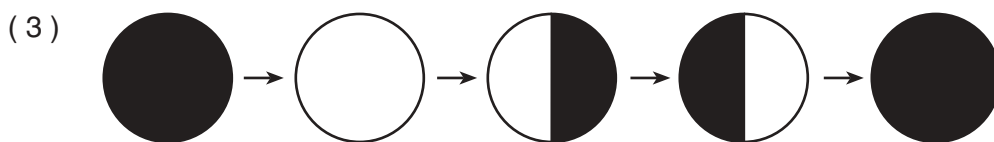
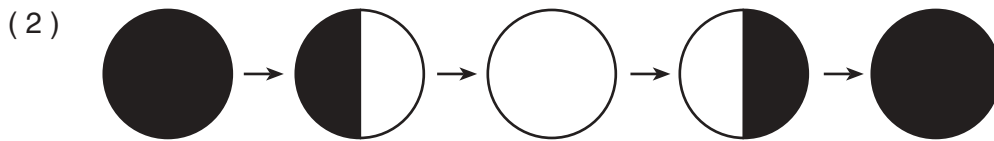
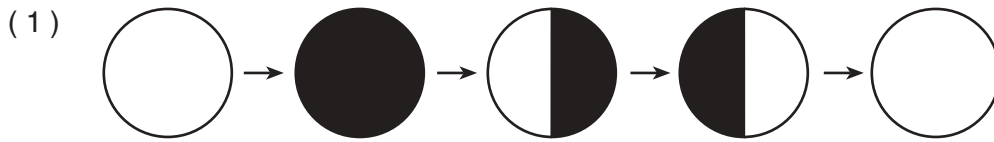
- 2 Earth's orbital velocity is slowest on July 5 because

- (1) the Moon is closest to Earth
- (2) Earth's distance from the Sun is greatest
- (3) Earth, the Moon, and the Sun are located along a straight line in space
- (4) the highest maximum temperatures occur in the Northern Hemisphere

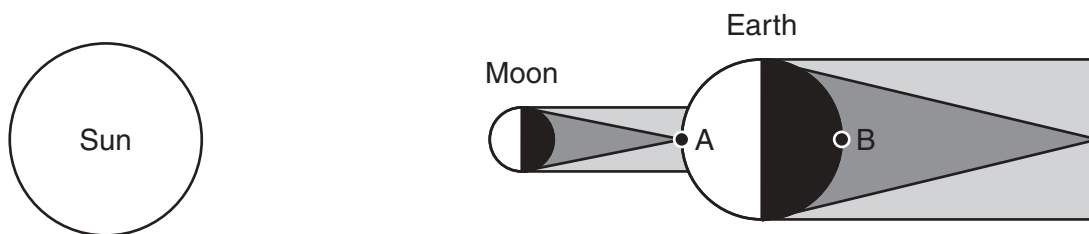
- 3 Three planets that are relatively large, gaseous, and of low density are

- (1) Mercury, Jupiter, and Saturn
- (2) Venus, Jupiter, and Neptune
- (3) Mars, Jupiter, and Uranus
- (4) Jupiter, Saturn, and Uranus

4 Which diagram sequence correctly shows the order of Moon phases, as viewed from Earth, for a period of 1 month? [Note that some phases have been omitted.]



5 The diagram below shows the relative positions of the Sun, the Moon, and Earth when an eclipse was observed from Earth. Positions A and B are locations on Earth's surface.

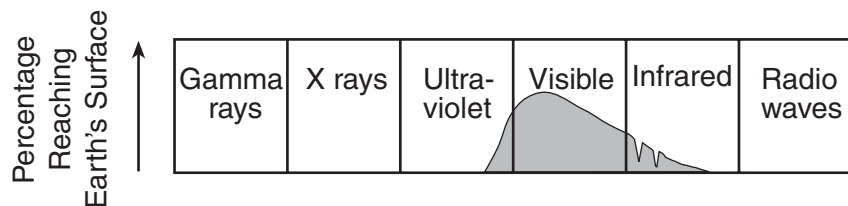


(Not drawn to scale)

Which statement correctly describes the type of eclipse that was occurring and the position on Earth where this eclipse was observed?

- (1) A lunar eclipse was observed from position A.
- (2) A lunar eclipse was observed from position B.
- (3) A solar eclipse was observed from position A.
- (4) A solar eclipse was observed from position B.

6 The diagram below shows the types of electromagnetic energy given off by the Sun. The shaded part of the diagram shows the approximate amount of each type actually reaching Earth's surface.



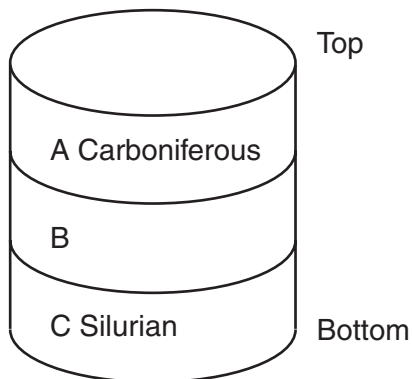
Which conclusion is best supported by the diagram?

- (1) All types of electromagnetic energy reach Earth's surface.
- (2) Gamma rays and x rays make up the greatest amount of electromagnetic energy reaching Earth's surface.
- (3) Visible light makes up the greatest amount of electromagnetic energy reaching Earth's surface.
- (4) Ultraviolet and infrared radiation make up the greatest amount of electromagnetic energy reaching Earth's surface.

7 Land surfaces of Earth heat more rapidly than water surfaces because

- (1) more energy from the Sun falls on land than on water
- (2) land has a lower specific heat than water
- (3) sunlight penetrates to greater depths in land than in water
- (4) less of Earth's surface is covered by land than by water

8 The geologic drill core below shows bedrock layers A, B, and C that have not been overturned. The geological ages of layers A and C are shown.



What is the geologic age of layer B?

- (1) Cambrian
- (2) Ordovician
- (3) Devonian
- (4) Permian

9 Most of Earth's surface ocean current patterns are primarily caused by

- (1) the force of gravity
- (2) the impact of precipitation
- (3) prevailing winds
- (4) river currents

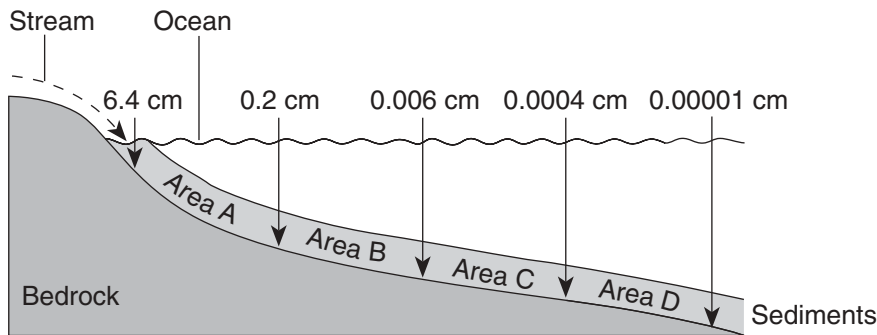
10 A student uses a sling psychrometer outdoors on a clear day. The dry-bulb (air) temperature is 10°C. The water on the wet bulb will most likely

- (1) condense, causing the wet-bulb temperature to be higher than the air temperature
- (2) condense, causing the wet-bulb temperature to be equal to the air temperature
- (3) evaporate, causing the wet-bulb temperature to be lower than the air temperature
- (4) evaporate, causing the wet-bulb temperature to be equal to the air temperature

11 In which direction do surface winds around low-pressure centers in the Northern Hemisphere generally move?

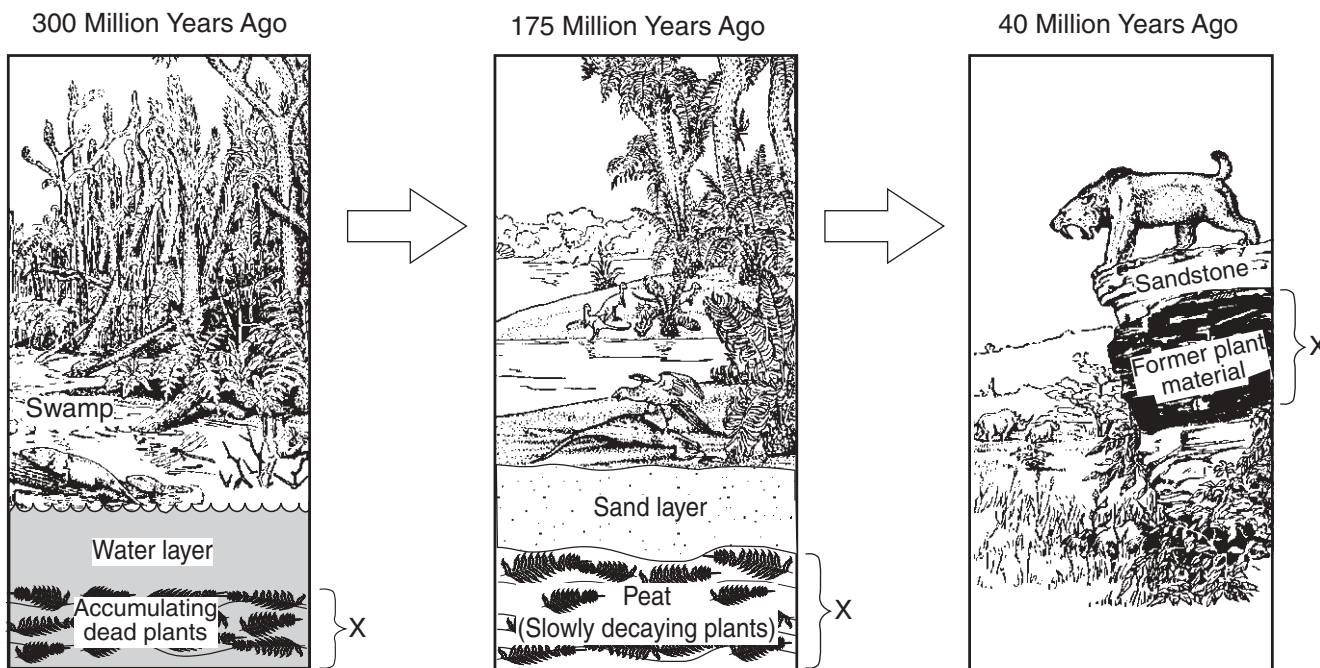
- (1) counterclockwise, toward the center of the low
- (2) clockwise, toward the center of the low
- (3) counterclockwise, away from the center of the low
- (4) clockwise, away from the center of the low

- 12 The profile below shows the average diameter of sediment that was sorted and deposited in specific areas A, B, C, and D by a stream entering an ocean.



As compaction and cementation of these sediments eventually occur, which area will become siltstone?

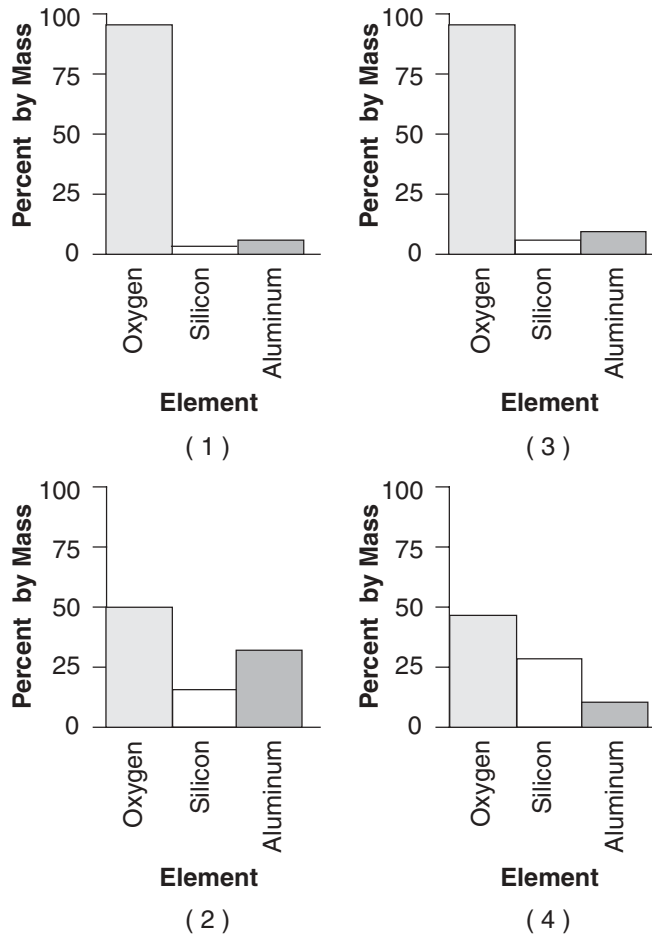
- (1) A (3) C
 (2) B (4) D
- 13 The sequence of diagrams below represents the gradual geologic changes in layer X, located just below Earth's surface.



