The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 19, 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.

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

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

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

Notice. . .

A four-function or scientific calculator and a copy of the *2001 Earth Science Reference Tables* must be available for your use while taking this examination.

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

Part A

Answer all questions in this part.

Directions (1–35): For *each* statement or question, write on your separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the *Earth Science Reference Tables*.

1 The planetary winds in Earth's Northern Hemisphere generally curve to the right due to Earth's

(1) orbit around the Sun
(2) spin on its axis
(3) magnetic field
(4) force of gravity

2 The redshift of light from distant galaxies provides evidence that the universe is

(1) shrinking, only
(2) expanding, only
(3) shrinking and expanding in a cyclic pattern
(4) remaining the same size

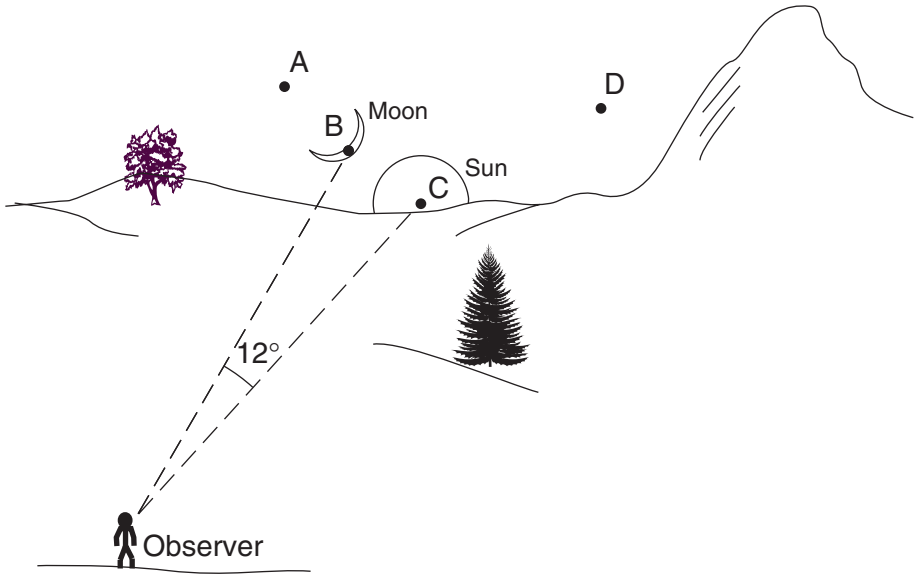
3 Which of these characteristics identify an Earth surface that is likely to be the best absorber of insolation?

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

4 Which phase change requires water to gain 540 calories per gram?

(1) solid ice melting
(2) liquid water freezing
(3) liquid water vaporizing
(4) water vapor condensing

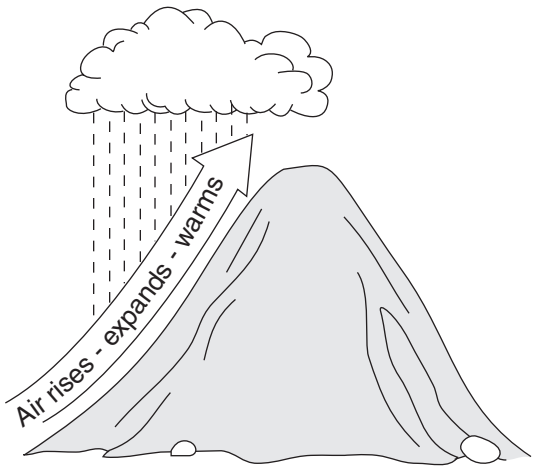
5 The diagram below shows the positions of the Moon and the Sun at sunset during an evening in New York State. Points *A*, *B*, *C*, and *D* represent positions along the western horizon.



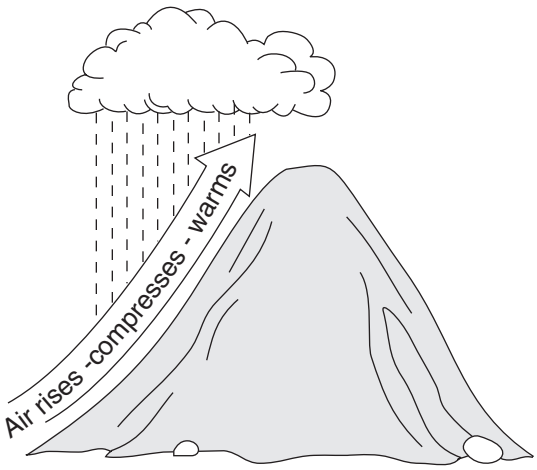
At sunset on the following evening, the Moon will be located at position

