

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

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 14, 2001 — 9:15 a.m. to 12:15 p.m., only

The 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 the answer sheet and fill in the heading.

The answer booklet for Part B-2 and Part C is stapled in the center of this examination booklet. Open the examination booklet, carefully remove the 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 the answer sheet and answer booklet.

The *Earth Science Reference Tables*, which you may need to answer some questions in this examination, are supplied separately. Be certain you have a copy of the *2001 edition* of these reference tables before you begin the examination.

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.

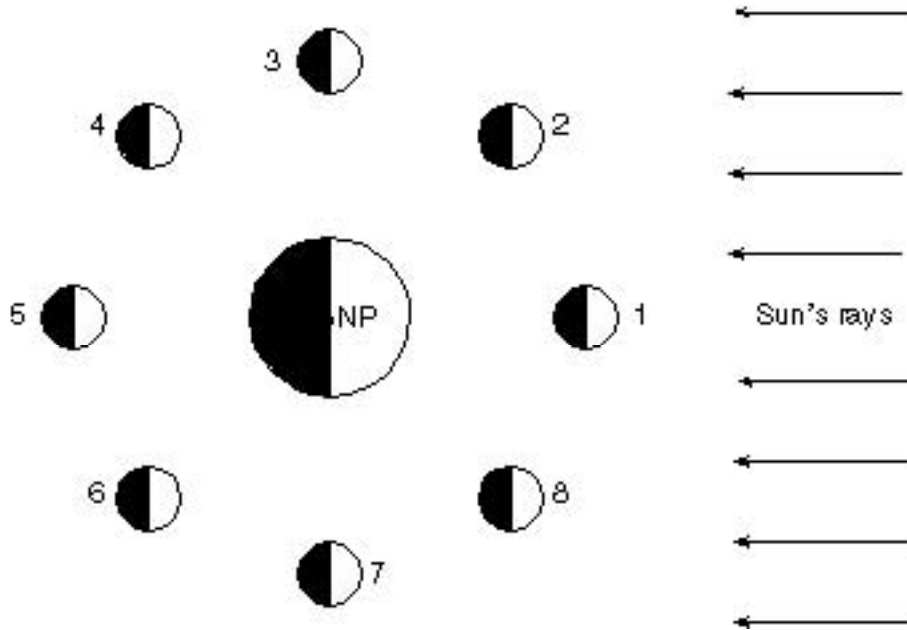
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part A

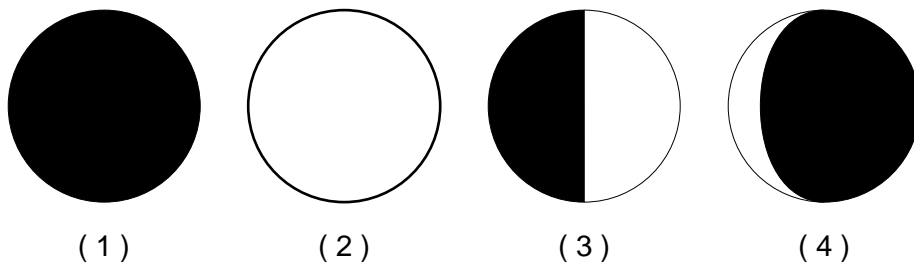
Answer all questions in this part.

Directions (1–35): For each statement or question, write on the 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 diagram below shows the Moon in different positions as it revolves around Earth, as observed from above the North Pole (NP).



Which image correctly represents the Moon at position 8, as observed from Earth?



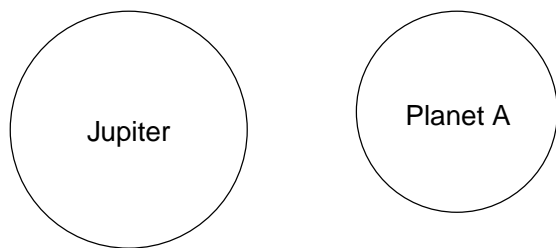
2 The Sun's position in space is best described as the approximate center of

- (1) a constellation
- (2) the universe
- (3) the Milky Way galaxy
- (4) our solar system

3 Compared to Pluto, Mercury moves more rapidly in its orbit because Mercury

- (1) is larger
- (2) is more dense
- (3) is closer to the Sun
- (4) has a more elliptical orbit

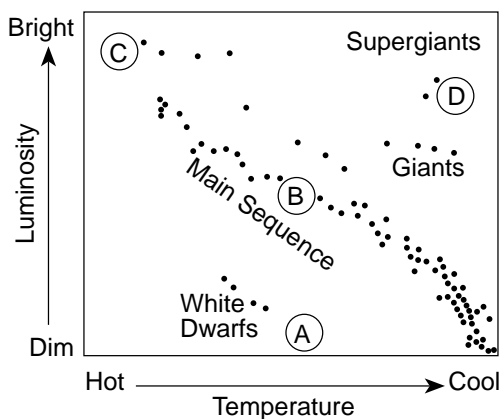
4 The diagram below represents two planets in our solar system drawn to scale, Jupiter and planet A.



Planet A most likely represents

- (1) Earth
- (2) Venus
- (3) Saturn
- (4) Uranus

5 The graph below represents the brightness and temperature of stars visible from Earth.



Which location on the graph best represents a star with average brightness and temperature?

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

6 The length of an Earth year is based on Earth's

- (1) rotation of 15°/hr
- (2) revolution of 15°/hr
- (3) rotation of approximately 1°/day
- (4) revolution of approximately 1°/day

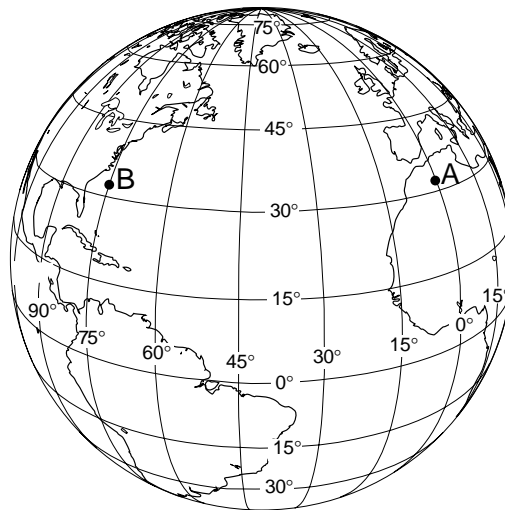
7 Earth's hydrosphere is best described as the

- (1) solid outer layer of Earth
- (2) liquid outer layer of Earth
- (3) magma layer located below Earth's stiffer mantle
- (4) gaseous layer extending several hundred kilometers from Earth into space

8 The passage of the Moon into Earth's shadow causes a

- (1) lunar eclipse
- (2) solar eclipse
- (3) new Moon
- (4) full Moon

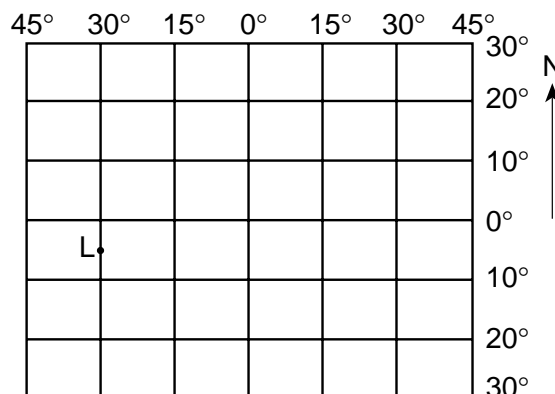
9 The diagram below shows the latitude-longitude grid on an Earth model. Points A and B are locations on the surface.



On Earth, the solar time difference between point A and point B would be

- (1) 1 hour
- (2) 5 hours
- (3) 12 hours
- (4) 24 hours

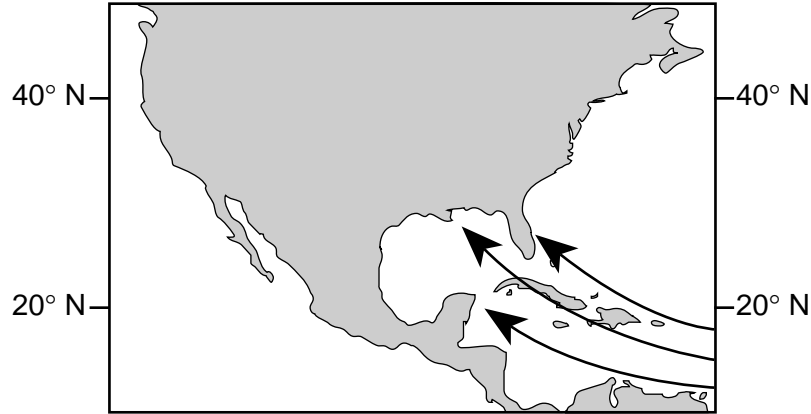
10 The diagram below represents part of Earth's latitude-longitude system.