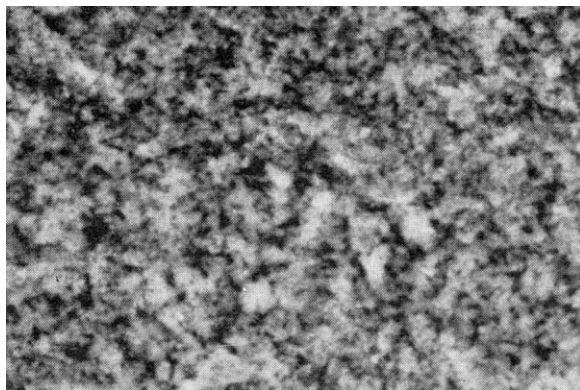
Which type of sedimentary rock was formed at layer X?

- (1) conglomerate (3) rock salt
 (2) shale (4) coal
- 14 Most water vapor enters the atmosphere by the processes of
- (1) convection and radiation
 (2) condensation and precipitation
 (3) evaporation and transpiration
 (4) erosion and conduction
- 15 Glaciers often form parallel scratches and grooves in bedrock because glaciers
- (1) deposit sediment in unsorted piles
 (2) deposit rounded sand in V-shaped valleys
 (3) continually melt and refreeze
 (4) drag loose rocks over Earth's surface

16 Which graph correctly represents the three most abundant elements, by mass, in Earth's crust?



17 The photograph below shows actual crystal sizes in a light-colored igneous rock that contains several minerals, including potassium feldspar, quartz, and biotite mica.

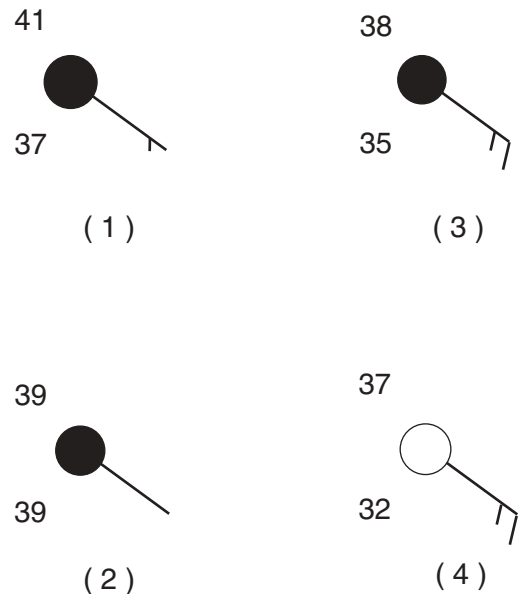


(Shown to actual size)

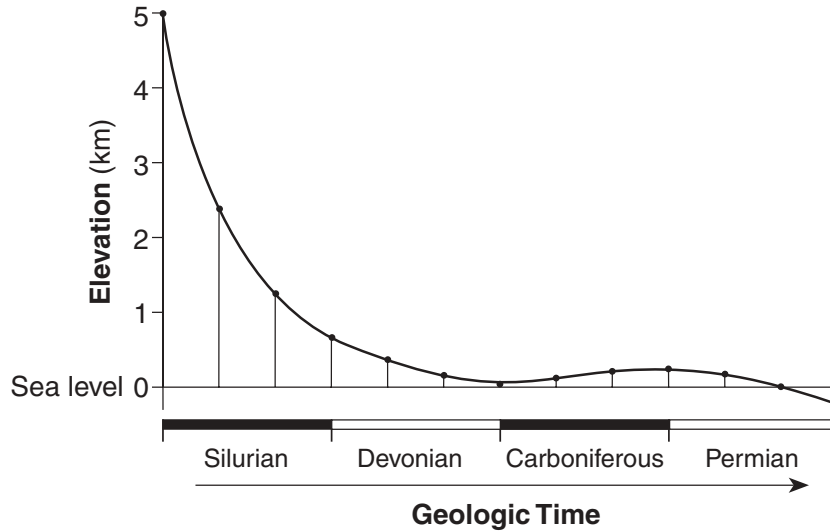
The rock should be identified as

- (1) granite
- (2) gabbro
- (3) basalt
- (4) rhyolite

18 Which weather station model shows the highest relative humidity?



19 The graph below shows the average change in the elevation of a mountain range over time.



According to the graph, the rate of uplifting was greater than the rate of erosion during which geologic time period?

- (1) Silurian
- (2) Devonian
- (3) Carboniferous
- (4) Permian

20 The photograph below shows an eroded plateau found in the southwestern United States.



The landscape was developed by the processes of

- (1) crustal uplift and stream erosion
- (2) crustal uplift and glacial erosion
- (3) crustal folding and stream erosion
- (4) crustal folding and glacial erosion

21 At which latitude and longitude in New York State would a salt mine in Silurian-age bedrock most likely be located?

- (1) 41° N 72° W
- (2) 43° N 77° W
- (3) 44° N 74° W
- (4) 44° N 76° W

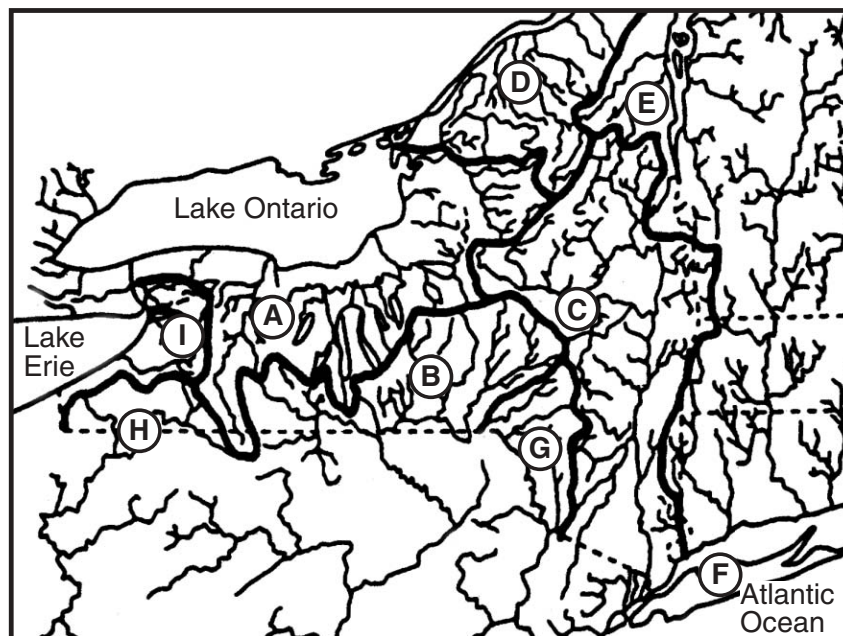
22 An unidentified mineral that is softer than calcite exhibits a metallic luster and cubic cleavage. This mineral most likely is

- (1) galena
- (2) pyrite
- (3) halite
- (4) pyroxene

23 The study of how seismic waves change as they travel through Earth has revealed that

- (1) *P*-waves travel more slowly than *S*-waves through Earth's crust
- (2) seismic waves travel more slowly through the mantle because it is very dense
- (3) Earth's outer core is solid because *P*-waves are not transmitted through this layer
- (4) Earth's outer core is liquid because *S*-waves are not transmitted through this layer

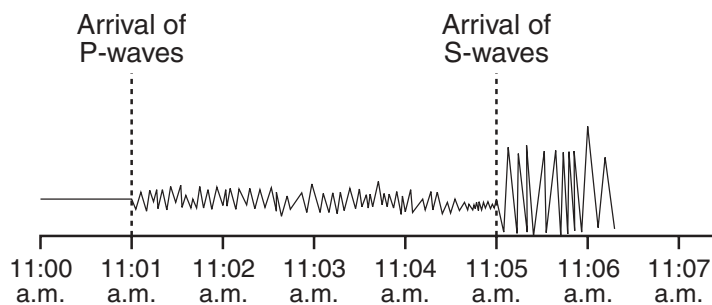
- 24 The map below shows major streams in the New York State area. The bold lines mark off sections A through I within New York State.



The best title for the map would be

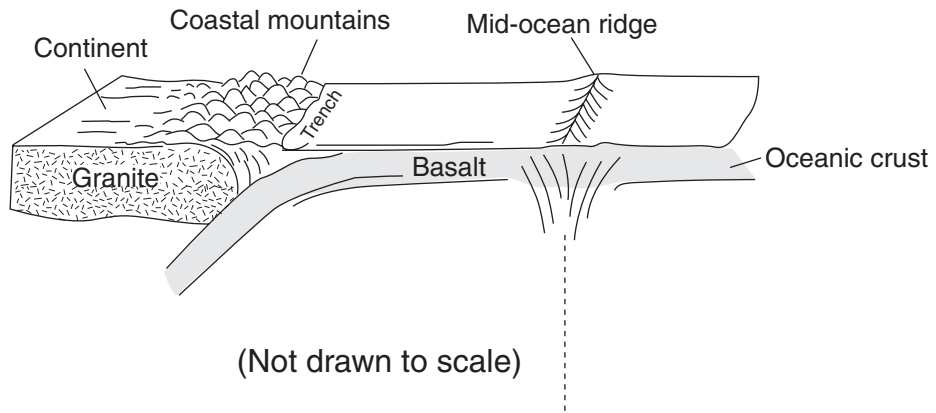
- (1) "Tectonic Plate Boundaries in New York State"
- (2) "Bedrock Geology Locations of New York State"
- (3) "Landscape Regions of New York State"
- (4) "Watershed Areas of New York State"

Base your answers to questions 25 and 26 on the earthquake seismogram below.

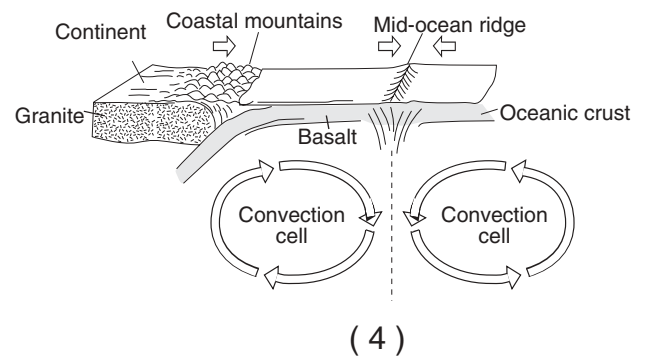
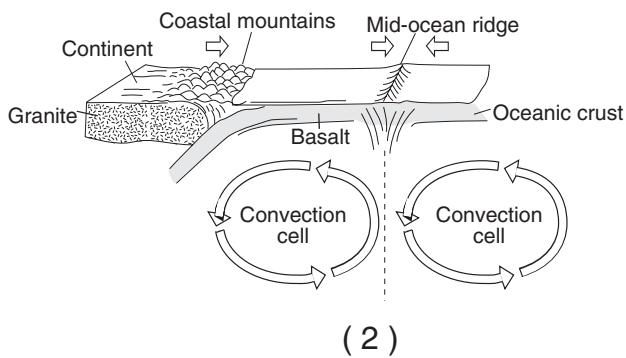
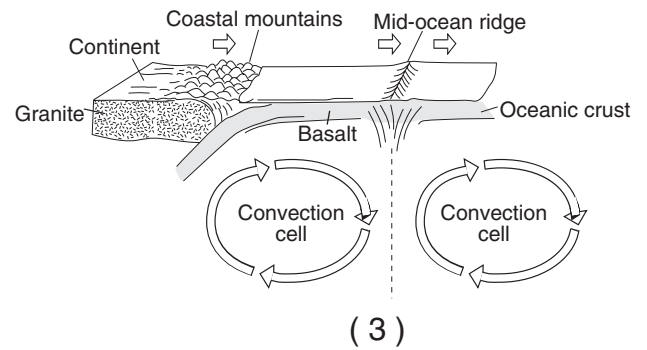
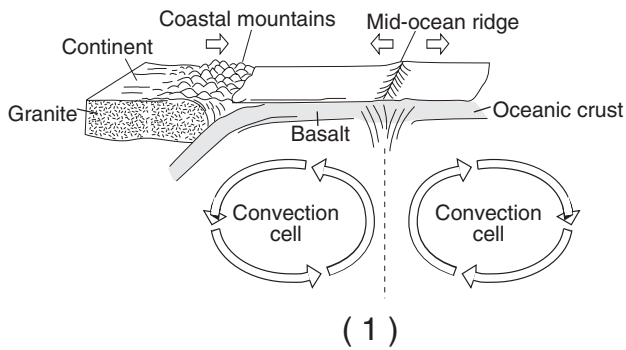