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

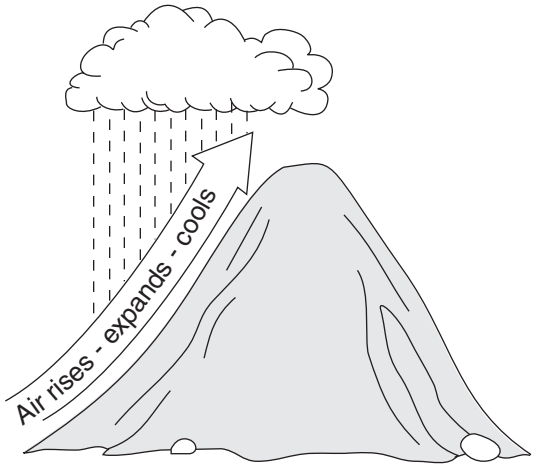
6 Which diagram best illustrates how air rising over a mountain produces precipitation?



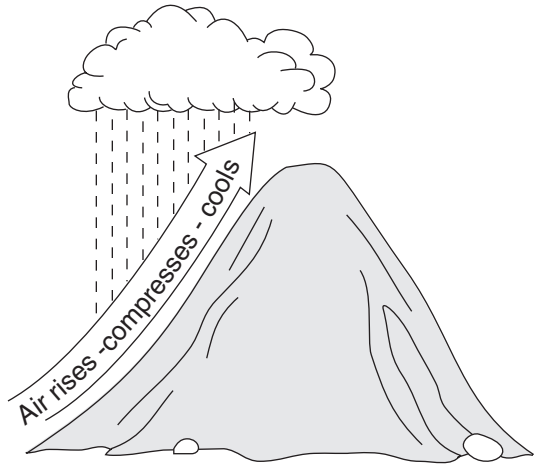
(1)



(3)



(2)



(4)

7 A student used a sling psychrometer to measure the humidity of the air. If the relative humidity was 65% and the dry-bulb temperature was 10°C, what was the wet-bulb temperature?

(1) 5°C
(2) 7°C
(3) 3°C
(4) 10°C

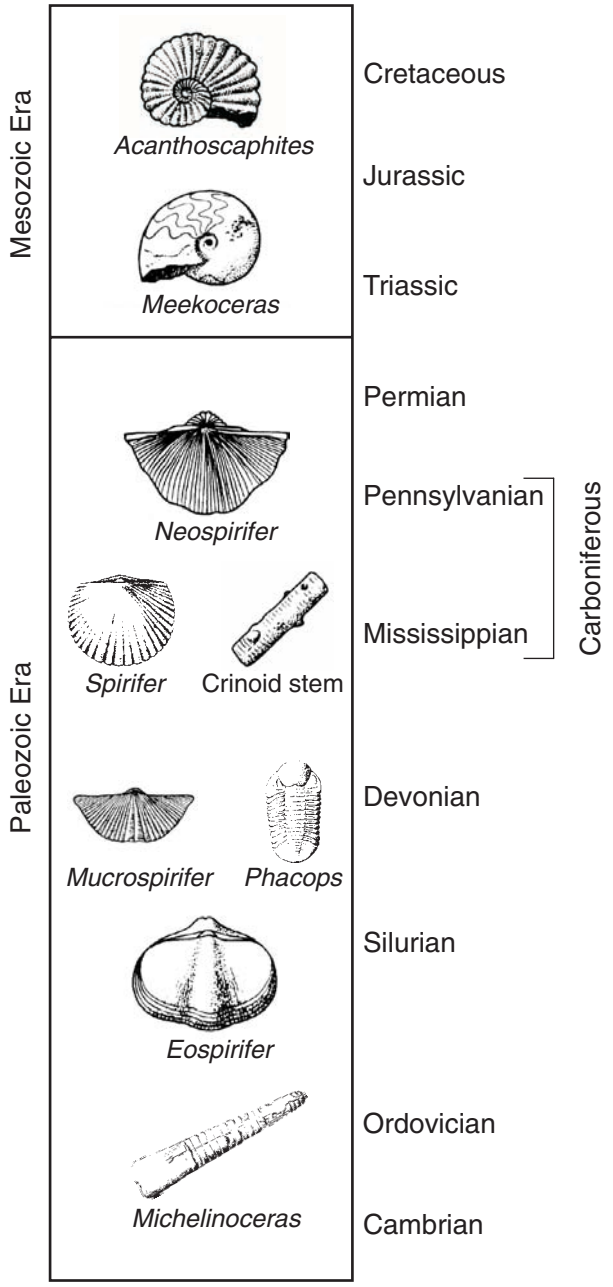
8 A gradual increase in atmospheric carbon dioxide would warm Earth's atmosphere because carbon dioxide is a