What is the latitude and longitude of point L?

- (1) 5° E 30° N
- (2) 5° W 30° S
- (3) 5° N 30° E
- (4) 5° S 30° W

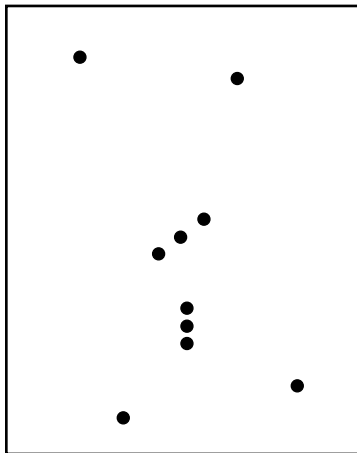
11 The map below shows part of North America.



The arrows shown on the map most likely represent the direction of movement of

- (1) Earth's rotation
- (2) the prevailing northeast winds
- (3) ocean conduction currents
- (4) Atlantic Ocean hurricanes

12 The diagram below represents the major stars of the constellation Orion, as viewed by an observer in New York State.



Which statement best explains why Orion can be observed from New York State on December 21 but not on June 21?

- (1) Orion has an eccentric orbit around Earth.
- (2) Orion has an eccentric orbit around the Sun.
- (3) Earth revolves around the Sun.
- (4) Earth rotates on its axis.

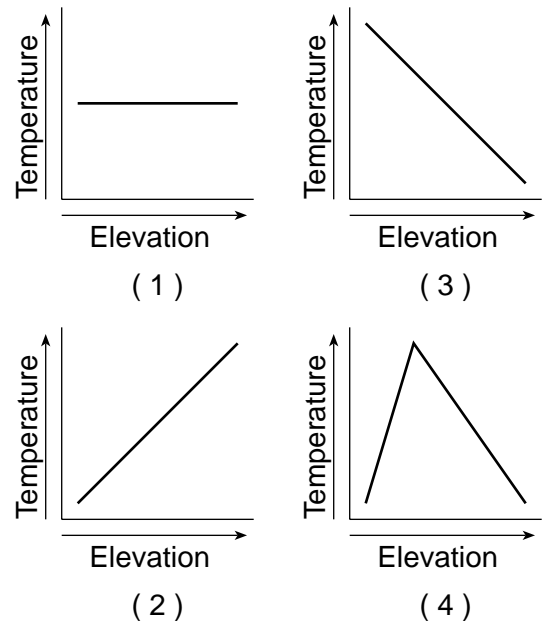
13 Which type of air mass usually contains the most moisture?

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

14 A student read in a newspaper that the maximum length of the daylight period for the year in Syracuse, New York, had just been reached. What was the date of this newspaper?

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

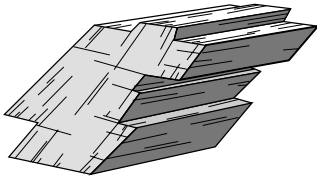
15 Which graph best shows the general effect that differences in elevation above sea level have on the average annual temperature?



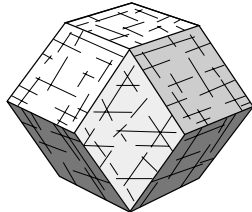
16 Ozone is concentrated in Earth's atmosphere at an altitude of 20 to 35 kilometers. Which atmospheric layer contains the greatest concentration of ozone?

- (1) mesosphere (3) troposphere
 (2) thermosphere (4) stratosphere

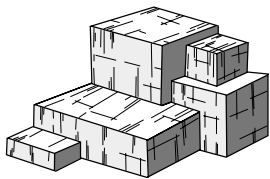
17 Halite has three cleavage directions at 90° to each other. Which model best represents the shape of a broken sample of halite?



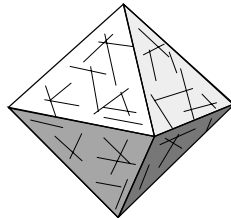
(1)



(3)



(2)



(4)

18 Which geologic feature is caused primarily by chemical weathering?

- (1) large caves in limestone bedrock
 (2) a pattern of parallel cracks in a granite mountain
 (3) blocks of basalt at the base of a steep slope
 (4) the smooth, polished surface of a rock in a dry, sandy area

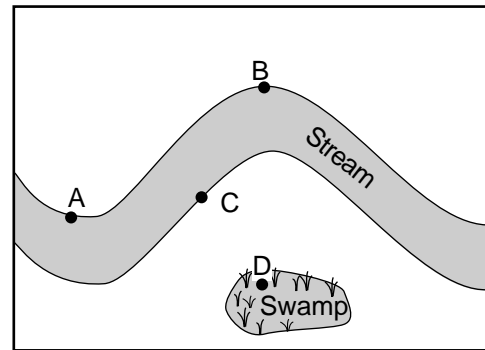
19 Ocean tides are best described as

- (1) unpredictable and cyclic
 (2) unpredictable and noncyclic
 (3) predictable and cyclic
 (4) predictable and noncyclic

20 Where is the most deposition likely to occur?

- (1) on the side of a sand dune facing the wind
 (2) at the mouth of a river, where it enters an ocean
 (3) at a site where glacial ice scrapes bedrock
 (4) at the top of a steep slope in a streambed

21 The map below shows the area surrounding a meandering stream.



At which point is erosion greatest?

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

22 What is the largest particle that can be kept in motion by a stream that has a velocity of 100 centimeters per second?

- (1) silt (3) pebble
 (2) sand (4) cobble

23 An extrusive igneous rock with a mineral composition of 35% quartz, 35% potassium feldspar, 15% plagioclase feldspar, 10% biotite, and 5% amphibole is called

- (1) rhyolite (3) gabbro
 (2) granite (4) basaltic glass

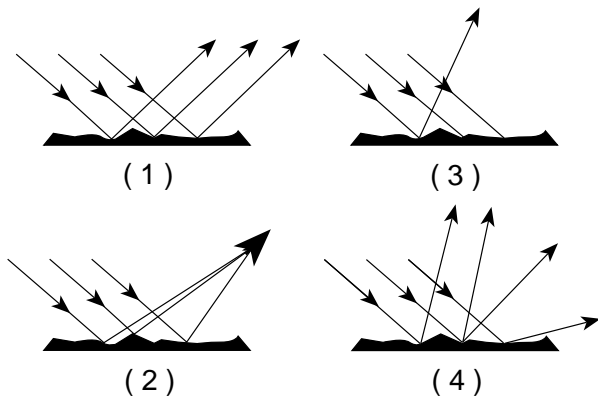
24 During which process does heat transfer occur because of density differences?

- (1) conduction (3) radiation
 (2) convection (4) reflection

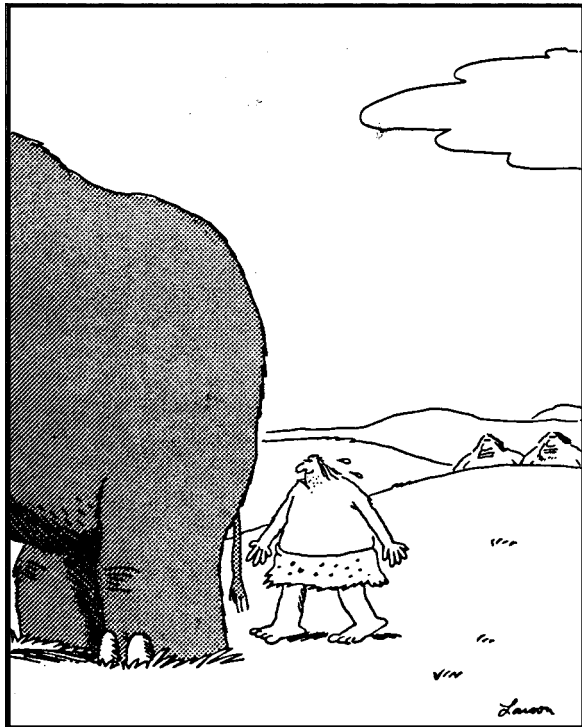
25 Carbon-14, an isotope used to date recent organic remains, would most likely be useful in determining the age of a fossil

- (1) trilobite (3) armored fish
 (2) *Coelophysis* (4) Beluga whale

26 Which diagram best represents visible light rays after striking a dark, rough surface?



27 The cartoon below illustrates possible interaction between humans and mammoths.



The primitive game of "Pull the mammoth's tail and run"

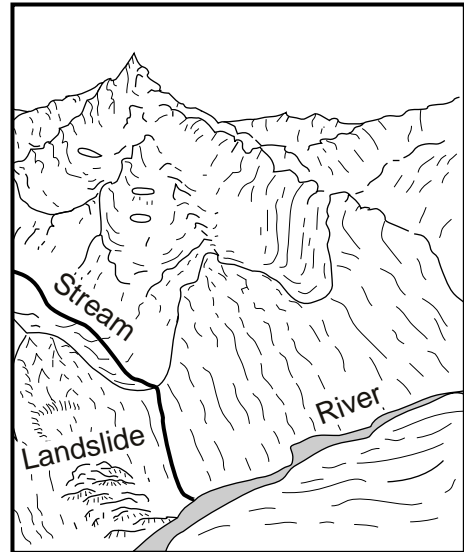
During which geologic timespan could this "game" have occurred?