- | | | | | | |
|---|---|---------|-----------|---------|----------|
| <p>25 When did the first <i>P</i>-waves arrive at this seismic station?</p> <ol style="list-style-type: none"> (1) 3 minutes after an earthquake occurred
2,600 km away (2) 5 minutes after an earthquake occurred
2,600 km away (3) 9 minutes after an earthquake occurred
3,500 km away (4) 11 minutes after an earthquake occurred
3,500 km away | <p>26 How many additional seismic stations must report seismogram information in order to locate this earthquake?</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">(1) one</td> <td style="width: 50%;">(3) three</td> </tr> <tr> <td>(2) two</td> <td>(4) four</td> </tr> </table> | (1) one | (3) three | (2) two | (4) four |
| (1) one | (3) three | | | | |
| (2) two | (4) four | | | | |

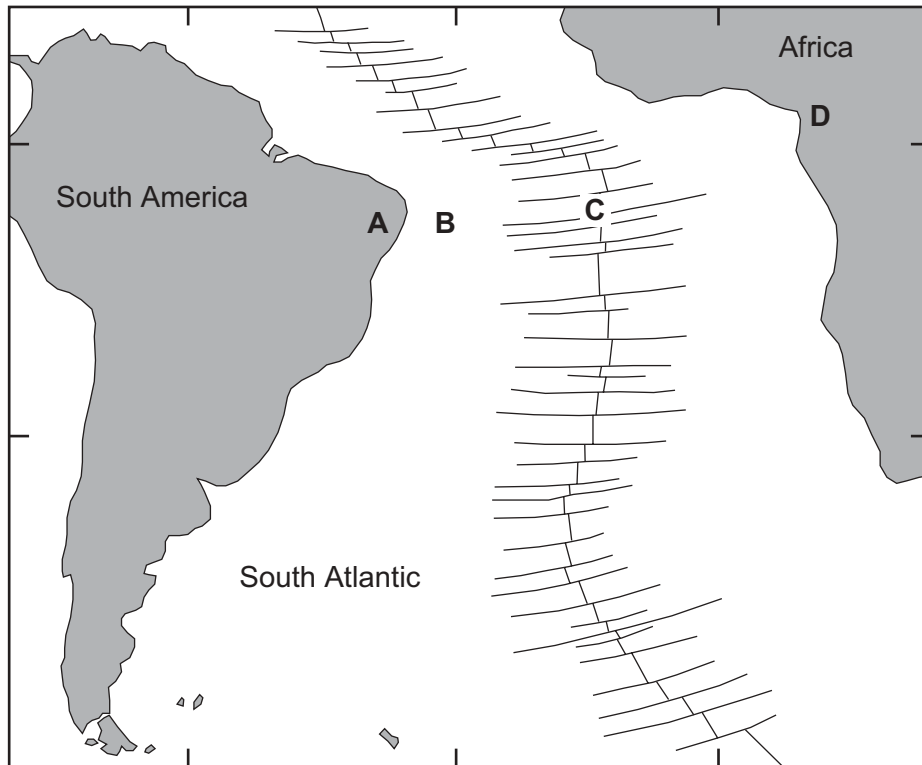
27 The diagram below shows some features of Earth's crust and upper mantle.



Which model most accurately shows the movements (arrows) associated with the surface features shown in the diagram?



Base your answers to questions 28 through 30 on the map below. The map shows the continents of Africa and South America, the ocean between them, and the ocean ridge and transform faults. Locations *A* and *D* are on the continents. Locations *B* and *C* are on the ocean floor.



28 The hottest crustal temperature measurements would most likely be found at location

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

29 Which table best shows the relative densities of the crustal bedrock at locations *A*, *B*, *C*, and *D*?

Relative Densities of Crust

More Dense	Less Dense
A, B	C, D

(1)

Relative Densities of Crust

More Dense	Less Dense
C, D	A, B

(3)

Relative Densities of Crust

More Dense	Less Dense
B, C	A, D

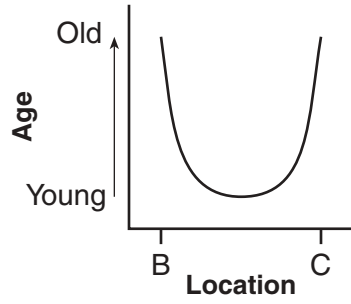
(2)

Relative Densities of Crust

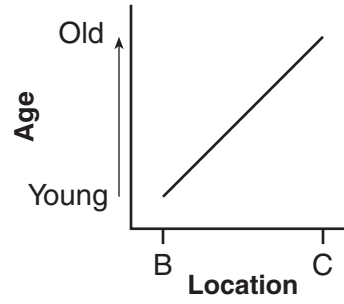
More Dense	Less Dense
A, D	B, C

(4)

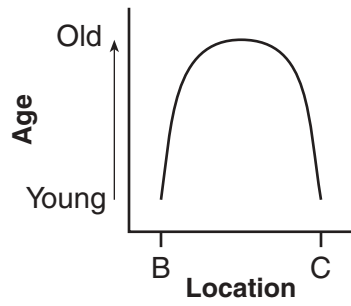
30 Which graph best shows the relative age of the ocean-floor bedrock from location *B* to location *C*?



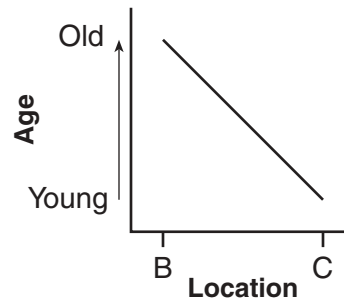
(1)



(3)

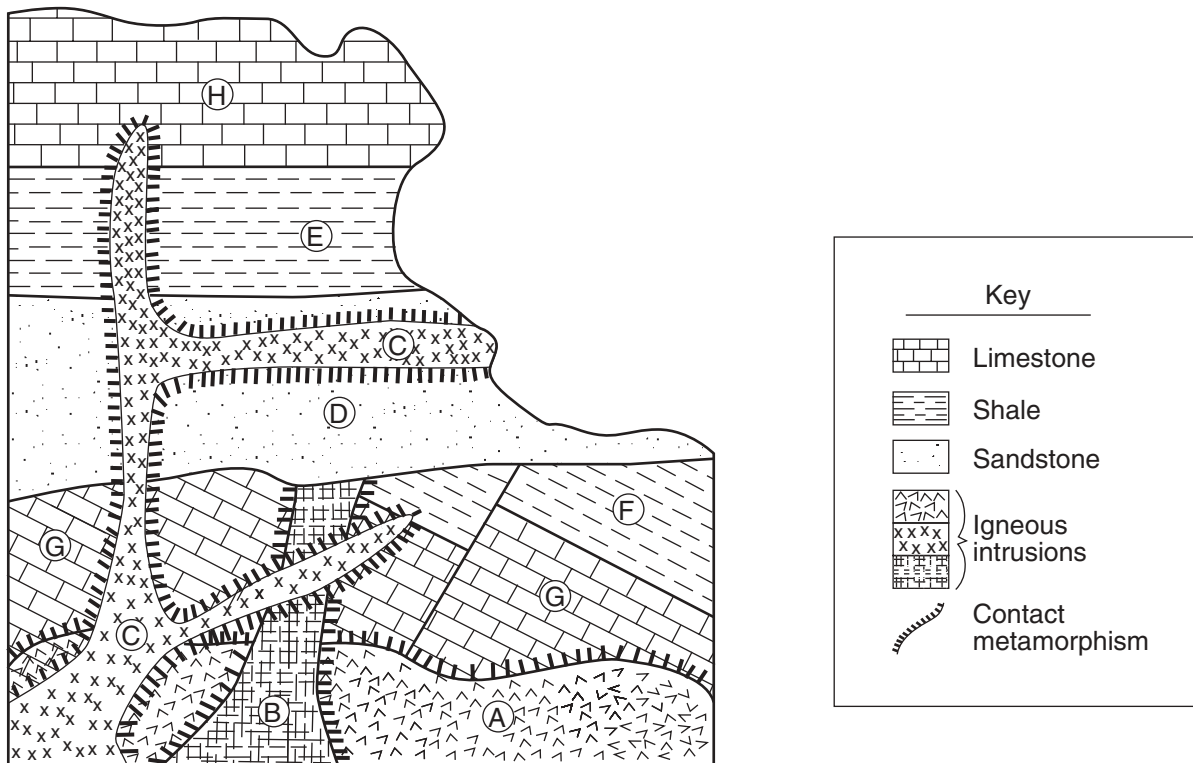


(2)



(4)

Base your answers to questions 31 and 32 on the diagram below, which shows a cross section of Earth's crust.



- 31 Which statement gives an accurate age relationship for the bedrock in the cross section?
- (1) Intrusion A is younger than intrusion C.
 - (2) Intrusion C is younger than intrusion B.
 - (3) Intrusion B is older than intrusion A.
 - (4) Intrusion C is older than layer E.

- 32 The most apparent buried erosional surface is found between rock units
- (1) A and B
 - (2) C and D
 - (3) D and F
 - (4) E and H

- 33 During a heavy rainfall, runoff will be greatest on a soil that has an infiltration (permeability) rate of
- (1) 0.1 cm/sec
 - (2) 0.2 cm/sec
 - (3) 0.3 cm/sec
 - (4) 1.2 cm/sec

- 34 Which inference is best supported by the rock and fossil record in New York State?
- (1) Eurypterids lived in shallow seas near present-day Syracuse.
 - (2) *Coelophysis* wandered through jungles near present-day Albany.
 - (3) The first coral reefs formed off the shoreline of present-day Long Island.
 - (4) The condor nested on the peaks of the ancestral Adirondack Mountains during the Grenville Orogeny.

- 35 The diagram below shows a rock with deformed structure and intergrown crystals.



- The rock was probably formed by
- (1) sediments that were deposited on the ocean floor
 - (2) heat and pressure that changed a preexisting rock
 - (3) volcanic lava that cooled on Earth's surface
 - (4) a meteor impact on Earth's surface

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*.

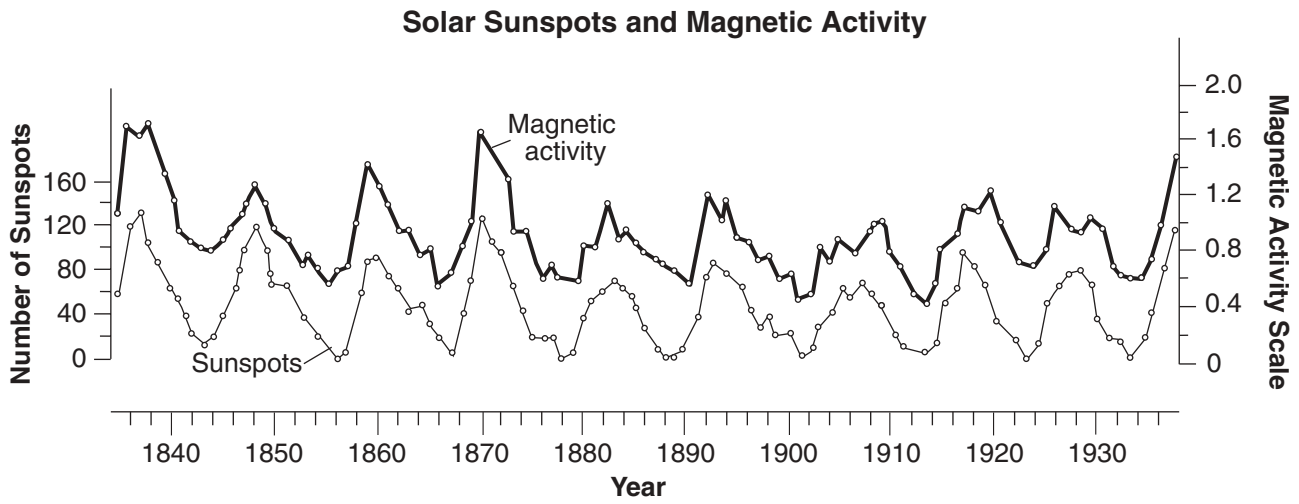
36 The table below shows the duration of insolation at different latitudes for three different days during the year.

Latitude	Day 1 Duration of Insolation (hours)	Day 2 Duration of Insolation (hours)	Day 3 Duration of Insolation (hours)
90° N	24	12	0
80° N	24	12	0
70° N	24	12	0
60° N	$18\frac{1}{2}$	12	$5\frac{1}{2}$
50° N	$16\frac{1}{4}$	12	$7\frac{3}{4}$
40° N	15	12	9
30° N	14	12	10
20° N	$13\frac{1}{4}$	12	$10\frac{3}{4}$
10° N	$12\frac{1}{2}$	12	$11\frac{1}{2}$
0°	12	12	12

Which dates are represented most correctly by Day 1, Day 2, and Day 3, respectively?