(1) poor reflector of ultraviolet radiation
(2) good reflector of ultraviolet radiation
(3) poor absorber of infrared radiation
(4) good absorber of infrared radiation

9 Why are the beaches that are located on the southern shore of Long Island often considerably cooler than nearby inland locations on hot summer afternoons?

(1) A land breeze develops due to the lower specific heat of water and the higher specific heat of land.
(2) A sea breeze develops due to the higher specific heat of water and the lower specific heat of land.
(3) The beaches are closer to the Equator than the inland locations are.
(4) The beaches are farther from the Equator than the inland locations are.

Base your answers to questions 10 and 11 on the chart below, which shows the geologic ages of some well-known fossils.



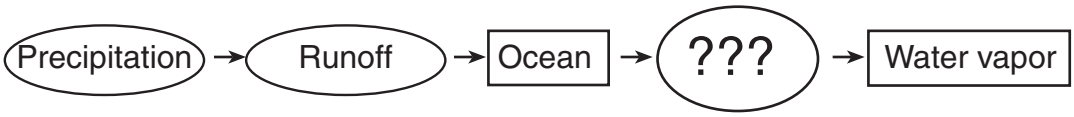
10 The *Spirifer,* Crinoid stem, and *Neospirifer* fossils might be found in some of the surface bedrock of which New York State landscape region?

(1) the Allegheny Plateau southeast of Jamestown
(2) the Catskills near Slide Mountain
(3) the Adirondack Mountains near Mt. Marcy
(4) the Erie-Ontario Lowlands northeast of Niagara Falls

11 Which New York State fossil is found in rocks of the same period of geologic history as *Meekoceras*?

(1) Condor
(2) Placoderm fish
(3) *Eurypterus*
(4) *Coelophysis*

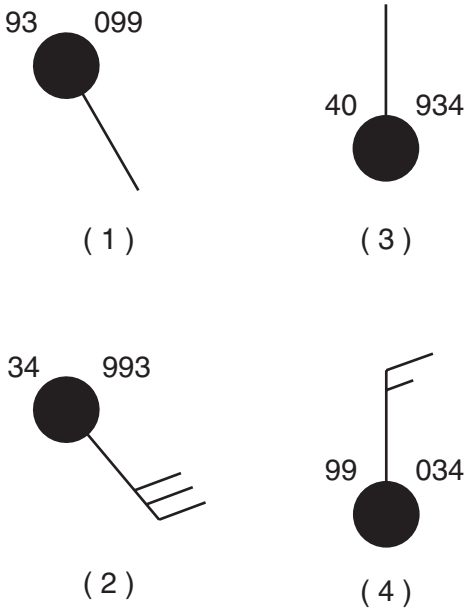
12 The flowchart below shows part of Earth's water cycle. The question marks indicate a part of the flowchart that has been deliberately left blank.



Which process should be shown in place of the question marks to best complete the flowchart?

(1) condensation
(2) deposition
(3) evaporation
(4) infiltration

13 Which weather-station model shows an air pressure of 993.4 millibars?



14 An Earth science student observed the following weather conditions in Albany, New York, for 2 days: The first day was warm and humid with southerly winds. The second day, the temperature was 15 degrees cooler, the relative humidity had decreased, and wind direction was northwest. Which type of air mass most likely had moved into the area on the second day?

(1) continental tropical
(2) continental polar
(3) maritime tropical
(4) maritime polar

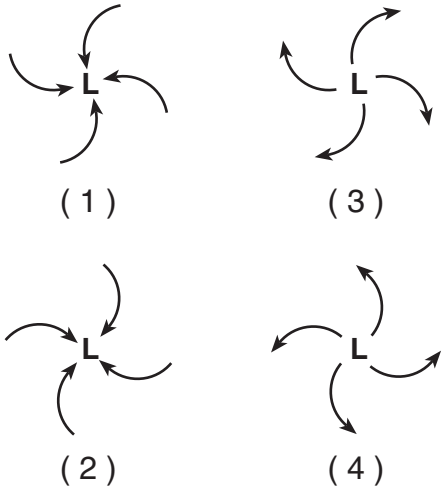
15 A sample of wood found in an ancient tomb contains 25% of its original carbon-14. The age of this wood sample is approximately