- (1) Pleistocene Epoch
- (2) Pennsylvanian Epoch
- (3) Precambrian Era
- (4) Paleozoic Era

28 The apparent shift in the direction of swing of a Foucault pendulum is caused by Earth's

- (1) revolution
- (2) rotation
- (3) spherical shape
- (4) tilted axis

29 The diagram below shows a glacial landscape.



Which evidence suggests that ice created this landscape?

- (1) U-shaped valleys
- (2) many stream valleys
- (3) sorted sediment on the valley floor
- (4) the landslide near the valley floor

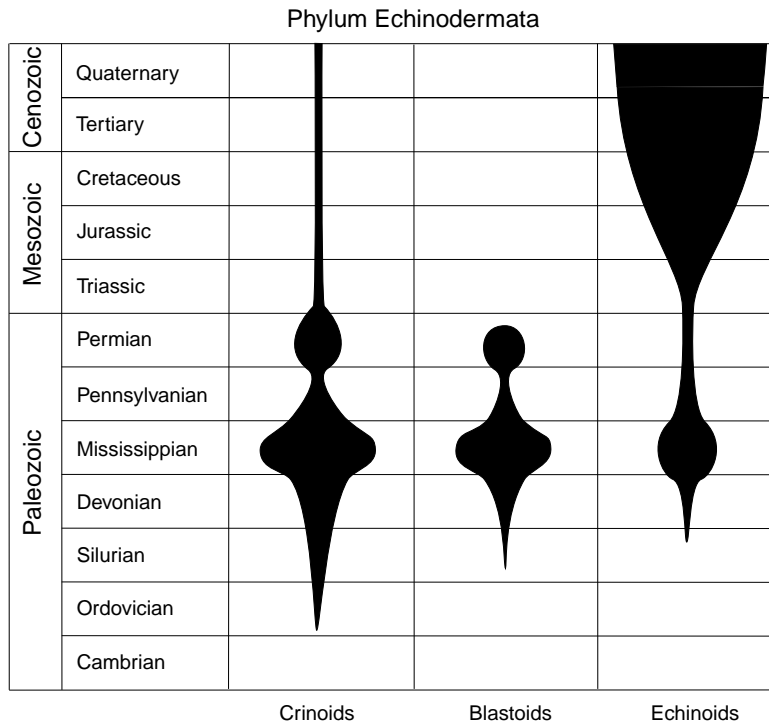
30 An earthquake's *P*-wave arrived at a seismograph station at 02 hours 40 minutes 00 seconds. The earthquake's *S*-wave arrived at the same station 2 minutes later. What is the approximate distance from the seismograph station to the epicenter of the earthquake?

- (1) 1,100 km
- (2) 2,400 km
- (3) 3,100 km
- (4) 4,000 km

31 When small particles settle through water faster than large particles, the small particles are probably

- (1) lighter
- (2) flatter
- (3) better sorted
- (4) more dense

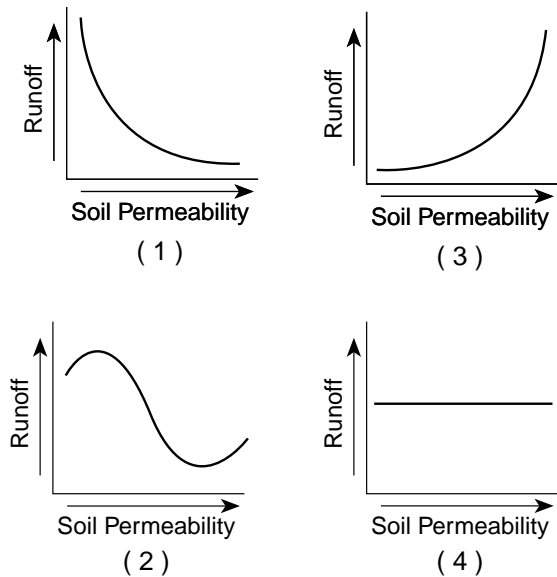
32 The diagram below shows the abundance of organisms called crinoids, blastoids, and echinoids throughout different geologic periods. The number of species living at any given time is represented by the width of the blackened areas.



Which statement about crinoids, blastoids, and echinoids is best supported by the diagram?

- (1) They are now extinct.
- (2) They came into existence during the same geologic period.
- (3) They existed during the Devonian Period.
- (4) They have steadily increased in number since they first appeared.

33 Which graph shows the effect of soil permeability on the amount of runoff in an area?



34 In a Doppler red shift, the observed wavelengths of light from distant celestial objects appear closer to the red end of the spectrum than light from similar nearby celestial objects. The explanation for the red shift is that the universe is presently

- (1) contracting, only
- (2) expanding, only
- (3) remaining constant in size
- (4) alternating between contracting and expanding

35 Which sequence of change in rock type occurs as shale is subjected to increasing heat and pressure?

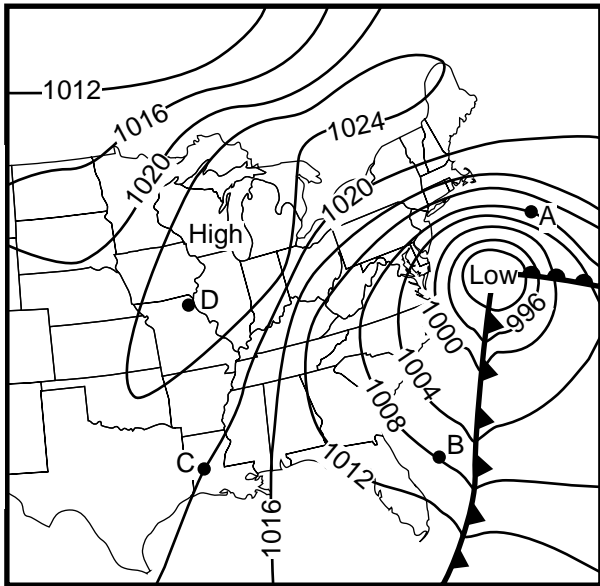
- (1) shale → schist → phyllite → slate → gneiss
- (2) shale → slate → phyllite → schist → gneiss
- (3) shale → gneiss → phyllite → slate → schist
- (4) shale → gneiss → phyllite → schist → slate

Part B-1

Answer all questions in this part.

Directions (36–51): For *each* statement or question, write on the 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 weather map below. Points *A*, *B*, *C*, and *D* are locations on Earth's surface.



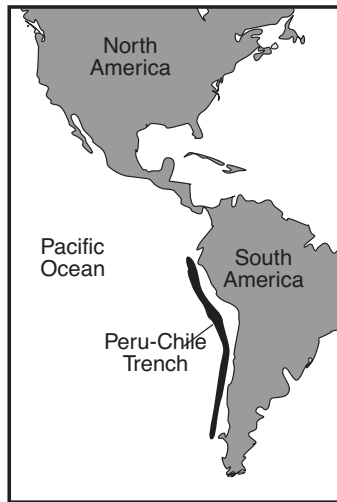
- 36 The isolines on the map represent values of air
 (1) density (2) humidity (3) pressure (4) temperature
- 37 The strongest winds are closest to location
 (1) *A* (2) *B* (3) *C* (4) *D*
- 38 Which type of front extends southward from the center of the low?
 (1) occluded (2) stationary (3) warm (4) cold

Base your answers to questions 39 and 40 on Moh's mineral hardness scale and the chart below showing the approximate hardness of some common objects..