- (1) March 21, September 22, December 21
- (2) June 21, September 22, December 21
- (3) September 22, December 21, March 21
- (4) December 21, March 21, June 21

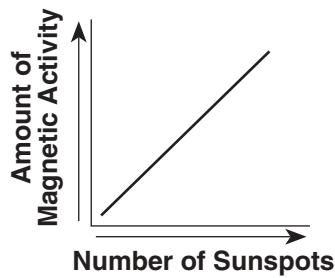
Base your answers to questions 37 and 38 on the graph below, which shows changes in the Sun's magnetic activity and changes in the number of sunspots over a period of approximately 100 years. Sunspots are dark, cooler areas within the Sun's photosphere that can be seen from Earth.



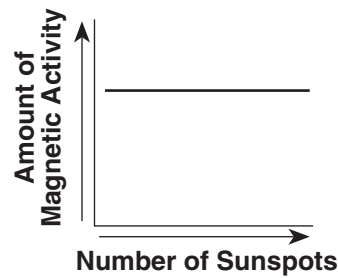
37 The graph indicates that years having the greatest number of sunspots occur

- (1) randomly and unpredictably
- (2) precisely at the beginning of each decade
- (3) in a cyclic pattern, repeating approximately every 6 years
- (4) in a cyclic pattern, repeating approximately every 11 years

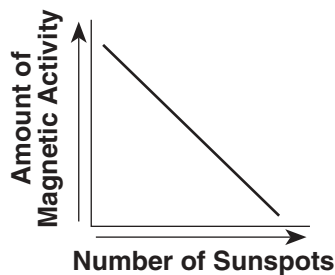
38 Which graph best represents the relationship between the number of sunspots and the amount of magnetic activity in the Sun?



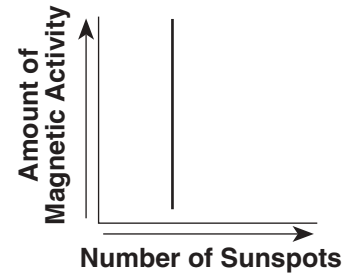
(1)



(3)

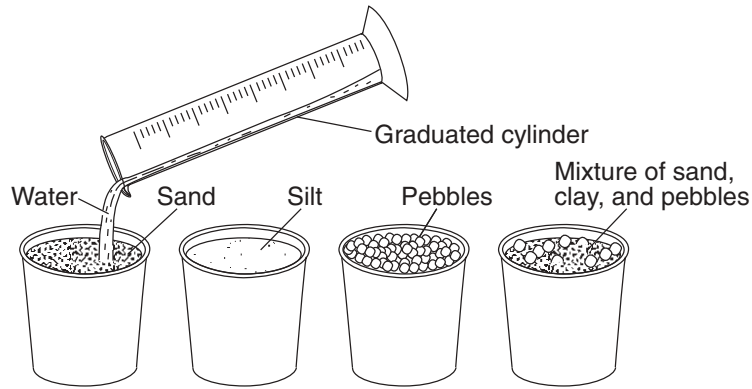


(2)



(4)

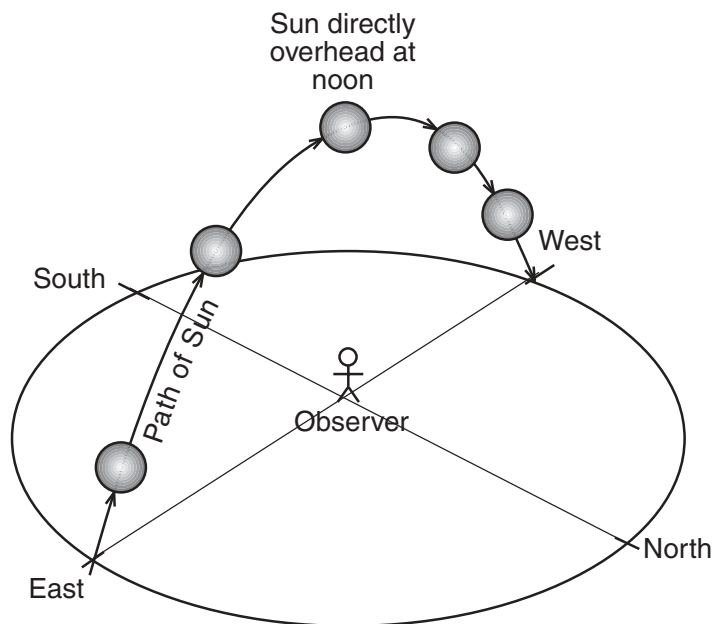
- 39 A student performed a laboratory activity in which water was poured slowly into four cups containing equal volumes of loosely packed sediment samples, as shown in the diagram below. All particles were spherical in shape and uniform in size within a container. After the water level reached the surface of each sample, the student determined the amount of water that had been added.



(Not actual size)

The results of the activity should have indicated that approximately equal amounts of water were added to the cups of

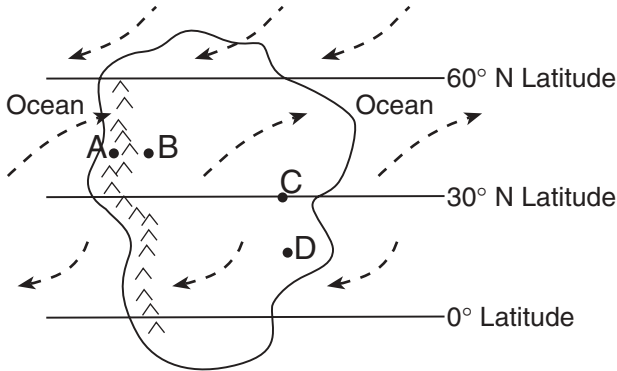
- (1) silt and pebbles, only
 - (2) sand, silt, and pebbles, only
 - (3) pebbles and the mixture, only
 - (4) sand, pebbles, and the mixture, only
- 40 The diagram below shows the apparent path of the Sun as viewed by an observer at a certain Earth location on March 21.



At which latitude is the observer located?

- (1) the Equator (0°)
- (2) $23\frac{1}{2}^\circ$ N
- (3) $66\frac{1}{2}^\circ$ N
- (4) 90° N

Base your answers to questions 41 through 43 on the map below. The map shows an imaginary continent on Earth. Arrows represent prevailing wind directions. Letters *A* through *D* represent locations on the continent. Locations *A* and *B* are at the same latitude and at the same elevation at the base of the mountains.



- 41 Over the course of a year, compared to location *B*, location *A* will have
- (1) less precipitation and a smaller temperature range
 - (2) less precipitation and a greater temperature range
 - (3) more precipitation and a smaller temperature range
 - (4) more precipitation and a greater temperature range
- 42 The climate at location *C* is much drier than at location *D*. This difference is best explained by the fact that location *C* is located
- (1) farther from any mountain range
 - (2) closer to a large body of water
 - (3) at a latitude that experiences longer average annual daylight
 - (4) at a latitude where air is sinking and surface winds diverge
- 43 Compared to the observations made at location *D*, the observed altitude of *Polaris* at location *B* is
- (1) always less
 - (2) only less from March 21 to September 22
 - (3) only greater from March 21 to September 22
 - (4) always greater

44 A list of three observed relationships is shown below.

- Erosional rate = depositional rate
- Amount of insolation = amount of terrestrial radiation
- Rate of condensation = rate of evaporation

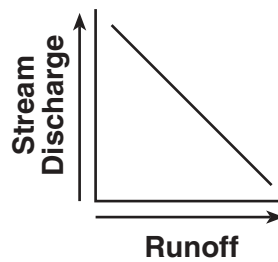
In which situation would each relationship exist?

- (1) when a cyclic change occurs
- (2) when a change of state occurs
- (3) when dynamic equilibrium is reached
- (4) when global warming ceases and global cooling begins

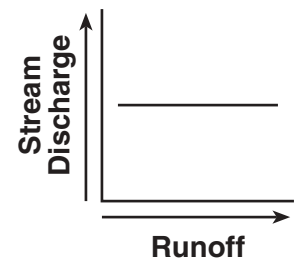
45 A student filled a graduated cylinder with 1,000 milliliters of water to represent a radioactive substance. After 30 seconds, the student poured out one-half of the water in the cylinder to represent the decay occurring within the first half-life. The student repeated the process every 30 seconds. How much water did the student pour from the cylinder at the 2-minute mark?

- (1) 12.5 mL
- (2) 62.5 mL
- (3) 125.0 mL
- (4) 250.0 mL

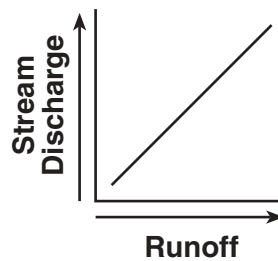
46 Which graph best represents the relationship between surface-water runoff and stream discharge?



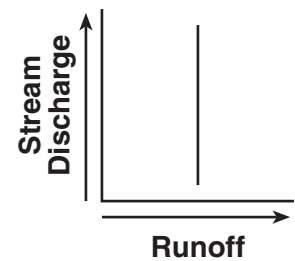
(1)



(3)

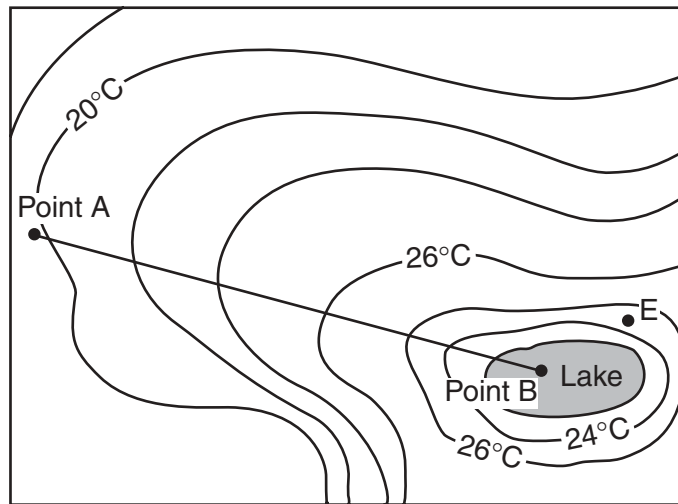


(2)

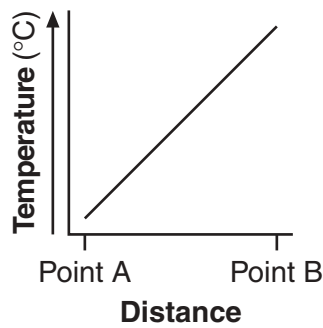


(4)

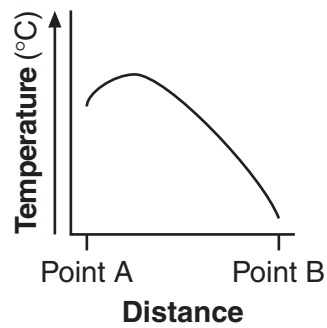
47 The temperature field map below represents surface air temperatures within a park. The location of a lake within the park is also indicated.



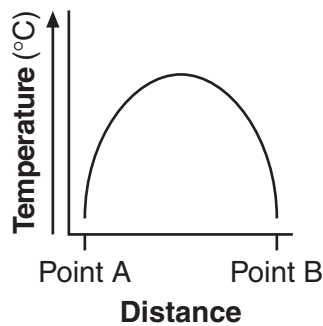
Which graph best represents the temperature profile along a straight line from point A to point B?