(1) 2,800 years
(2) 5,700 years
(3) 11,400 years
(4) 17,100 years

16 Which set of conditions would produce the most runoff of precipitation?

(1) gentle slope and permeable surface
(2) gentle slope and impermeable surface
(3) steep slope and permeable surface
(4) steep slope and impermeable surface

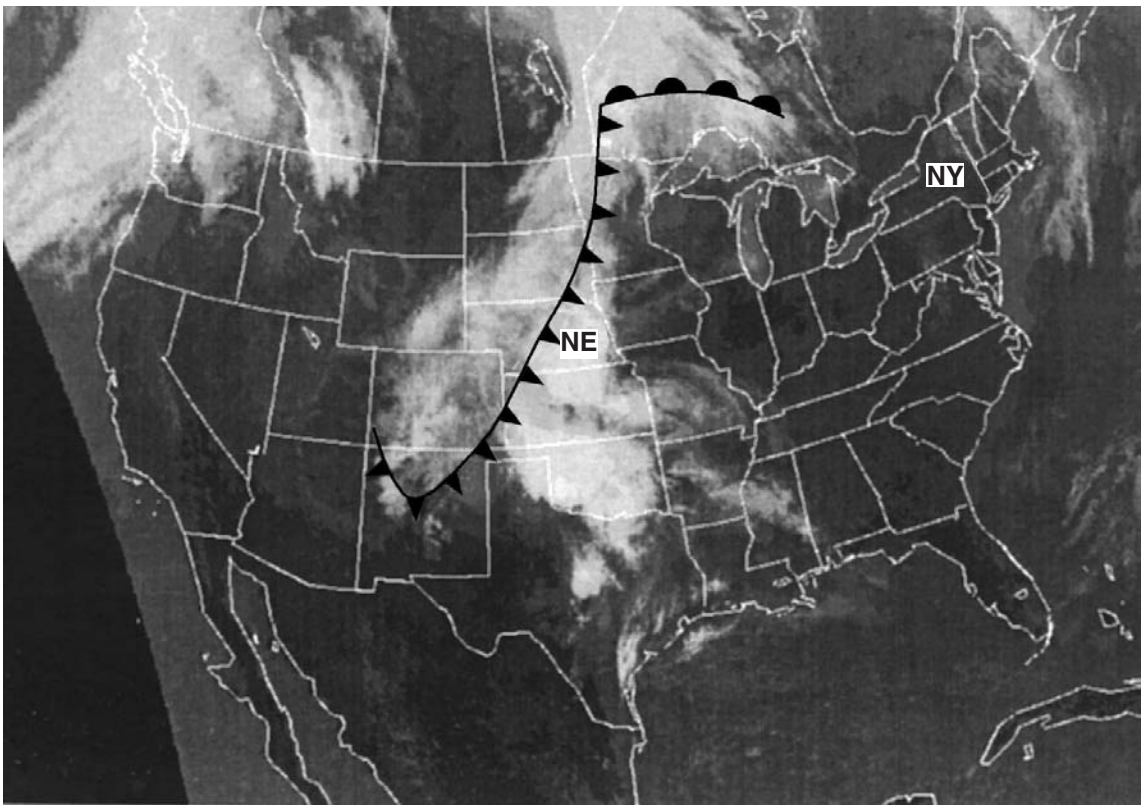
17 Which map view best shows the movement of surface air around a low-pressure system in the Northern Hemisphere?



18 The surface bedrock of a region of eastern New York State is shale. Which statement best explains why the soil that covers the shale in this region contains abundant garnet and gneiss pebbles?

(1) Volcanic lava flowed over the shale bedrock.
(2) A meteor impact scattered garnet and gneiss pebbles over the area.
(3) The soil consists of rock materials transported to this region by agents of erosion.
(4) The soil formed from the chemical and physical weathering of shale.

Base your answers to questions 19 and 20 on the satellite image below, which shows cloud patterns associated with weather fronts over the United States on a certain day. The states of Nebraska (NE) and New York (NY) have been labeled.