Moh's Mineral Hardness Scale		Approximate Hardness of Common Objects
Talc	1	
Gypsum	2	Fingernail (2.5)
Calcite	3	Copper penny (3.5)
Fluorite	4	
Apatite	5	Iron nail (4.5)
Feldspar	6	Glass (5.5)
Quartz	7	Steel file (6.5)
Topaz	8	
Corundum	9	
Diamond	10	Streak plate (7.0)

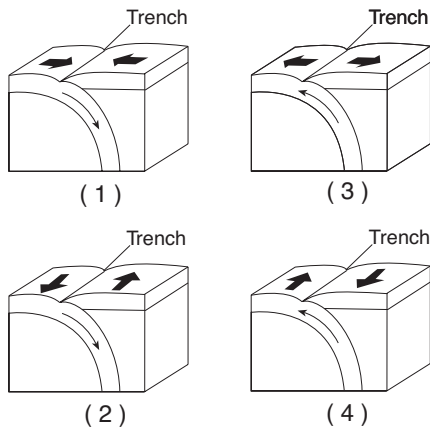
- 39 Which statement is best supported by this scale?
 (1) A fingernail will scratch calcite, but not quartz.
 (2) A fingernail will scratch quartz, but not calcite.
 (3) A piece of glass can be scratched by quartz, but not by calcite.
 (4) A piece of glass can be scratched by calcite, but not by quartz.
- 40 The hardness of these minerals is most closely related to the
 (1) mineral's color
 (2) mineral's abundance in nature
 (3) amount of iron the mineral contains
 (4) internal arrangement of the mineral's atoms

Base your answers to questions 41 through 43 on the map below, which shows the location of the Peru-Chile Trench.



- 41 The Peru-Chile Trench marks the boundary between the
- (1) Pacific Plate and the Antarctic Plate
 - (2) Nazca Plate and the South American Plate
 - (3) North American Plate and the Cocos Plate
 - (4) Caribbean Plate and the Scotia Plate

- 42 In which diagram do the arrows best represent the motions of Earth's crust at the Peru-Chile Trench?

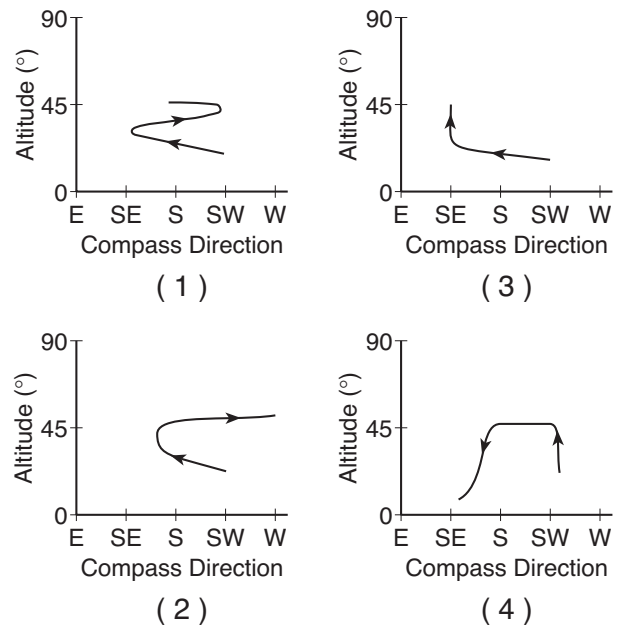


- 43 Which observation provides the best evidence of the pattern of crustal movement at the Peru-Chile Trench?
- (1) the direction of flow of warm ocean currents
 - (2) the mineral composition of samples of mafic mantle rock
 - (3) comparison of the rates of sediment deposition
 - (4) the locations of shallow-focus and deep-focus earthquakes

44 The table below shows the altitude and compass direction of one planet, as viewed by an observer in New York State at 10 p.m. on the first day of each month from April through November.

Month	Altitude	Compass Direction
April	20°	SW
May	23°	SSW
June	25°	S
July	29°	SSE
August	33°	SE
September	38°	S
October	42°	SW
November	45°	S

Which graph best represents a plot of this planet's apparent path, as viewed by the observer over the 7-month period?



Base your answers to questions 45 and 46 on the data table below. The data table provides information about the Moon, based on current scientific theories.

Information About the Moon

Subject	Current Scientific Theories
Origin of the Moon	Formed from material thrown from a still-liquid Earth following the impact of a giant object 4.5 billion years ago
Craters	Largest craters resulted from an intense bombardment by rock objects around 3.9 billion years ago
Presence of water	Mostly dry, but water brought in by the impact of comets may be trapped in very cold places at the poles
Age of rocks in terrae highlands	Most are older than 4.1 billion years; highland anorthosites (igneous rocks composed almost totally of feldspar) are dated at 4.4 billion years
Age of rocks in maria plains	Varies widely from 2 billion to 4.3 billion years
Composition of terrae highlands	Wide variety of rock types, but all contain more aluminum than rocks of maria plains
Composition of maria plains	Wide variety of basalts
Composition of mantle	Varying amounts of mostly olivine and pyroxene

45 Which statement is supported by the information in the table?

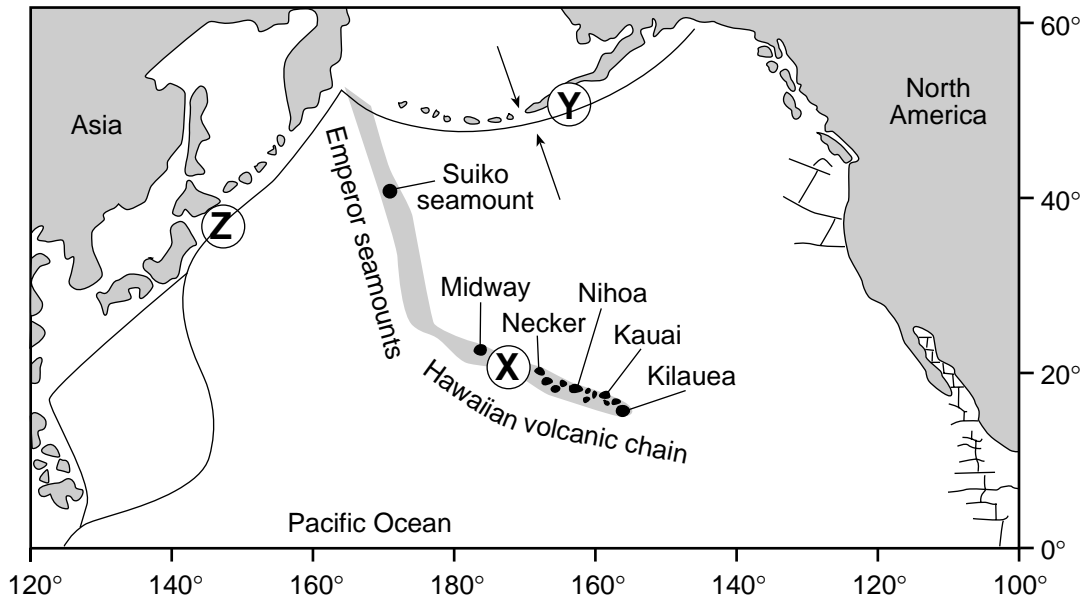
- (1) The Moon was once a comet.
- (2) The Moon once had saltwater oceans.
- (3) Earth is 4.5 billion years older than the Moon.
- (4) Earth was liquid rock when the Moon was formed.

46 Which Moon feature is an impact structure?

- (1) crater
- (2) maria plain
- (3) terrae highland
- (4) mantle

Base your answers to questions 47 through 49 on the map and data table below. The map shows the locations of volcanic islands and seamounts that erupted on the seafloor of the Pacific Plate as it moved northwest over a stationary mantle hotspot beneath the lithosphere. The hotspot is currently under Kilauea. Island size is not drawn to scale. Locations X, Y, and Z are on Earth's surface.