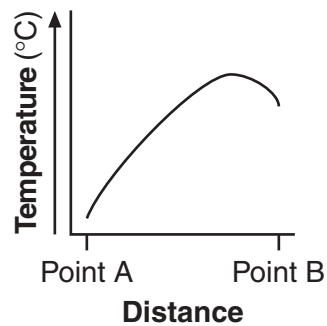
(1)



(3)

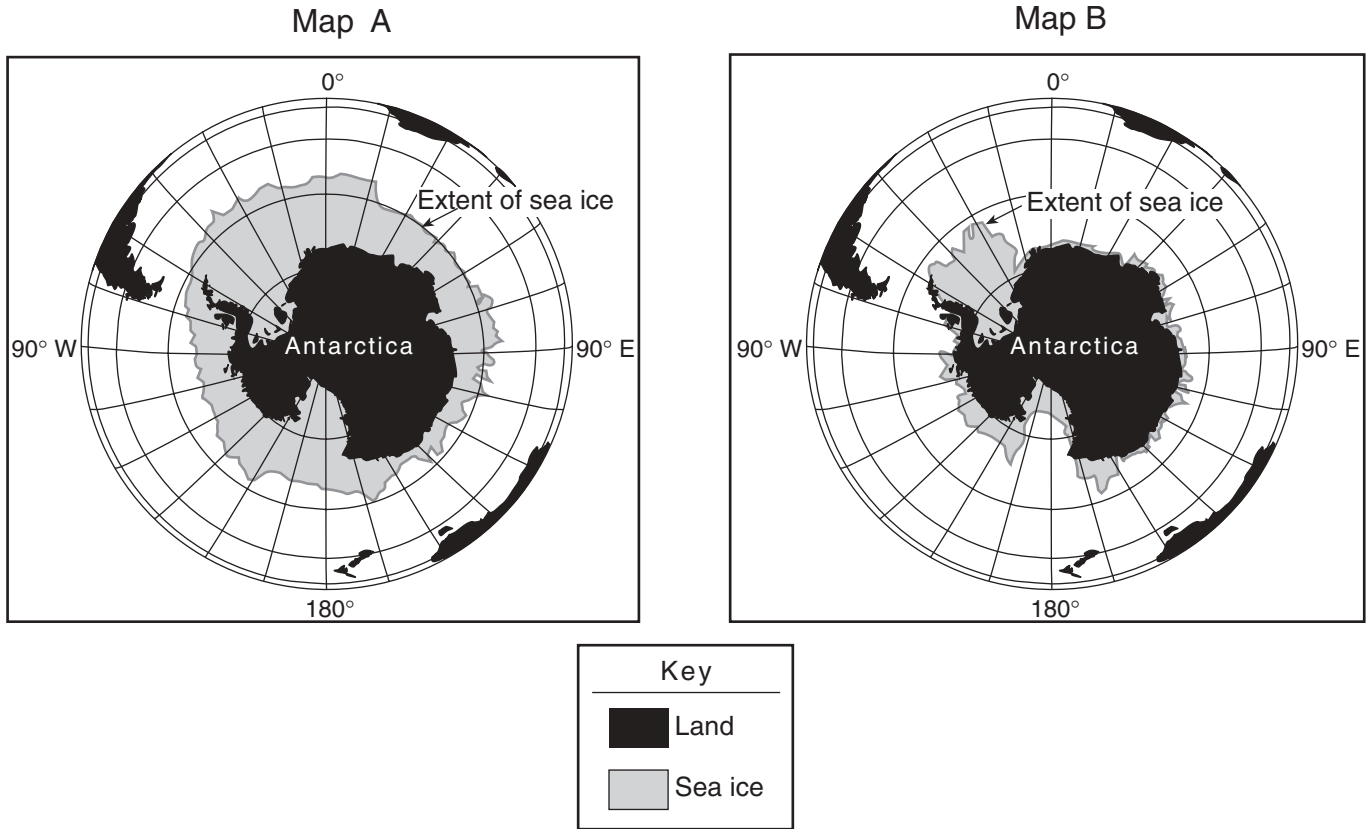


(2)



(4)

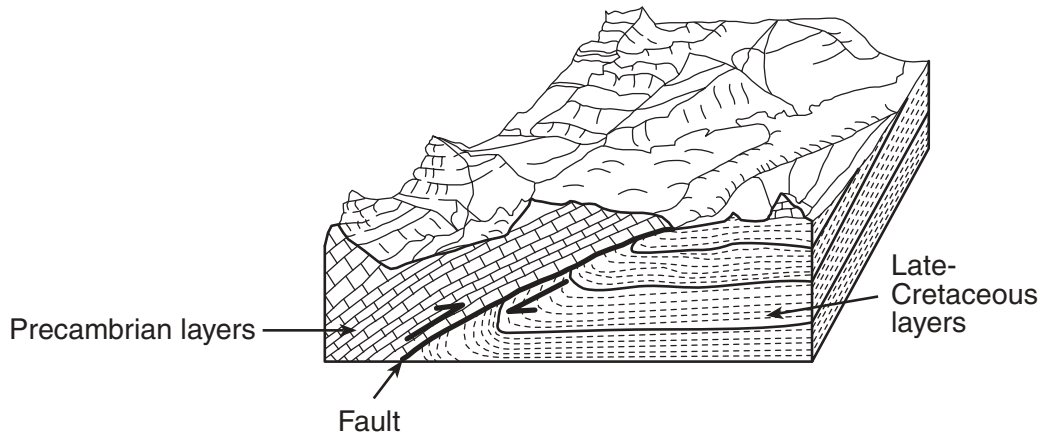
48 The maps below show the amount of sea ice surrounding the continent of Antarctica at two different times of the year. Map A represents late August when the area covered by sea ice approaches its greatest extent. Map B represents the minimum extent of sea ice.



Which month is most probably represented by map B?

- (1) February
- (2) May
- (3) June
- (4) October

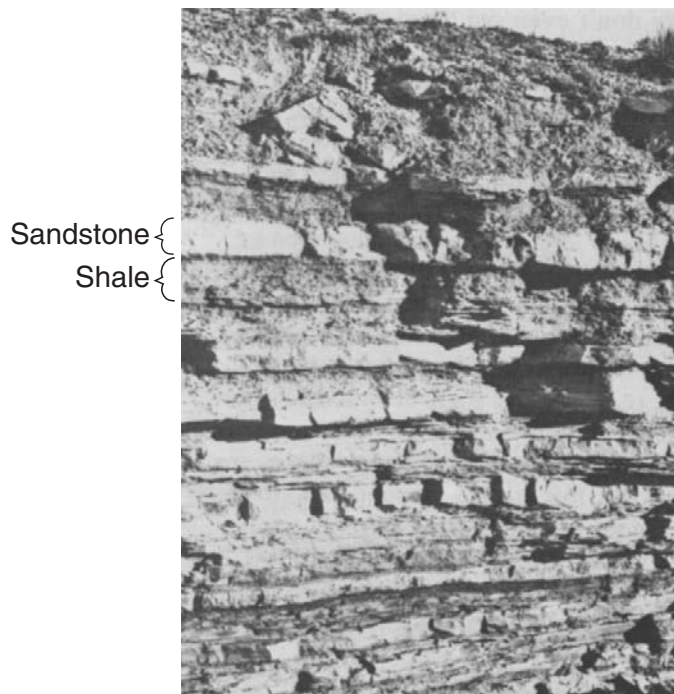
49 The geologic block diagram below shows surface features and subsurface structures of a section of Montana.



The faulting shown in the diagram could have occurred

- (1) 2,100 million years ago
- (2) 520 million years ago
- (3) 250 million years ago
- (4) 50 million years ago

50 The photograph below shows an outcrop of horizontal rock layers in New York State.



Rock outcrops like this are most commonly found in which area of New York State?

- | | |
|--------------------------|----------------------------|
| (1) Hudson Highlands | (3) Atlantic Coastal Plain |
| (2) Adirondack Mountains | (4) Appalachian Plateau |
-

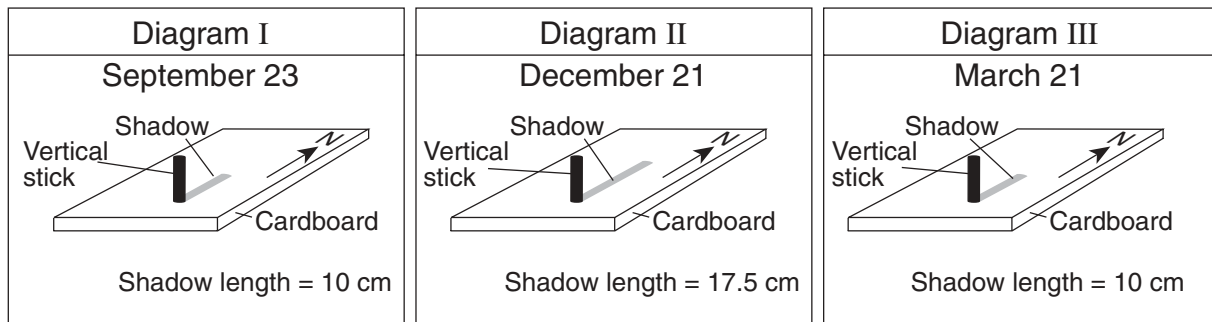
Part B-2

Answer all questions in this part.

Directions (51–63): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables*.

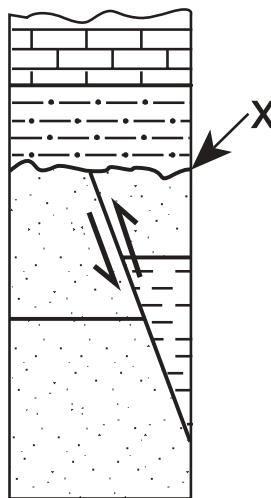
- 51 Identify by name the surface ocean current that cools the climate of locations on the western coastline of North America. [1]

Base your answers to questions 52 and 53 on diagrams I through III below. Diagrams I, II, and III represent the length and direction of the shadow of a vertical stick measured at noon on three different dates at 42° N latitude.



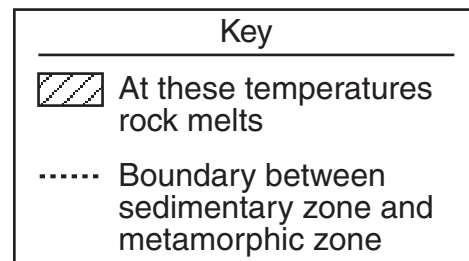
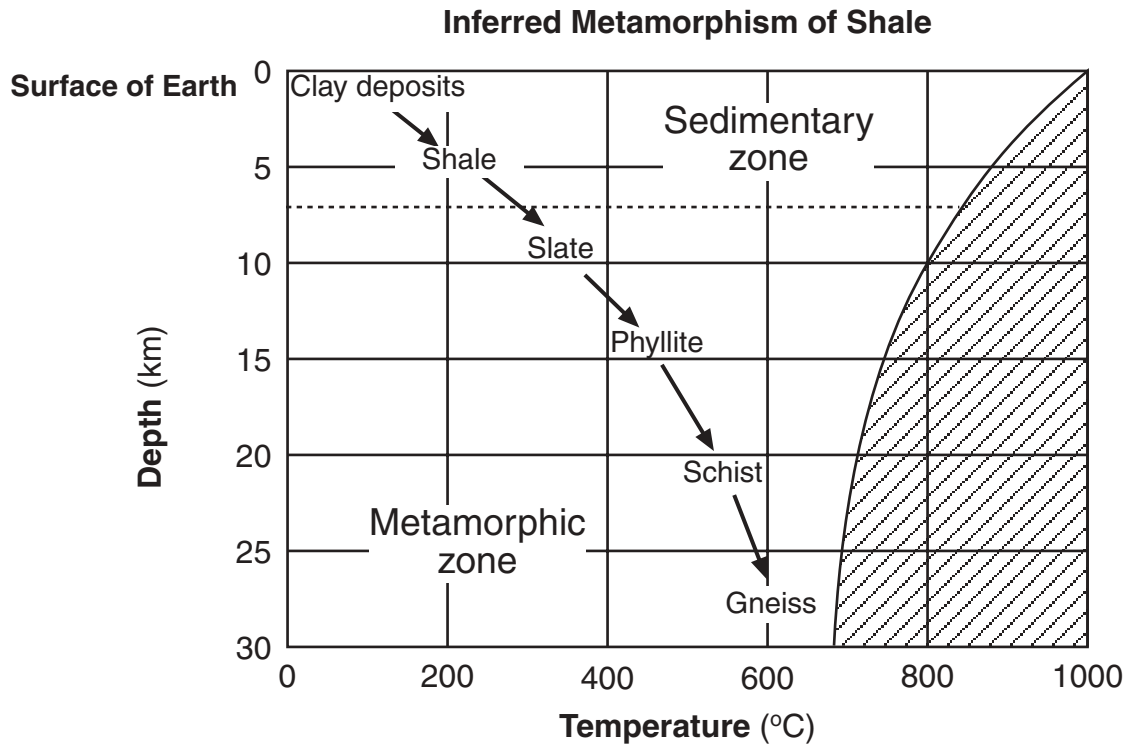
- 52 Explain how the changing altitude (angle of incidence) of the noon Sun affects the length of the shadows shown in the diagrams. [1]
- 53 On the diagram provided *in your answer booklet*, draw the direction and length of the shadow at noon that will most likely be observed at 42° N latitude on June 21. [1]
-

- 54 The diagram below shows a cross section of New York State bedrock that has not been overturned. Line X represents an unconformity.



The index fossil *Eurypterus* is found in the limestone layer. What trilobite index fossil could be found in the shale layer? [1]

Base your answers to questions 55 and 56 on the graph below, which shows a generalized sequence of rock types that form from original clay deposits at certain depths and temperature conditions within Earth's interior.