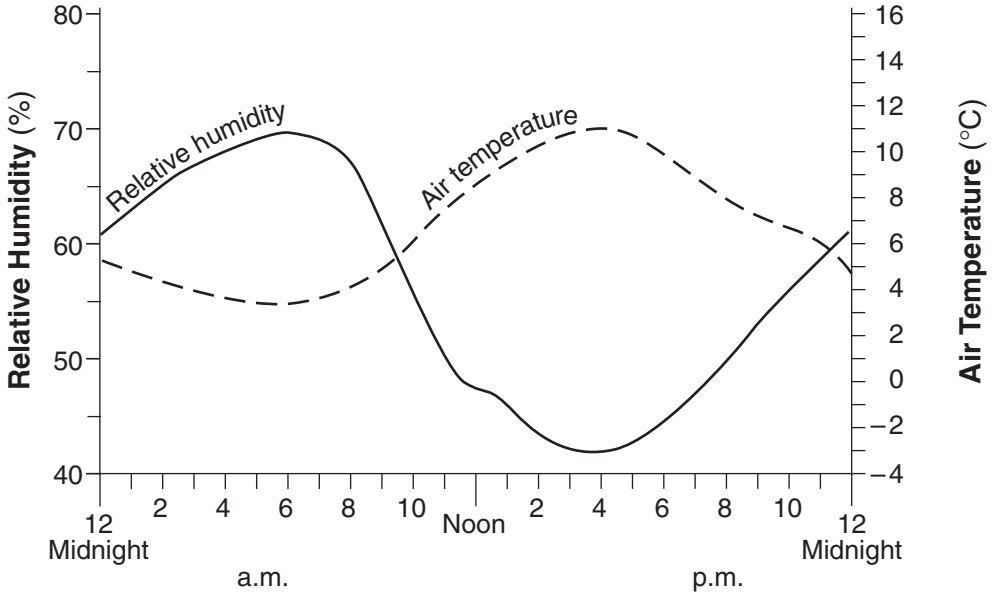
19 At the time this satellite image was taken, what were the weather conditions in New York State?

(1) clear skies with no precipitation
(2) mostly cloudy in the northern part of the State and clear in the southern part
(3) cloudy with heavy precipitation
(4) very cloudy with no precipitation

20 Which type of front was producing the weather in Nebraska when this image was taken?

(1) cold front
(2) warm front
(3) stationary front
(4) occluded front

Base your answers to questions 21 and 22 on the graph below, which shows the changes in relative humidity and air temperature during a spring day in Washington, D.C.



21 Which statement best describes the relationship between relative humidity and air temperature as shown by the graph?

(1) Relative humidity decreases as air temperature decreases.
(2) Relative humidity decreases as air temperature increases.
(3) Relative humidity increases as air temperature increases.
(4) Relative humidity remains the same as air temperature decreases.

22 What were the relative humidity and air temperature at noon on this day?

(1) 47% and 32°F
(2) 65% and 32°F
(3) 47% and 48°F
(4) 65% and 48°F

23 Landscapes will undergo the most chemical weathering if the climate is

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

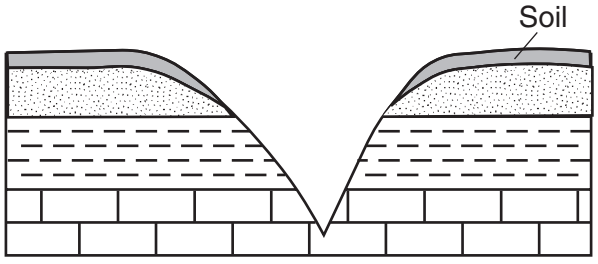
24 A huge undersea earthquake off the Alaskan coastline could produce a

(1) tsunami
(2) cyclone
(3) hurricane
(4) thunderstorm

25 Which rock is foliated, shows mineral alignment but not banding, and contains medium-sized grains of quartz and pyroxene?