Map of Volcanic Features



Data Table
Age of Volcanic Features

Volcanic Feature	Distance from Kilauea (km)	Age (millions of years)
Kauai	545	5.6
Nihoa	800	6.9
Necker	1,070	10.4
Midway	2,450	16.2
Suiko seamount	4,950	41.0

47 Approximately how far has location X moved from its original location over the hotspot?

- (1) 3,600 km
- (2) 2,500 km
- (3) 1,800 km
- (4) 20 km

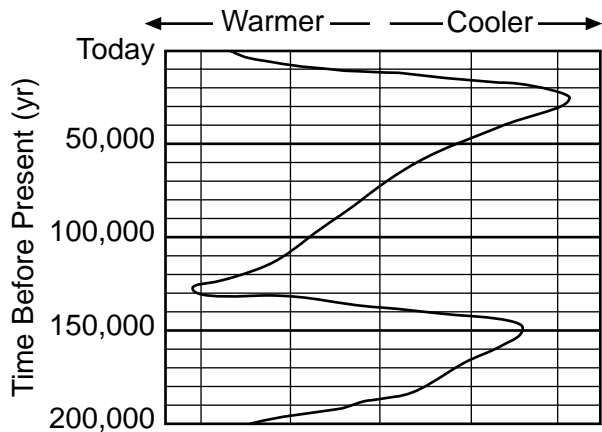
48 According to the data table, what is the approximate speed at which the island of Kauai has been moving away from the mantle hotspot, in kilometers per million years?

- (1) 1
- (2) 10
- (3) 100
- (4) 1,000

49 Which lithospheric plate boundary features are located at Y and Z?

- (1) trenches created by the subduction of the Pacific Plate
- (2) rift valleys created by seafloor spreading of the Pacific Plate
- (3) secondary plates created by volcanic activity within the Pacific Plate
- (4) mid-ocean ridges created by faulting below the Pacific Plate

50 The diagram below shows trends in the temperature of North America during the last 200,000 years, as estimated by scientists.



What is the total number of major glacial periods that have occurred in North America in the last 200,000 years?

- (1) 5 (3) 3
 (2) 2 (4) 4

51 The Himalayan Mountains are located along a portion of the southern boundary of the Eurasian Plate. At the top of Mt. Everest (29,028 feet) in the Himalayan Mountains, climbers have found fossilized marine shells in the surface bedrock. From this observation, which statement is the best inference about the origin of the Himalayan Mountains?

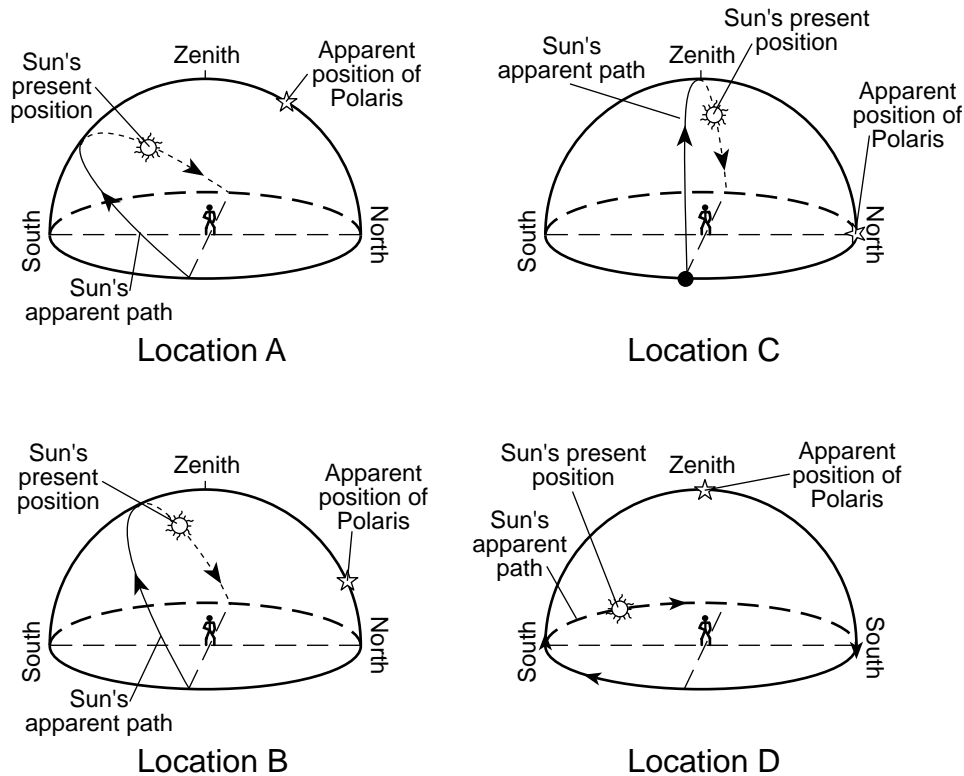
- (1) The Himalayan Mountains were formed by volcanic activity.
 (2) Sea level has been lowered more than 29,000 feet since the shells were fossilized.
 (3) The bedrock containing the fossil shells is part of an uplifted seafloor.
 (4) The Himalayan Mountains formed at a divergent plate boundary.

Part B-2

Answer all questions in this part.

Directions (52–64): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables*.

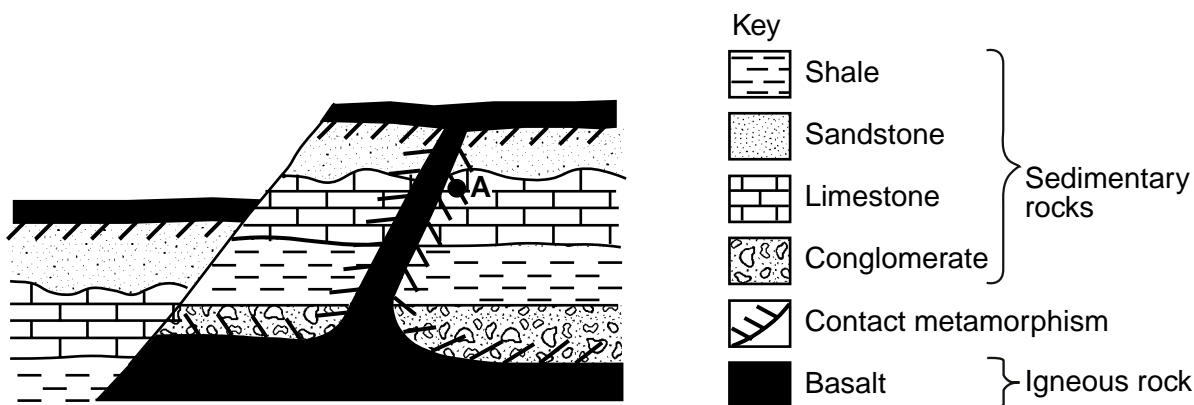
Base your answers to questions 52 through 56 on the diagram below. The diagram represents the apparent path of the Sun observed at four locations on Earth's surface on March 21. The present positions of the Sun, Polaris, and the zenith (position directly overhead) are shown for an observer at each location.



- 52 The observer at location *A* casts a shadow at the time represented in the diagram.
- State the compass direction in which the observer at location *A* must look to view her shadow. [1]
 - Describe the change in the length of the shadow that will occur between the time shown and sunset. [1]
- 53 State the approximate time of day for the observer at location *B* when the Sun is at the position shown in the diagram. [1]
- 54 Explain why the intensity of sunlight at noon on March 21 is greater at location *C* than at the other locations. [1]
- 55 The observer at location *D* is located at a higher latitude than the other three observers. State *one* way that this conclusion can be determined from the diagram. [1]
- 56 State the other day of the year when the Sun's apparent path is exactly the same as that shown for these four locations on March 21. [1]

Base your answers to questions 57 through 61 on the diagram and information below.

The diagram shows a cross section of a portion of Earth's crust that has undergone geological processes. Overturning of rock layers has not occurred. Point A represents one location of metamorphic rock.



- 57 State *one* piece of evidence that indicates basalt is the youngest rock unit in the cross section. [1]
- 58 As magma cools, what process changes it into basalt? [1]
- 59 State the name of the inorganic sedimentary rock shown in the cross section that is composed of sediment with the greatest range in particle size. [1]
- 60 State the name of the rock, formed by contact metamorphism, located at A. [1]
- 61 State *one* piece of evidence that shows that crustal uplift has occurred in this region. [1]

Base your answers to questions 62 through 64 on the weather information below.

A student using a sling psychrometer obtained a dry-bulb reading of 20°C and a wet-bulb reading of 16°C for a parcel of air outside the classroom.

- 62 State the dewpoint. [1]
- 63 State the change in relative humidity as the air temperature and the dewpoint get closer to the same value. [1]
- 64 On another day, the student determined the dewpoint was 70°F. Record the dewpoint, using the proper format, in the correct location on the weather station model provided *in your answer booklet*. [1]

Part C

Answer all questions in this part.

Directions (65–79): 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 65 through 67 on the paragraph below, which describes some factors that affect Earth's climate.