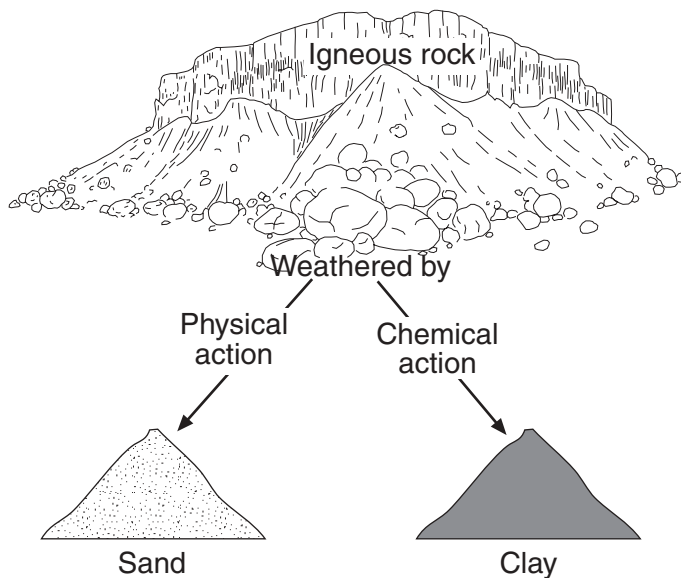
55 When clay materials are buried to a depth of 14 kilometers, which type of metamorphic rock is normally formed? [1]

56 Explain why gneiss would *not* form at a depth of 27 kilometers and at a temperature of 800°C. [1]

Base your answers to questions 57 through 60 on the weather map provided *in your answer booklet*, which shows partial weather-station data for several cities in eastern North America.

- 57 On the weather map provided *in your answer booklet*, draw isotherms every 10°F, starting with 40°F and ending with 70°F. Isotherms must extend to the edges of the map. [2]
- 58 In the space provided *in your answer booklet*, calculate the temperature gradient between Richmond, Virginia, and Hatteras, North Carolina, by following the directions below.
- a Write the equation for gradient. [1]
 - b Substitute data from the map into the equation. [1]
 - c Calculate the average gradient and label your answer with the correct units. [1]
- 59 State the actual air pressure, in millibars, shown at Miami, Florida. [1]
- 60 State the general relationship between air temperature and latitude for locations shown on the map. [1]
-

Base your answers to questions 61 through 63 on the diagram below, which shows igneous rock that has undergone mainly physical weathering into sand and mainly chemical weathering into clay.



- 61 Compare the particle size of the physically weathered fragments to the particle size of the chemically weathered fragments. [1]
- 62 Describe the change in temperature and moisture conditions that would cause an increase in the rate of chemical weathering into clay. [1]
- 63 If the igneous rock is a layer of vesicular andesite, identify *three* types of mineral grains that could be found in the sand. [1]
-

Part C

Answer all questions in this part.

Directions (64–77): 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 64 and 65 on your knowledge of Earth science and on the newspaper article shown below, written by Paul Recer and printed in the *Times Union* on October 9, 1998.

Astronomers peer closer to big bang

WASHINGTON — The faintest and most distant objects ever sighted — galaxies of stars more than 12 billion light years away — have been detected by an infrared camera on the Hubble Space Telescope.

The sighting penetrates for the first time to within about one billion light years of the very beginning of the universe, astronomers said, and shows that even at that very early time there already were galaxies with huge families of stars.

“We are seeing farther than ever before,” said Rodger I. Thompson, a University of Arizona astronomer and the principal researcher in the study.

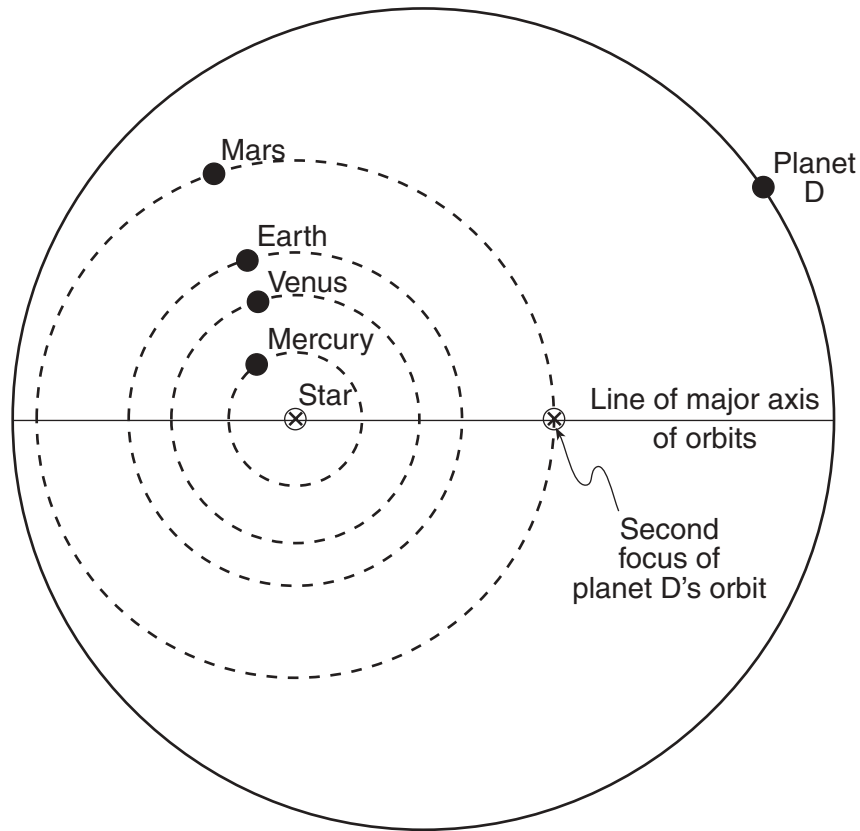
Thompson and his team focused an infrared instrument on the Hubble on a narrow patch of the sky that had been previously photographed in visible light. The instrument detected about 100 galaxies that were not seen in the visible light and 10 of these were at extreme distance.

He said the galaxies are seen as they were when the universe was only about 5 percent of its present age. Astronomers generally believe the universe began with a massive explosion, called the “big bang,” that occurred about 13 billion years ago.

Since the big bang, astronomers believe that galaxies are moving rapidly away from each other, spreading out and becoming more distant.

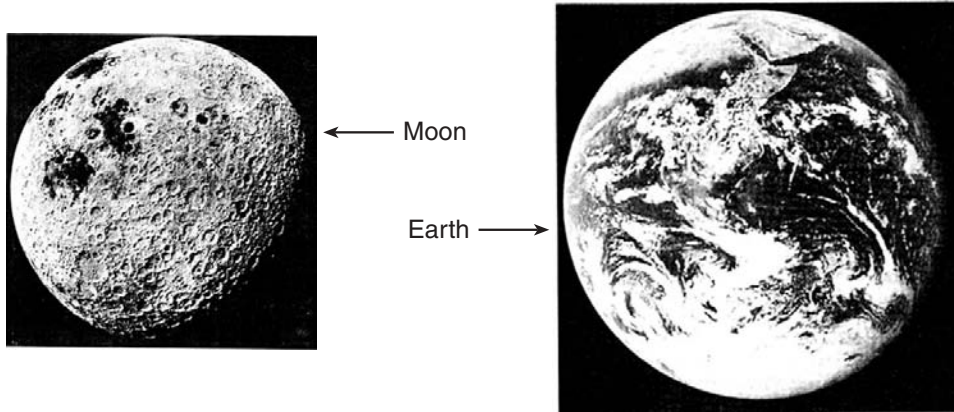
- 64 The big-bang theory is widely believed by astronomers to explain the beginning of the universe. Why does the light from distant galaxies support the big-bang theory? [1]
- 65 Compare the age of Earth and our solar system to the age of these distant galaxies of stars. [1]
-

Base your answers to questions 66 and 67 on the diagram below, which shows the orbit of planet *D* around the star *Upsilon Andromedae*. The dashed lines show where the paths of the first four planets of our solar system would be located if they were going around *Upsilon Andromedae* instead of the Sun. All distances are drawn to scale.



- 66 Describe the eccentricity of planet *D*'s orbit relative to the eccentricities of the orbits of the planets shown in our solar system. [1]
- 67 Describe the changes in gravitational force between planet *D* and the star *Upsilon Andromedae* during one complete orbit around the star. Be sure to describe where the force is greatest and where the force is least. [1]
-

68 The photographs below show the Moon and Earth as viewed from space. It is inferred that Earth had many impact craters similar to those shown on the Moon.

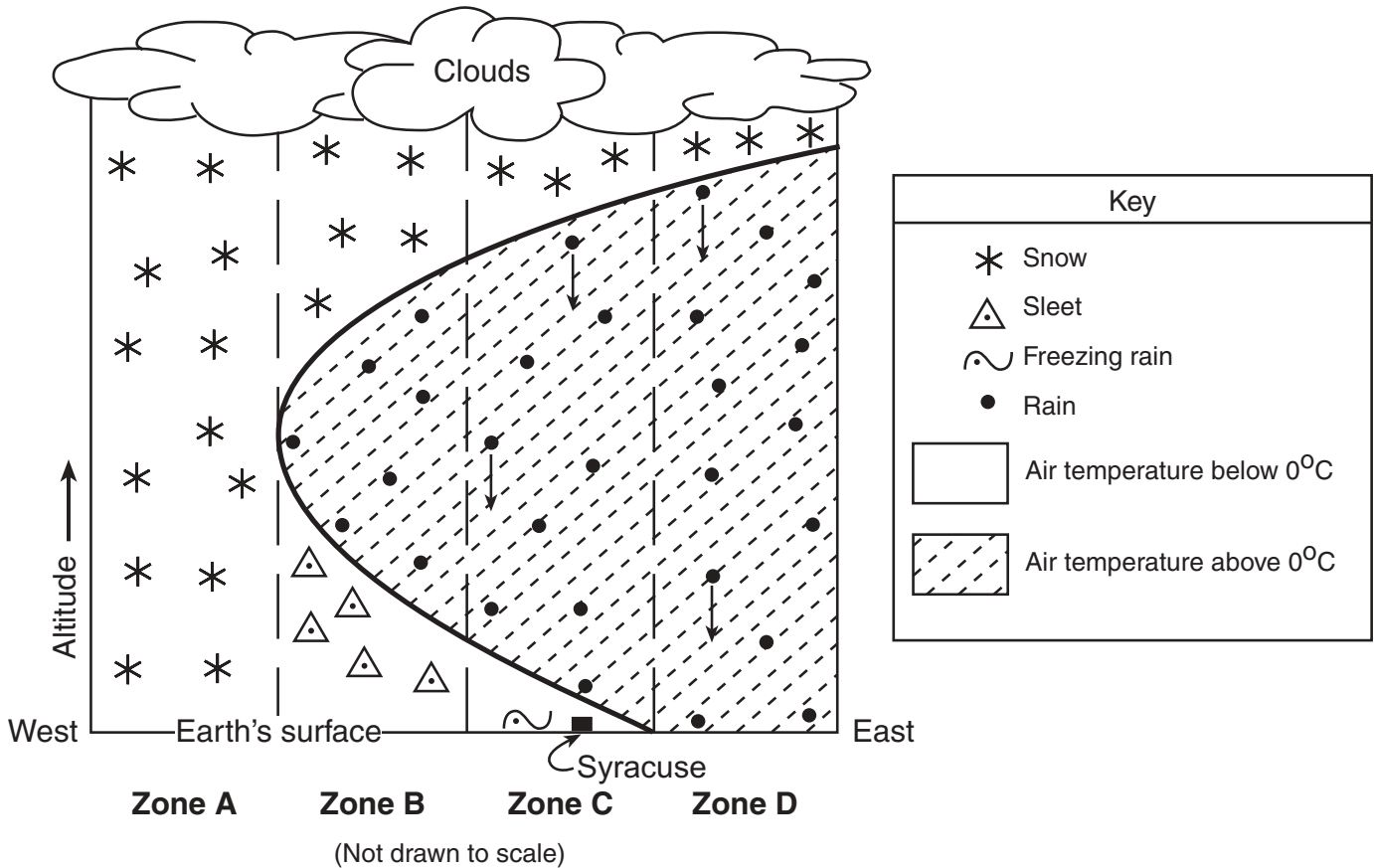


(Not drawn to scale)

Describe one process that has destroyed many of the impact craters that once existed on Earth. [1]

69 Name one region of the United States that is likely to experience a major damaging earthquake. Explain why an earthquake is likely to occur in that region. [1]

Base your answers to questions 70 through 73 on the atmospheric cross section below, which represents a winter storm system. Zones A, B, C, and D are located on a west to east line at approximately 43° N latitude across New York State. This cross section shows how solid and liquid forms of precipitation depend on the air temperature above Earth's surface. The storm is moving from west to east.