(1) phyllite
(2) schist
(3) gneiss
(4) quartzite

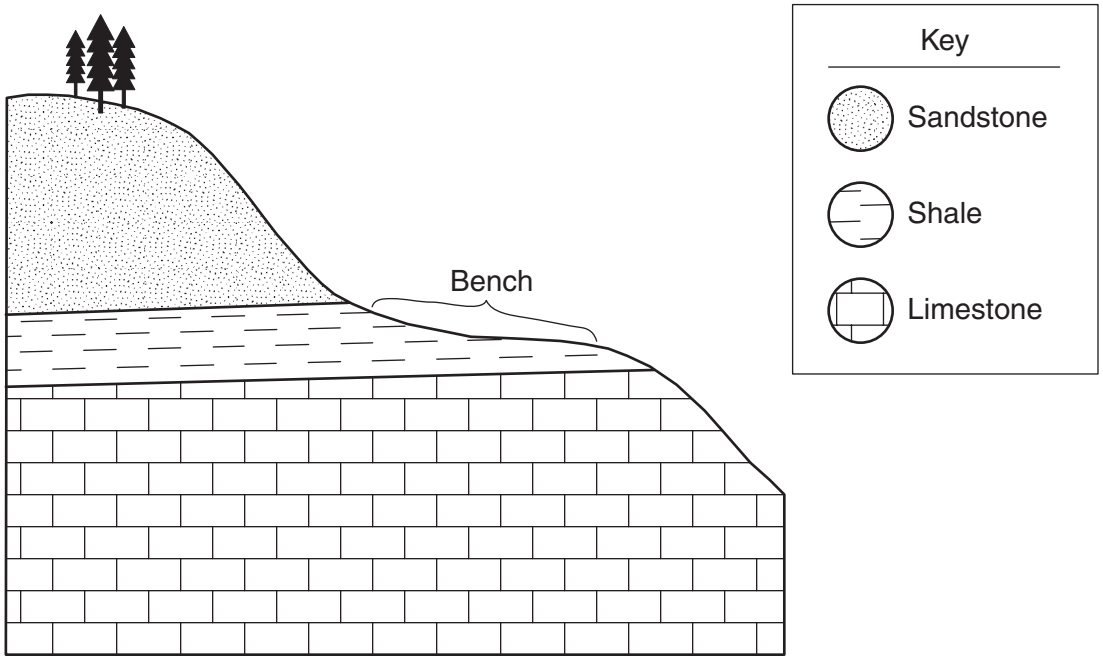
26 The cross section below shows a V-shaped valley and the bedrock beneath the valley.



Which agent of erosion is responsible for cutting most V-shaped valleys into bedrock?

(1) surface winds
(2) running water
(3) glacial ice
(4) ocean waves

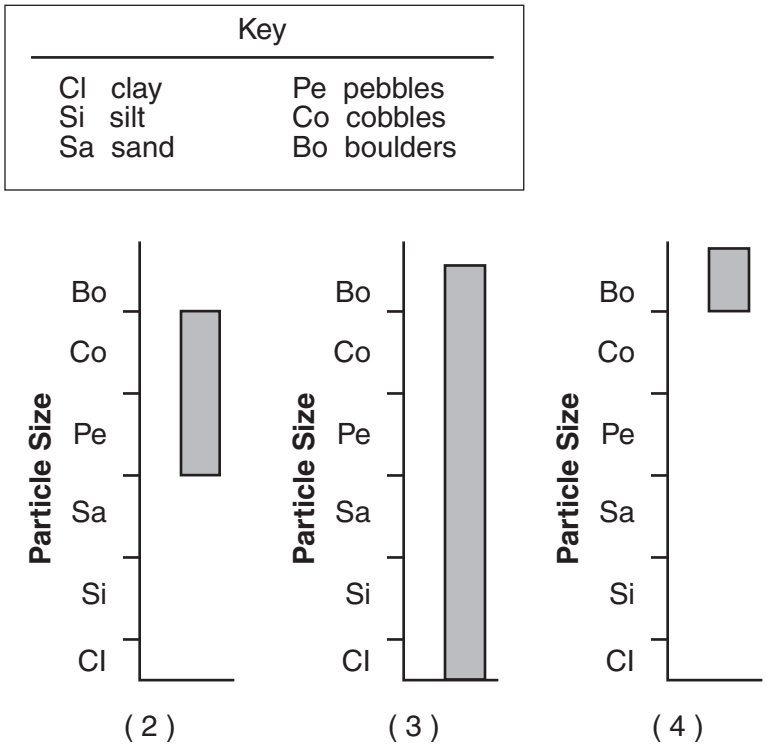
27 The geologic cross section below shows a hillslope and the rock layers that underlie it.