Earth's climate is in a delicate state of balance. Many factors affect climate. Any small change in the factors may lead to long-term cooling or warming of Earth's atmosphere. For example, during the last 100 years, measurements have shown a gradual increase in atmospheric carbon dioxide. This change has been linked to an increase in Earth's average atmospheric temperature. Variations in the tilt of Earth's axis have been similarly linked to the occurrence of ice ages. Both the increases in temperature and the occurrence of ice ages have been linked to changes in global sea level.

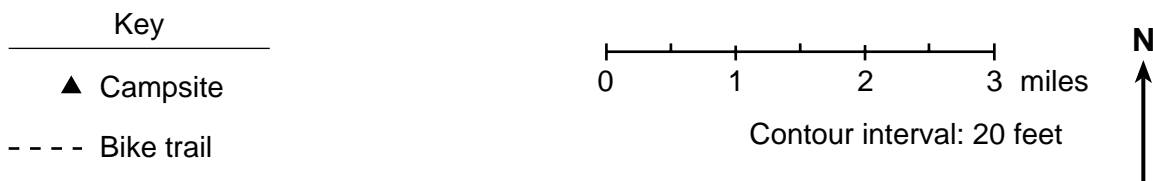
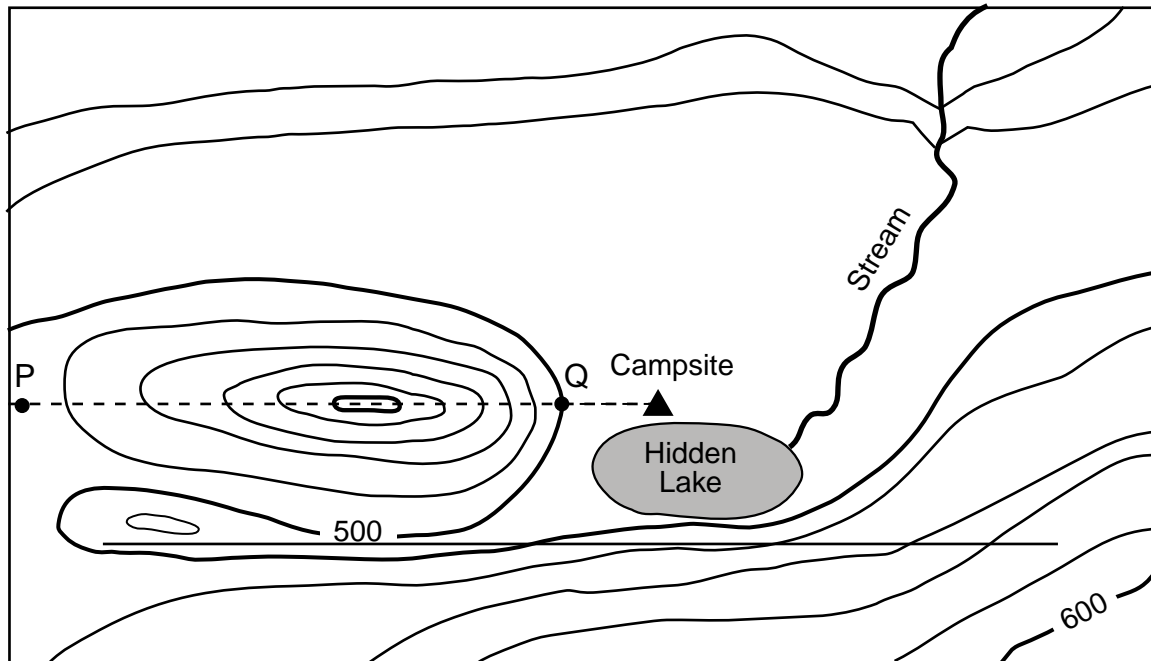
- 65 State *one* reason for the increase in the amount of carbon dioxide in Earth's atmosphere during the last 100 years. [1]
- 66 State *one* way that the recent increase in average global temperature can cause changes in ocean water level. [1]
- 67 State what would happen to the average summer and winter temperatures in New York State if the tilt of Earth's axis were to decrease from $23\frac{1}{2}^{\circ}$ to 20° . [1]
-

GO RIGHT ON TO THE NEXT PAGE. 

Base your answers to questions 68 through 75 on the reading passage and topographic map below.


A group of Earth science students decided to take an adventurous camping trip, so they rode bicycles to a New York State park that was located in an isolated area. They traveled up a steep hill. When they reached the top, they looked at the landscape and noticed a lake at the bottom of the hill. They named it Hidden Lake. To the left of Hidden Lake was a large field with a small stream. They decided to set up their campsite in the field near Hidden Lake. To get to the field, they cycled down a very steep slope.

The map below shows the location of the bicycle trail and the students' campsite. Points *P* and *Q* are reference points on the map.



- 68 State the evidence shown on the map that indicates that the area directly north of Hidden Lake is relatively flat. [1]
- 69 a State the general compass direction in which the stream is flowing. [1]
 b State how contour lines provide the evidence for determining this direction. [1]
- 70 On the grid provided *in your answer booklet*, draw a profile of the landscape along the bicycle trail from point *P* to point *Q* by following the directions below.
 a Plot the elevation along line *PQ* by marking with a dot *each* point where a contour line is crossed by line *PQ*. Point *P* and point *Q* have been plotted for you. [2]
 b Connect the dots to complete the profile. [1]

- 71 The students decided to measure the speed of the stream by floating apples down a straight section of the stream. Describe the steps the students must take to determine the stream's surface rate of movement (speed) by using a stopwatch, a 10-foot rope, and several apples. Include the equation for calculating rate. [3]
- 72 While exploring the stream, a student found a rock containing a trilobite fossil. Name the most likely type of rock this student found. [1]
- 73 State the geologic era during which the rock containing the trilobite most likely formed. [1]
- 74 The next day the students decided to move their campsite 1 mile directly east of their original campsite. On the map provided *in your answer booklet*, place another campsite symbol, ▲, to indicate the location of their second campsite. [1]
- 75 The students decided to take a different route home to avoid riding their bicycles up the steep hill. Plan a return route that will take the campers back to point *P* and that will involve the *least* change in elevation during the trip. On the map provided *in your answer booklet*, draw a line from the second campsite to point *P* to show the route. Place arrows on the line to show the direction that the students will be traveling. [1]
-

GO RIGHT ON TO THE NEXT PAGE. 

Base your answers to questions 76 through 79 on the magazine article and diagram below.

Lake-Effect Snow

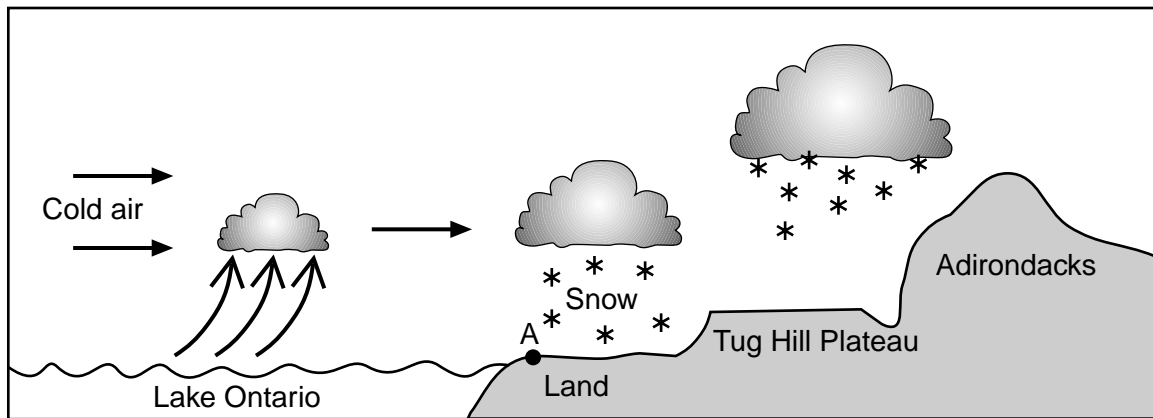
During the cold months of the year, the words “lake effect” are very much a part of the weather picture in many locations in New York State. Snow created by the lake effect may represent more than half the season’s snowfall in some areas.

In order for heavy lake-effect snow to develop, the temperature of the water at the surface of the lake must be higher than the temperature of the air flowing over the water. The higher the water temperature and the lower the air temperature, the greater the potential for lake-effect snow.

A lake-effect storm begins when air flowing across the lake is warmed as it comes in close contact with the water. The warmed air rises and takes moisture along with it. This moisture, which is water vapor from the lake, is turned into clouds as it encounters much colder air above. When the clouds reach the shore of the lake, they deposit their snow on nearby land. A typical lake-effect storm is illustrated in the diagram below.