70 Explain why sleet is occurring in Zone B. [1]

71 At the time of the events represented by the cross section, Syracuse, New York, is experiencing the following weather conditions:

Cloud cover	100%
Wind speed	15 knots
Present weather	Freezing rain
Precipitation	1.23 inches past 6 hours
Visibility	1 mile

The temperature, dewpoint, and wind direction are shown on the weather station model in your answer booklet. Using proper format, add the information shown in the table to the model provided in your answer booklet. [2]

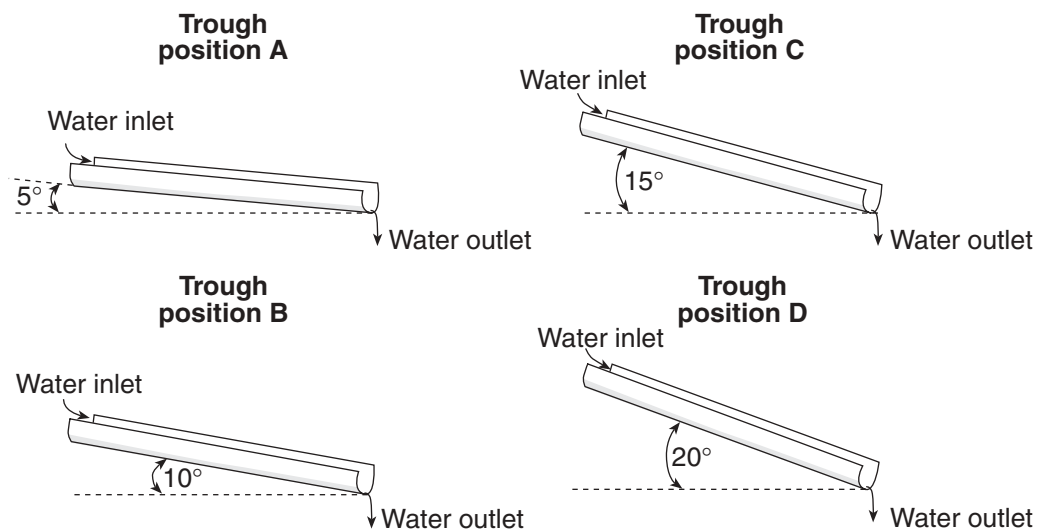
72 As the storm moves eastward, the type of precipitation received in Syracuse changes. State the type of precipitation that will immediately follow freezing rain. [1]

73 Describe the general air movement and temperature change that caused the clouds associated with this storm to form. [2]

- 74 An island measures 10 kilometers from east to west and 8 kilometers from north to south. A single hill on the east side of the island has a maximum elevation of 57 meters and is steepest to the north. In the box provided *in your answer booklet*, draw a simple contour map to represent this island, using a distance scale of 1 centimeter = 1 kilometer and a contour interval of 10 meters. [4]

Base your answers to questions 75 through 77 on the information and diagram below and on the data table provided *in your answer booklet*.

A student used water, a trough, a timer, a Ping-Pong ball, and a metric ruler to investigate waterflow. The trough was set at different angles to compile the data in the data table provided *in your answer booklet*.



- 75 Calculate the average velocity of the water flowing down the trough in each position, A, B, C, and D. Record your answers in the data table provided *in your answer booklet*. Express your answers to the *nearest tenth*. [2]
- 76 State the purpose of the student's investigation. [1]
- 77 Based on the data and the values you calculated for average stream velocity, state an appropriate conclusion to this investigation. [1]
-

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Tuesday, January 28, 2003 — 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

**PHYSICAL SETTING
 EARTH SCIENCE**

Tuesday, January 28, 2003 — 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.

<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 _____ **Current**

52 _____

53 _____

June 21

Vertical stick

54 _____

55 _____

56 _____

For Raters Only

51

52

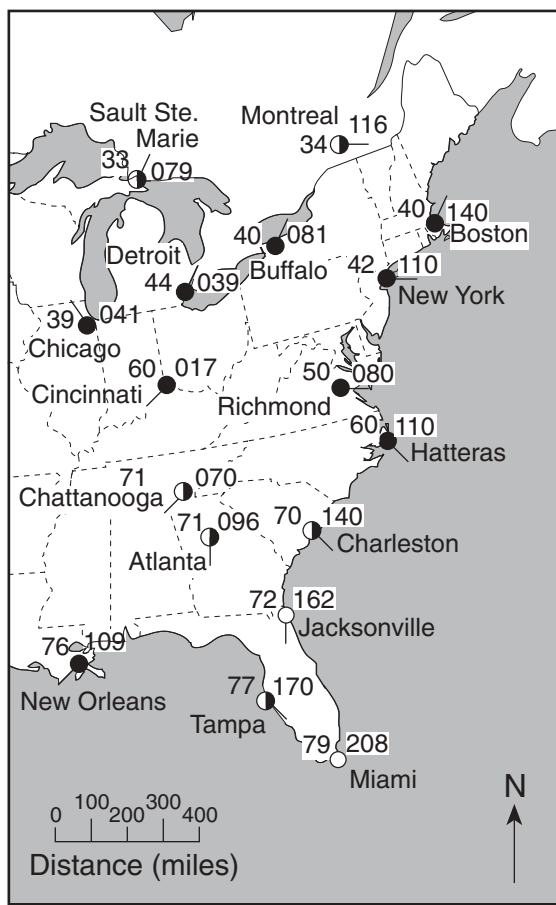
53

54

55

56

57



57

58

<i>a</i>	Gradient =
<i>b</i>	Gradient =
<i>c</i>	Gradient =

58b

c

59 _____ mb

59

60 _____

60

**For Raters
Only**

61 _____

62 _____

63 (1) _____
(2) _____
(3) _____

61
62
63

Part C

**Total Score
for Part B-2**

64 _____

65 _____

66 _____

67 _____

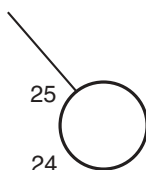
68 _____

69 Region: _____
Explanation: _____

70 _____

71

64
65
66
67
68
69
70
71



For Raters
Only

72 _____

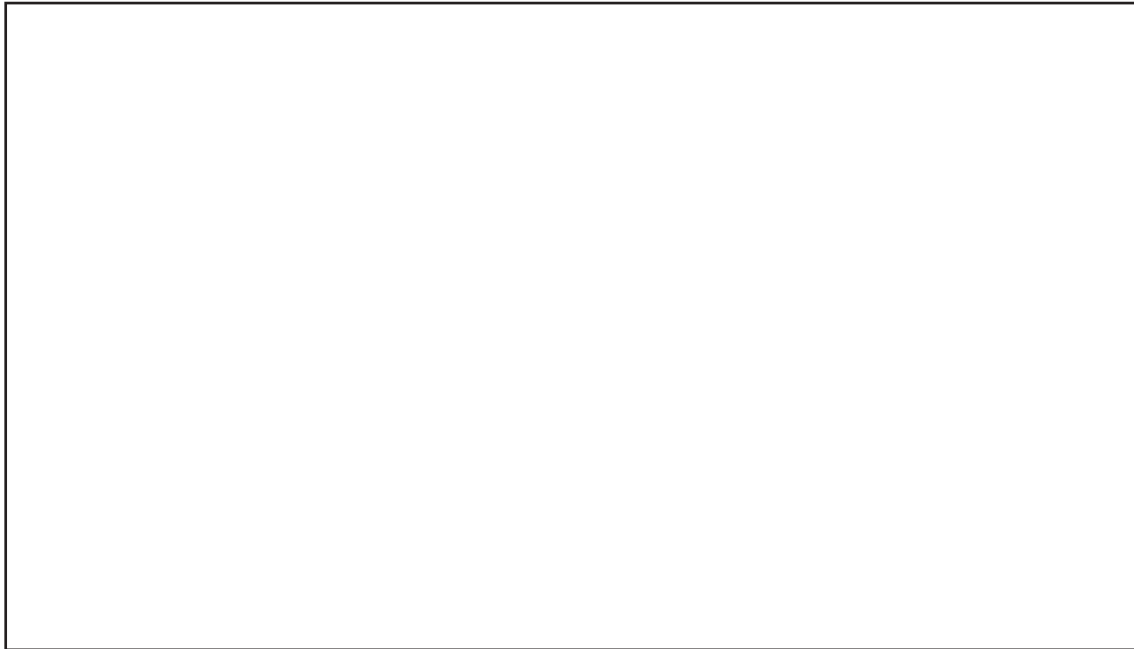
72

73 Air movement: _____

73

Temperature change: _____

74



74



75

Data Table

Trough Position	Slope (degrees)	Length of Trough (meters)	Time (seconds)	Velocity (meters/second)
<i>A</i>	5	1.5	4.4	
<i>B</i>	10	1.5	3.5	
<i>C</i>	15	1.5	2.7	
<i>D</i>	20	1.5	2.3	

75

76 _____

76

77 _____

77

FOR TEACHERS ONLY

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

PS-ES PHYSICAL SETTING/EARTH SCIENCE

Tuesday, January 28, 2003 — 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.

Part A and Part B-1

Allow 1 credit for each correct response.

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

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 [1] Allow 1 credit for **California** Current.

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

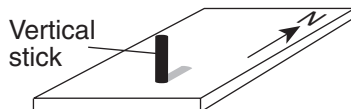
the higher the Sun, the shorter the shadow

the greater the angle, the shorter the shadow

the lower the Sun's angle, the longer the shadow

53 [1]

June 21



Allow 1 credit for drawing a shadow shorter than the height of the vertical stick. The shadow must be drawn extending north, parallel to the north arrow.

54 [1] Allow 1 credit for the trilobites ***Elliptocephala*** or ***Cryptolithus***. Do *not* allow credit for the trilobite *Phacops* or any fossil that is not a trilobite.

55 [1] Allow 1 credit for **phyllite**.

56 [1] Allow 1 credit for a correct response that clearly explains that at this depth and temperature these rock materials would melt. Acceptable responses include, but are not limited to, these examples:

Rocks at a depth of 27 km and at a temperature of 800°C will be melted.

The temperature should be approximately 600°C in order for gneiss to form.

Melted rocks will form igneous rocks.

57 [2]



Allow 2 credits for four correctly drawn isotherms. If more than the four required isotherms are drawn, all isotherms must be correct to receive 2 credits.

Allow only 1 credit for only two or three correctly drawn isotherms.

or

Allow only 1 credit if all four required isotherms are drawn correctly, but extra isotherms are drawn incorrectly.

Note: Allow credit even if the isotherms are not labeled.

Allow credit if the isotherms extend to the edge of the map or if the isotherms extend only to the edge of the continent and not into the ocean.

- 58** [2] **a** Allow no credit for writing the equation.
- b** Allow 1 credit for correctly substituting both temperature and distance information (± 10 miles) into the equation written in part *a*. The student need *not* record the units. Acceptable responses include, but are not limited to, these examples:

$$\text{Gradient} = \frac{10 \text{ F}^\circ (\text{F})}{200 \text{ miles}}$$

$$\text{Gradient} = \frac{10}{200}$$

- c** Allow 1 credit for correctly calculating the gradient, based on the student's answer in part *b*. Units that are consistent with the student's answer in part *b* must be included to receive credit. Acceptable responses include, but are not limited to, these examples:

$$\text{Gradient} = \frac{0.05 \text{ F}^\circ}{\text{mile}} \text{ or } \frac{0.05^\circ \text{ F}}{\text{mile}}$$

$$\text{Gradient} = \frac{.05 \text{ F}^\circ}{\text{mile}} \text{ or } \frac{.05^\circ \text{ F}}{\text{mile}}$$

- 59** [1] Allow 1 credit for **1020.8** mb.
- 60** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Temperatures generally decrease as latitude increases.
Temperature and latitude are inversely related.
- 61** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- The physically weathered sediments are larger in particle size than the chemically weathered particles.
The sand fragments are larger than clay fragments.
The sand fragments range from 0.006 cm to 0.2 cm in diameter and the clay fragments are less than 0.0004 cm in diameter.
- 62** [1] Allow 1 credit for giving both correct conditions. Acceptable responses include, but are not limited to, this example:
- Moisture and temperature should both increase.
- 63** [1] Allow 1 credit for a correct response. Students must have *three* of the following mineral grains:
- plagioclase feldspar
biotite
amphibole
quartz *or* pyroxene
- Note:** Do *not* allow credit for an answer that includes both quartz and pyroxene.