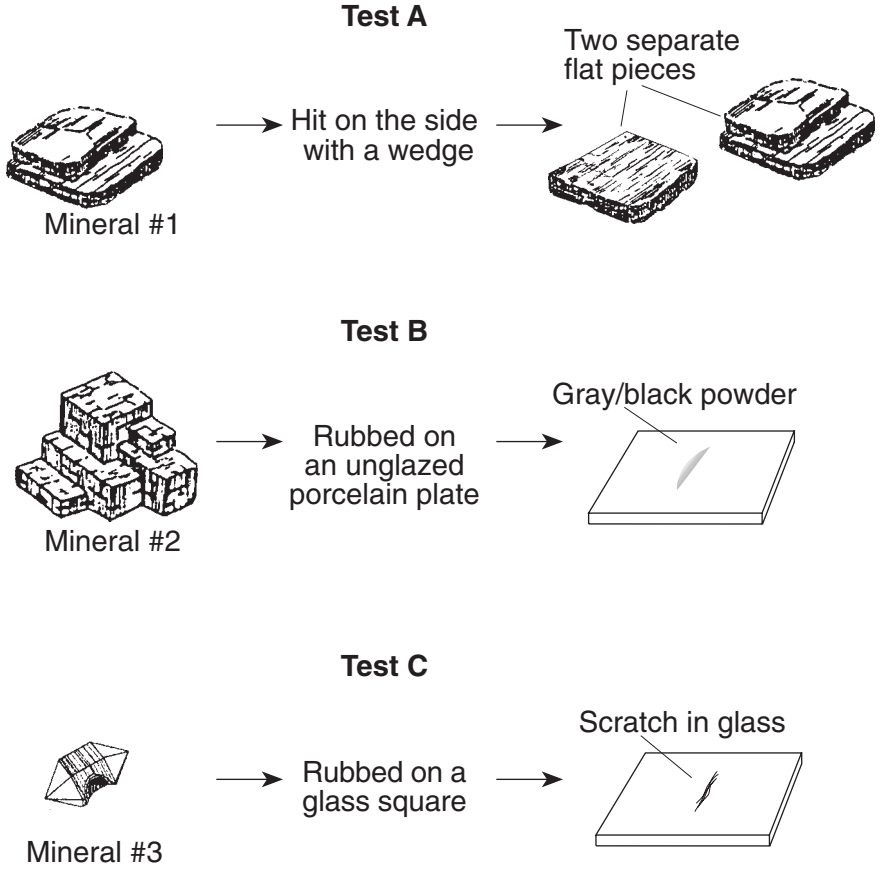
Which difference between the sandstone, shale, and limestone layers caused the formation of the relatively gently sloped section labeled "bench"?

(1) rock age
(2) fossil content
(3) resistance to weathering
(4) amount of uranium-238

28 Which graph best represents the range of particle sizes that can be carried by a glacier?



Base your answers to questions 29 and 30 on the diagram below, which shows three minerals with three different physical tests, *A*, *B*, and *C*, being performed on them.



29 Which sequence correctly matches each test, *A*, *B*, and *C*, with the mineral property tested?

(1) *A*—cleavage; *B*—streak; *C*—hardness
(2) *A*—cleavage; *B*—hardness; *C*—streak
(3) *A*—streak; *B*—cleavage; *C*—hardness
(4) *A*—streak; *B*—hardness; *C*—cleavage

30 The results of all three physical tests shown are most useful for determining the

(1) rate of weathering of the minerals
(2) identity of the minerals
(3) environment where the minerals formed
(4) geologic period when the minerals formed

31 An air temperature of 95°C most often exists in which layer of the atmosphere?

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

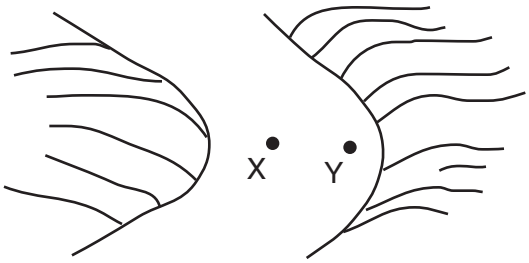
32 During the intrusion of the Palisades Sill, contact metamorphism changed sandstone and shale into

(1) diorite
(2) marble
(3) limestone
(4) hornfels

33 Which process most likely formed a layer of the sedimentary rock, gypsum?

(1) precipitation from seawater
(2) solidification of magma
(3) folding of clay-sized particles
(4) melting of sand-sized particles

34 The diagram below shows a stream flowing past points *X* and *Y*. If the velocity of the stream at point *X* is 100 centimeters per second, which statement best describes the sediments being transported past these points?



(1) At points *X* and *Y*, only clay is being transported.
(2) At points *X* and *Y*, only sand, silt, and clay are being transported.
(3) Some pebbles being transported at point *Y* are bigger than those being transported at point *X*.
(4) Some pebbles and cobbles are being transported at points *X* and *Y*, but not sand, silt, or clay.