The area most likely to receive snow from a lake is called a “snowbelt.” Lake Ontario’s snowbelt includes the counties along the eastern and southeastern ends of the lake. Because the lake runs lengthwise from west to east, the prevailing westerly winds are able to gather the maximum amount of moisture as they flow across the entire length of the lake. There can be lake-effect snowfall anywhere around the lake, but the heaviest and most frequent snowfalls occur near the eastern shore.

In parts of the snowbelt, the lake effect combines with a phenomenon known as orographic lifting to produce some very heavy snowfalls. After cold air has streamed over the length of Lake Ontario, it moves inland and is forced to climb the slopes of the Tug Hill Plateau and the Adirondack Mountains, resulting in very heavy snowfall.



- 76 State the relationship that must exist between water temperature and air temperature for lake-effect snow to develop. [1]
- 77 State why locations east and southeast of Lake Ontario are more likely to receive lake-effect snow than are locations west of the lake. [1]
- 78 State the name of the New York State landscape region that includes location A shown in the diagram. [1]
- 79 State why very heavy snowfall occurs in the Tug Hill Plateau region. [1]
-

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 14, 2001 — 9:15 a.m. to 12:15 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 51

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**

Thursday, June 14, 2001 — 9:15 a.m. to 12:15 p.m., only

ANSWER BOOKLET Male

Student Sex: Female

Teacher

School Grade

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

Performance Test Score
(Maximum Score: 23)

Part	Maximum Score	Student's Score
A	35	
B-1	16	
B-2	14	
C	20	

Total Written Test Score
(Maximum Raw Score: 85)

Final Score
(from conversion chart)

Raters' Initials:
 Rater 1 Rater 2

Part B-2

For Raters Only

52 *a* _____
 b _____
 53 _____ p.m.
 54 _____

55 _____

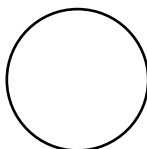
56 _____

52*a*
 52*b*
 53
 54
 55
 56

For Raters Only

57 _____

58 _____
59 _____
60 _____
61 _____

62 _____ °C
63 _____
64 _____


57

58

59

60

61

62

63

64

**Total
Score for
Part B-2**

Part C

65 _____

66 _____

67 _____

65

66

67

**For Raters
Only**

68

68

69 a

69 a

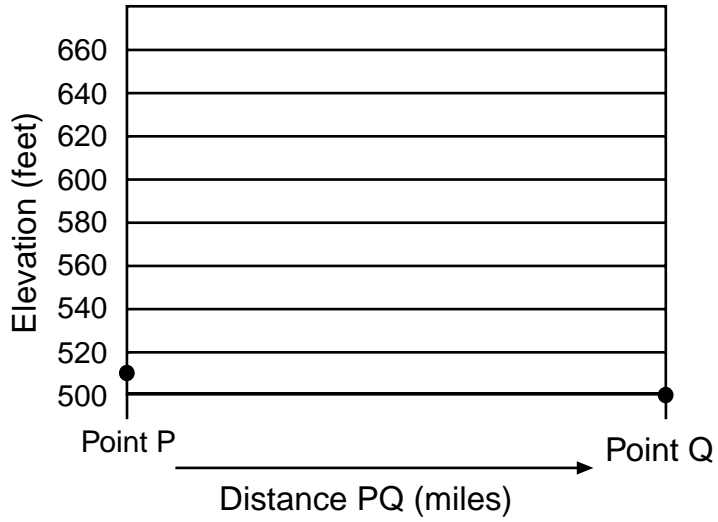
b

69 b

70 a

70 b

70 a-b



71

71

72

72

73

Era

73

For Raters Only

74

75

76

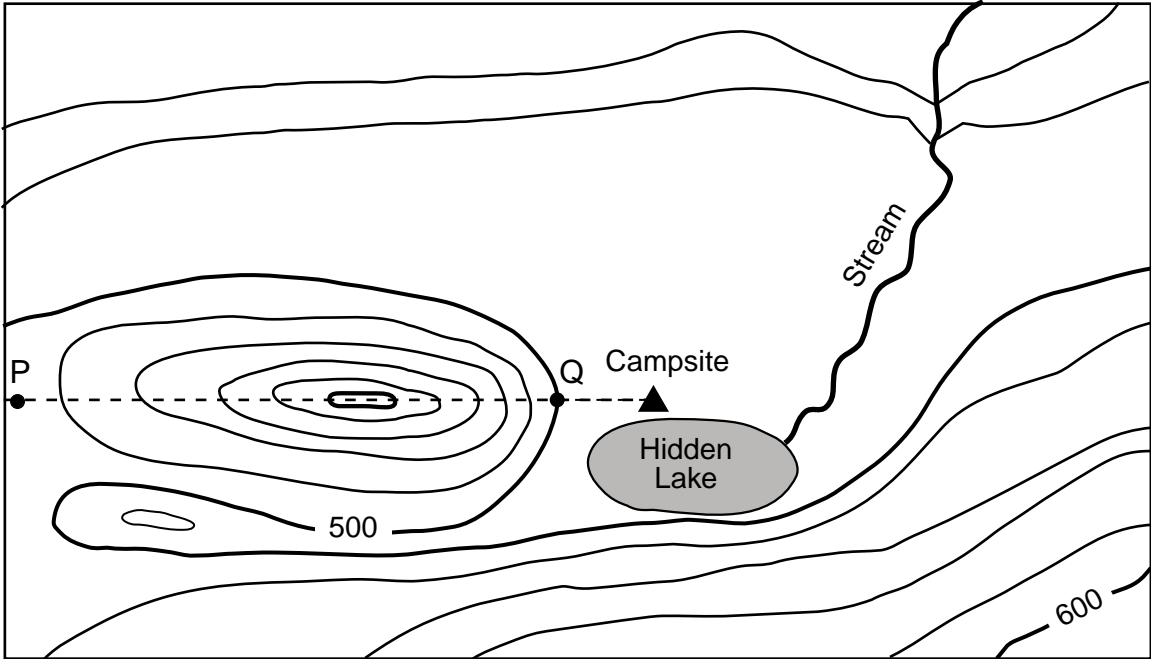
77

78

79

Total Score for Part C

74-75



Key

▲ Campsite

----- Bike trail

0 1 2 3 miles

Contour interval: 20 feet



76

77

78

79

FOR TEACHERS ONLY

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

PS-ES

PHYSICAL SETTING/EARTH SCIENCE

Thursday, June 14, 2001 — 9:15 a.m. to 12:15 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 1	25 4	36 3	44 1
2 4	14 2	26 3	37 1	45 4
3 3	15 3	27 1	38 4	46 1
4 3	16 4	28 2	39 3	47 3
5 2	17 2	29 1	40 4	48 3
6 4	18 1	30 1	41 2	49 1
7 2	19 3	31 4	42 1	50 2
8 1	20 2	32 3	43 4	51 3
9 2	21 2	33 1		
10 4	22 3	34 2		
11 4	23 1	35 2		
12 3	24 2			

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 Living Environment and Physical Setting/Earth Science*.

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. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

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

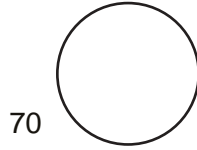
Allow a total of 14 credits for this part. The student must answer all questions in this part.

- 52** [2] **a** Allow 1 credit for **northeast** or **east northeast** or **north northeast**.
b Allow 1 credit for **increase** or **become longer**.
- 53** [1] Allow 1 credit for **2:30** p.m.(±1 hour)
- 54** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
The Sun is highest in the sky at noon at location *C*.
The observer is at the Equator.
- 55** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
Polaris has an altitude of 90°.
The Sun’s apparent path is along the horizon.
The only direction shown on the diagram is south; she must be at the North Pole.
- 56** [1] Allow 1 credit for **September 21, 22, 23**, or **autumnal equinox**.
- 57** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
The intrusion cuts across all rock layers.
The basalt is on the surface.
- 58** [1] Allow 1 credit for **solidification** or **crystallization**.
- 59** [1] Allow 1 credit for **conglomerate**.
- 60** [1] Allow 1 credit for **marble** or **hornfels**.
- 61** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
The bedrock is faulted.
There is an unconformity.

62 [1] Allow 1 credit for **14°C**.

63 [1] Allow 1 credit for **relative humidity increases**.