Part C

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

- 64** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- A shift of light from distant galaxies toward the red end of the spectrum shows galaxies are moving away from Earth.
- The red shift shows that the universe is expanding.
- 65** [1] Allow 1 credit for a correct response. Allow credit for any answer that shows the correct relative-age relationship even if the actual ages are incorrect. Acceptable responses include, but are not limited to, these examples:
- Earth and our solar system are younger than the Milky Way galaxy.
- The estimated age of Earth and our solar system is 4.6 billion years and these distant galaxies are 12 billion years old.
- Our solar system is about 5 billion years old, much younger than these 12-billion-year-old galaxies.
- 66** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Planet *D* has a much more eccentric orbit than any of the first four planets of our solar system.
- The first four planets of our solar system have less eccentric orbits than planet *D*.
- 67** [1] Allow 1 credit for a correct response that includes when the force is greatest and when the force is least. Acceptable responses include, but are not limited to, this example:
- The gravitational pull is greatest when planet *D* is closest to the star and the pull is least when planet *D* is farthest from the star.
- 68** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Weathering has broken down the rock of the craters.
- Erosion has removed the weathered rock of the craters.
- Earth's plate tectonics have destroyed surface craters during subduction.

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

Region: California

Explanation: crustal movement along the San Andreas Fault

Region: Pacific Northwest Coast

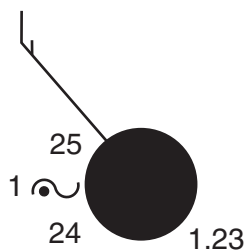
Explanation: A subduction zone is nearby.

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

Snow is melting and refreezing to sleet as it falls.

The rain freezes as it falls through colder air before it hits the ground.

- 71 [2]



Allow 2 credits if four or five variables are drawn correctly.

Allow only 1 credit if only two or three variables are drawn correctly.

Note: Feathers may be placed on either side of the staff.

Do *not* allow credit for numbers with labels.

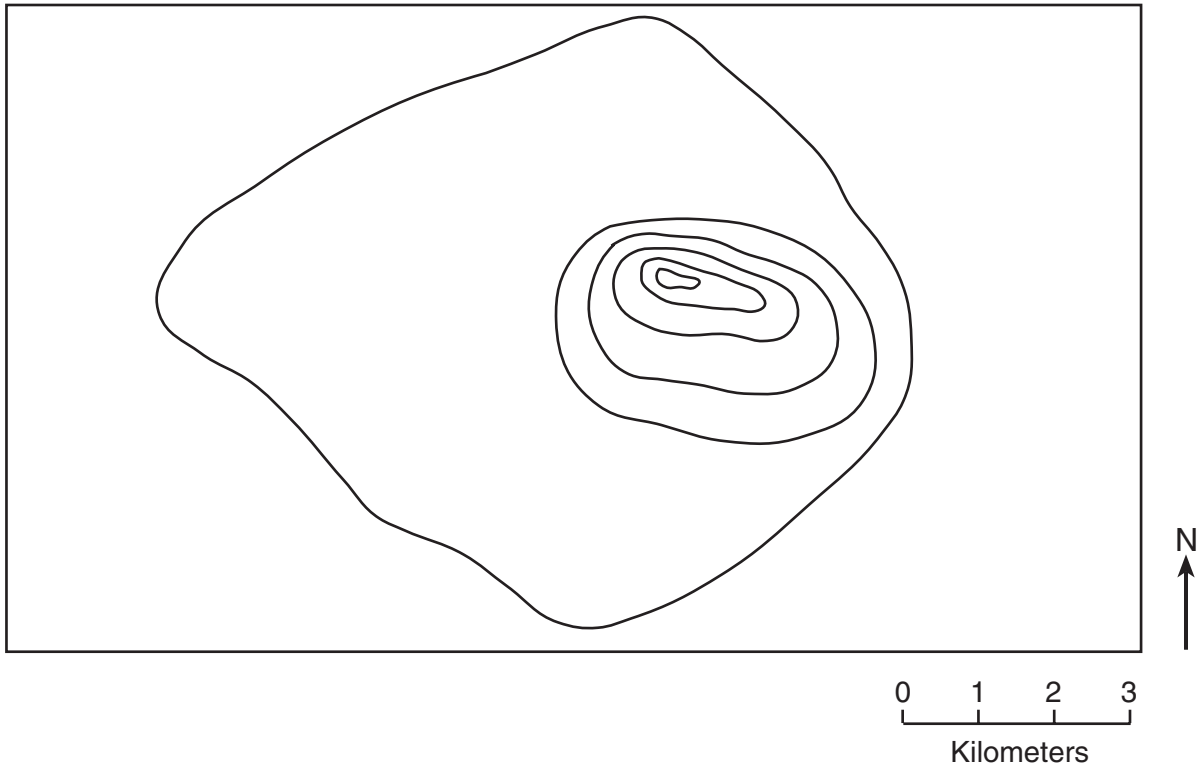
- 72 [1] Allow 1 credit for **sleet**.

- 73 [2] Allow 1 credit for indicating that the air rises.

and

Allow 1 credit for indicating that the air cools.

74 [4] An example of a correctly drawn island is shown below.



Allow 1 credit if the island is drawn the correct size (± 0.5 cm).

and

Allow 1 credit if the hill is placed on the east side of the island.

and

Allow 1 credit if the contour lines are closest together on the north side of the hill.

and

Allow 1 credit if five closed contour lines are used to indicate the hill on the island. These lines do *not* include the edge of the island.

Note: Allow credit even if the contour lines are not labeled and if a graphic scale is not included.

75 [2] The correct answers are shown below.

Trough *A* = **.3** or **0.3**

Trough *B* = **.4** or **0.4**

Trough *C* = **.6** or **0.6**

Trough *D* = **.7** or **0.7**

Allow 2 credits if three or four answers are calculated correctly.

Allow only 1 credit if only one or two answers are calculated correctly.

Note: Allow credit even if the answers are not rounded to the nearest tenth.

76 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:
to determine the relationship between stream velocity and the slope of a streambed

77 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:
As the slope of the streambed increases, stream velocity increases.

or

Allow 1 credit for an appropriate response consistent with the student's results calculated in question 75.

Regents Examination in Physical Setting/Earth Science — January 2003

Chart for Determining the Final Examination Score

(Use for January 2003 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 87.

Total Performance Test Score

		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	99	98	97	97	97	97	96	96	95	95	94	94	93	92	92	91	90	89	89	88	87	86	85
	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	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
	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	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
	79	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
	78	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
	77	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	82	81
	76	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
	75	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
	74	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
	73	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
	72	94	93	92	92	91	91	91	90	90	89	89	88	88	87	86	86	85	84	84	83	82	81	80	79
	71	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
	70	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
	69	92	91	90	90	90	89	89	88	88	88	87	87	86	85	85	84	83	83	82	81	80	79	78	77
	68	92	90	89	89	89	88	88	88	87	87	86	86	85	85	84	83	83	82	81	80	79	78	77	77
	67	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
	66	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
	65	90	89	88	87	87	87	86	86	86	85	85	84	83	83	82	82	81	80	79	78	78	77	76	75
	64	89	88	87	86	86	86	85	85	85	84	84	83	83	82	81	81	80	79	78	78	77	76	75	74
	63	88	87	86	86	85	85	85	84	84	83	83	82	82	81	80	80	79	78	78	77	76	75	74	73
	62	87	86	85	85	84	84	84	83	83	82	82	81	81	80	80	79	78	78	77	76	75	74	73	72
61	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71	
60	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71	
59	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71	
58	85	84	82	82	82	82	81	81	80	80	79	79	78	78	77	76	76	75	74	73	72	72	71	70	
57	84	83	82	81	81	81	80	80	80	79	79	78	77	77	76	76	75	74	73	72	72	71	70	69	
56	83	82	81	80	80	80	80	79	79	78	78	77	77	76	75	75	74	73	72	72	71	70	69	68	
55	82	81	80	80	79	79	79	78	78	77	77	76	76	75	75	74	73	72	72	71	70	69	68	67	
54	81	80	79	79	79	78	78	77	77	77	76	76	75	74	74	73	72	72	71	70	69	68	67	66	
53	80	79	78	78	78	77	77	77	76	76	75	75	74	73	73	72	71	71	70	69	68	67	66	65	
52	80	79	77	77	77	76	76	76	75	75	74	74	73	73	72	71	71	70	69	68	67	66	66	65	
51	79	78	77	76	76	76	75	75	74	74	74	73	72	72	71	70	70	69	68	67	67	66	65	64	
50	78	77	76	75	75	75	74	74	74	73	73	72	72	71	70	70	69	68	67	67	66	65	64	63	
49	77	76	75	75	74	74	74	73	73	72	72	71	71	70	69	69	68	67	67	66	65	64	63	62	
48	75	74	73	73	73	72	72	71	71	71	70	70	69	68	68	67	66	66	65	64	63	62	61	60	

Regents Examination in Physical Setting/Earth Science — January 2003
Chart for Determining the Final Examination Score
(Use for January 2003 examination only.)

Total 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
47	75	73	72	72	72	71	71	71	70	70	69	69	68	68	67	66	66	65	64	63	62	61	60	60
46	74	73	71	71	71	71	70	70	69	69	68	68	67	67	66	65	65	64	63	62	61	61	60	59
45	73	72	71	70	70	70	69	69	69	68	68	67	66	66	65	65	64	63	62	61	61	60	59	58
44	72	71	70	69	69	69	68	68	68	67	67	66	66	65	64	64	63	62	61	61	60	59	58	57
43	71	70	69	69	68	68	68	67	67	66	66	65	65	64	63	63	62	61	61	60	59	58	57	56
42	69	68	67	67	67	66	66	66	65	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54
41	69	68	66	66	66	65	65	65	64	64	63	63	62	62	61	60	60	59	58	57	56	55	55	54
40	68	67	65	65	65	65	64	64	63	63	62	62	61	61	60	59	59	58	57	56	55	55	54	53
39	67	66	65	64	64	64	63	63	63	62	62	61	60	60	59	59	58	57	56	55	55	54	53	52
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	64	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	55	55	54	53	52	51	50	49
36	63	62	61	61	61	60	60	60	59	59	58	58	57	56	56	55	54	54	53	52	51	50	49	48
35	63	62	60	60	60	59	59	59	58	58	57	57	56	56	55	54	54	53	52	51	50	49	49	48
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	60	59	58	58	57	57	57	56	56	55	55	54	54	53	52	52	51	50	50	49	48	47	46	45
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	57	56	54	54	54	54	53	53	52	52	51	51	50	50	49	48	48	47	46	45	44	44	43	42
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	44	43	43	42	42	41	40	39	38	37	36	35
24	49	48	47	46	46	46	45	45	44	44	43	43	42	41	41	40	39	38	38	37	36	35	34	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	45	44	43	42	42	42	41	41	40	40	40	39	38	38	37	36	36	35	34	33	33	32	31	30
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	31	30	29	28	27	27	26	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	35	34	33	33	33	32	32	32	31	31	30	30	29	28	28	27	26	26	25	24	23	22	21	20
13	35	34	32	32	32	31	31	31	30	30	29	29	28	28	27	26	26	25	24	23	22	21	21	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	31	30	29	29	28	28	28	27	27	26	26	25	25	24	24	23	22	21	21	20	19	18	17	16
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	25	24	23	23	22	22	22	21	21	20	20	19	19	18	18	17	16	15	15	14	13	12	11	10
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	10	9	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	19	18	17	17	16	16	16	15	15	14	14	13	13	12	12	11	10	10	9	8	7	6	5	4
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

January 2003 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	16,30	58	68,75
Math Key Idea 2	2,19	37,38,46,52,55, 60	66,67,75,76,77
Math Key Idea 3	1	43,45,53	
Sci. Inq. Key Idea 1	1	62	64,73
Sci. Inq. Key Idea 2		39	
Sci. Inq. Key Idea 3	5,6,8,12,13,17, 18,20,21,22,24, 28,29,30,31,32	36,40,41,42,48, 49,50,52,54,55, 56,59,60,61,63	66,71,72,74,75
Eng. Des. Key Idea 1		39	75,76,77
Standard 2			
Key Idea 1			64,65,72
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1	9	62	69,77
Key Idea 2	5,18,27	39,41,42,47,57, 58,60	70,71,74
Key Idea 3	29	59	74
Key Idea 4	20	44	
Key Idea 5	4,13	37,38	69,75
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4			
Performance Indicator 1	1,2,3,4,5,8,14, 18,21,31,32,33, 34	36,37,38,39,40, 43,45,49,52,53, 54	64,65,66,67
Performance Indicator 2	6,7,9,10,11,12, 15,19,20,23,24, 25,26,27,28,29, 30	36,41,42,44,46, 47,48,50,57,58, 59,60,61,62	68,69,70,71,72, 73,74,75,76,77
Performance Indicator 3	12,13,16,17,22, 35	55,56,63	
Reference Tables			
ESRT 2001 Edition	3,7,8,12,13,16, 17,21,22,25,34, 35	49,50,54,58,59, 61,63	65,66,71,74,75