64 [1]



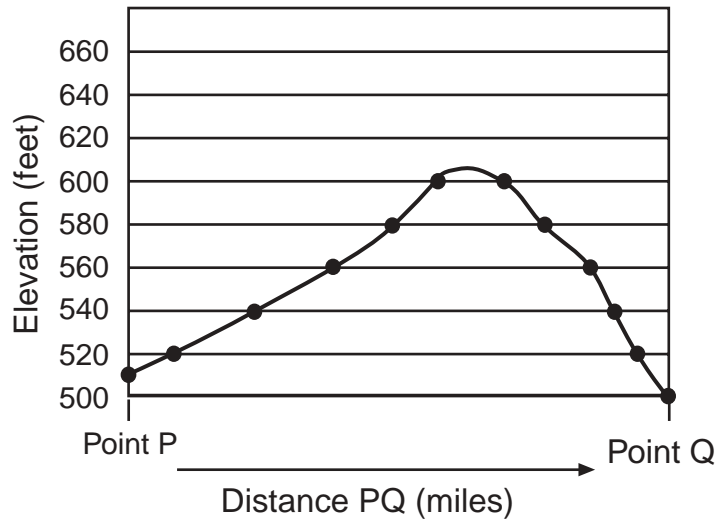
Allow 1 credit for correctly indicating the dewpoint. Do *not* allow this credit if ° or °F is written.

Part C

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

- 65** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- burning fossil fuels
 - population increases
- 66** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Global warming melts glaciers, causing a rise in sea level.
 - Increased evaporation could lower sea level.
- 67** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- warmer winter temperatures and cooler summer temperatures
 - smaller temperature range
- 68** [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Lack of contour lines indicates a relatively flat area.
 - The stream shows meanders.
 - The contour lines are spaced far apart.
- 69** [2] **a** Allow 1 credit for **north** or **northeast** or **north northeast**.
- b** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- Contour lines bend upstream.
 - Streams flow from higher contours to lower contours.
 - Streams flow opposite the apex of the contour lines.

70 [3] *a-b*



- a** Allow 2 credits if 8 to 10 points are plotted correctly. Allow only 1 credit if only 5 to 7 points are plotted correctly.
- b** Allow 1 credit for correctly connecting all the plotted points. The high point of the profile must be greater than 600 ft but less than 620 ft.

71 [3] Allow 1 credit for measuring the distance with the rope.

and

Allow 1 credit for timing the apples.

and

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

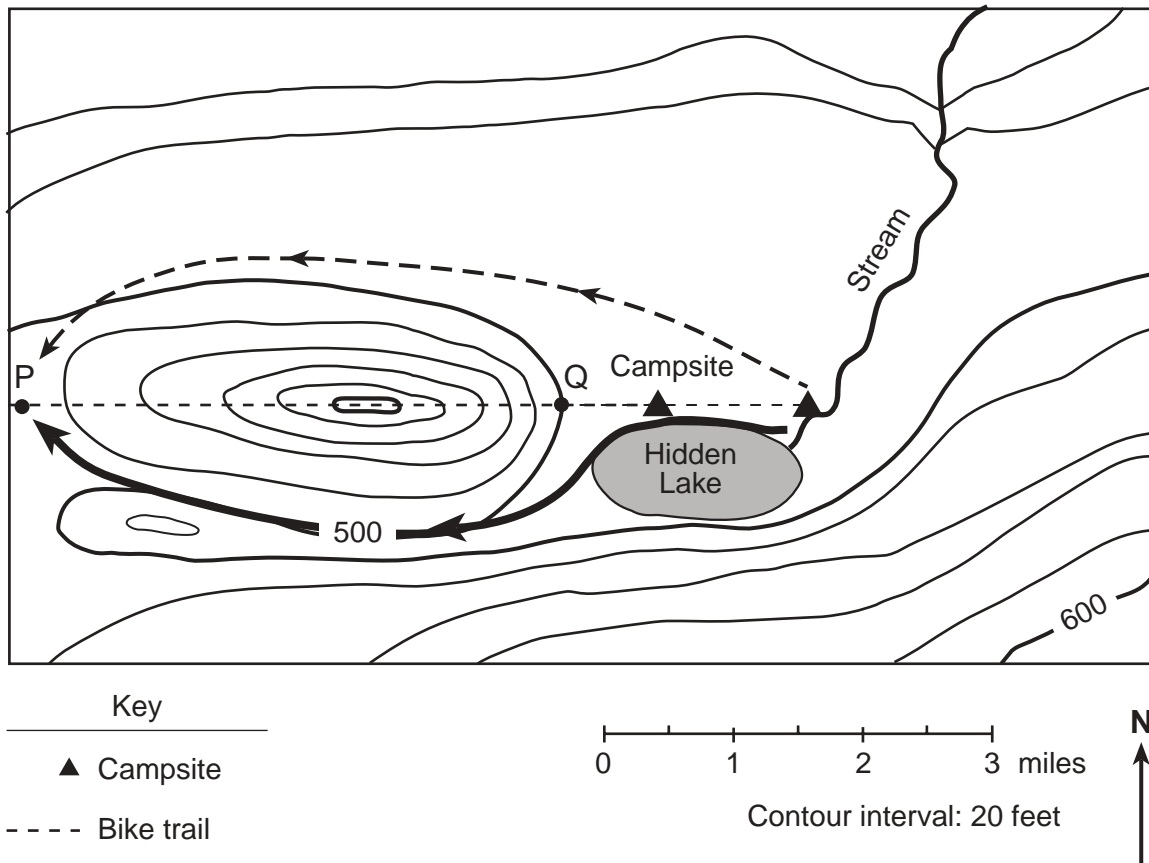
$$\text{rate} = \frac{\text{distance}}{\text{time}}$$

$$\text{rate of change} = \frac{\text{change in field value}}{\text{time}}$$

72 [1] Allow 1 credit for **sedimentary** or any specific type of sedimentary rock.

73 [1] Allow 1 credit for **Paleozoic** Era.

74–75



- 74 [1] Allow 1 credit for correctly indicating on the map the location of the second campsite (± 0.2 mi).
- 75 [1] Allow 1 credit for either route shown on the map above or for any other appropriate route from the student's plotted campsite on which the 500-foot contour line is crossed only once.
- 76 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- The temperature of the lake water at the surface must be higher than the temperature of the air flowing over the water.
 - Water temperature is warmer than air temperature.
- 77 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:
- prevailing winds
 - Lake Ontario runs lengthwise from west to east, and the prevailing winds pick up moisture as they flow across the entire length.
- 78 [1] Allow 1 credit for **Erie-Ontario Lowlands**.
- 79 [1] Allow 1 credit for a correct response that includes the idea of **rising** or **cooling air** or **increased condensation** or **orographic lifting**.

Map to Core Curriculum

Standards	Question Numbers		
	Part A	Part B	Part C
Standard 1—Analysis, Inquiry, and Design			
Mathematical Analysis			
Key Idea 1	19	40,44,45,46,48,52a, 55	71,75
Key Idea 2	3,21	40	71
Key Idea 3		37,47,48,52a,52b	69a,69b,71
Scientific Inquiry			
Key Idea 1		41,51	77,79
Key Idea 2			71
Key Idea 3			71
Engineering Design			74
Standard 2—Information Systems			
Key Idea 1		64	76
Key Idea 2		64	
Key Idea 3			
Standard 6—Interconnectedness: Common Themes			
Key Idea 1		38,49,57,58,59,60,63	67,69b,71,76,77
Key Idea 2	5	39,41,52a,52b,54,55,56,57,61	68,69b,70,78
Key Idea 3	4,5,32	38,53	74
Key Idea 4			
Key Idea 5	19	38,41,50,52,53,56,63	66,77,79
Key Idea 6		36,37	65,75
Standard 7—Interdisciplinary Problem Solving			
Key Idea 1			71,73
Key Idea 2			75
Standard 4		Intro. Key Idea 1 45,46	Intro. Key Idea 2 76
Key Idea 1	1,2,3,4,6,7,8,9,10,12,14,19,25,26,28,32,33,34	44,46,51,52a,52b,53,54,55,56,57,61	67,72,73
Key Idea 2	7,11,13,14,15,16,18,20,21,22,24,27,29,30,31	36,37,41,42,43,47,48,49,50,54,59,60,61,62,63,64	65,66,68,69a,69b,70,71,72,74,75,76,77,78,79
Key Idea 3	17,18,23,35	39,40,58,59,60	
Earth Science Reference Tables (2001 edition)	3,4,5,13,16,17,22,23,25,27,30,35	38,41,42,48,49,58,59,60,62,63,64	71,73,78