35 Specific mass extinction of living organisms and global climatic changes in geologic history are inferred by most scientists to have been caused by

(1) the impact of asteroids or large meteors on Earth's surface
(2) the gravitational pull of the Sun on Earth's surface
(3) large energy surges from the surface of the Sun
(4) earthquakes occurring along crustal plate boundaries

Part B–1

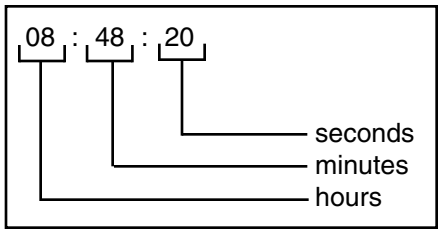
Answer all questions in this part.

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

Base your answers to questions 36 through 38 on the data table below, which gives information collected at seismic stations *A*, *B*, *C*, and *D* for the same earthquake. Some of the data has been deliberately omitted.

Seismic Station	*P*-Wave Arrival Time	*S*-Wave Arrival Time	Difference in Arrival Times	Distance to Epicenter
A	08:48:20	No *S*-waves arrived		
B	08:42:00		00:04:40	
C	08:39:20		00:02:40	
D	08:45:40			6,200 km

Key for Reading Time on the Table



36 What is the most probable reason for the absence of *S*-waves at station *A*?

(1) *S*-waves cannot travel through liquids.
(2) *S*-waves were not generated at the epicenter.
(3) Station *A* was located on solid bedrock.
(4) Station *A* was located too close to the epicenter.

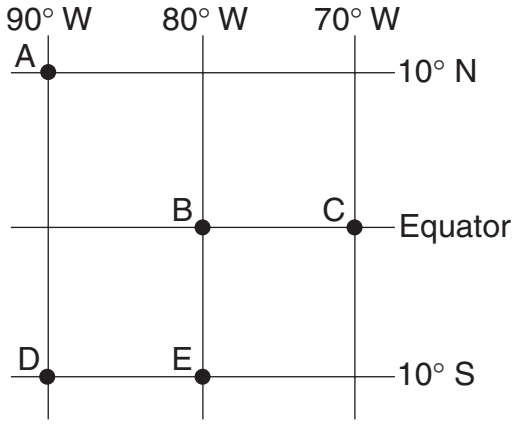
37 What is the approximate distance from station *C* to the earthquake epicenter?

(1) 3,200 km
(2) 2,400 km
(3) 1,600 km
(4) 1,000 km

38 How long did it take the *P*-wave to travel from the epicenter of the earthquake to seismic station *D*?

(1) 00:46:20
(2) 00:39:20
(3) 00:17:20
(4) 00:09:40

Base your answers to questions 39 and 40 on the map below, which shows the latitude and longitude of five observers, *A*, *B*, *C*, *D*, and *E*, on Earth.



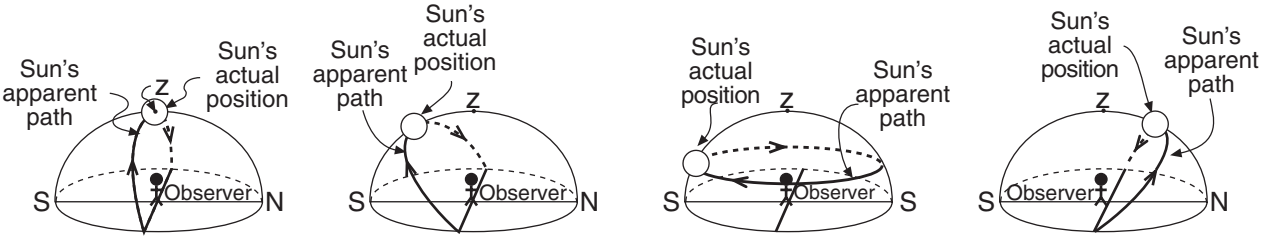
39 What is the altitude of *Polaris* (the North Star) above the northern horizon for observer *A*?

(1) 0°
(2) 10°
(3) 80°
(4) 90°

40 Which two observers would be experiencing the same apparent solar time?

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

Base your answers to questions 41 through 43 on the diagram below, which shows a model of the apparent path and position of the Sun in relation to an observer at four different locations, *A*, *B*, *C*, and *D*, on Earth's surface on the dates indicated. The zenith (z) and the actual position of the Sun in the model at the time of the observation are shown. [The zenith is the point directly over the observer.]



41 According to the Sun's actual position shown in the diagrams, the most intense insolation is being received by the observer at location

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

42 Where on Earth's surface is the observer at location *C* located?

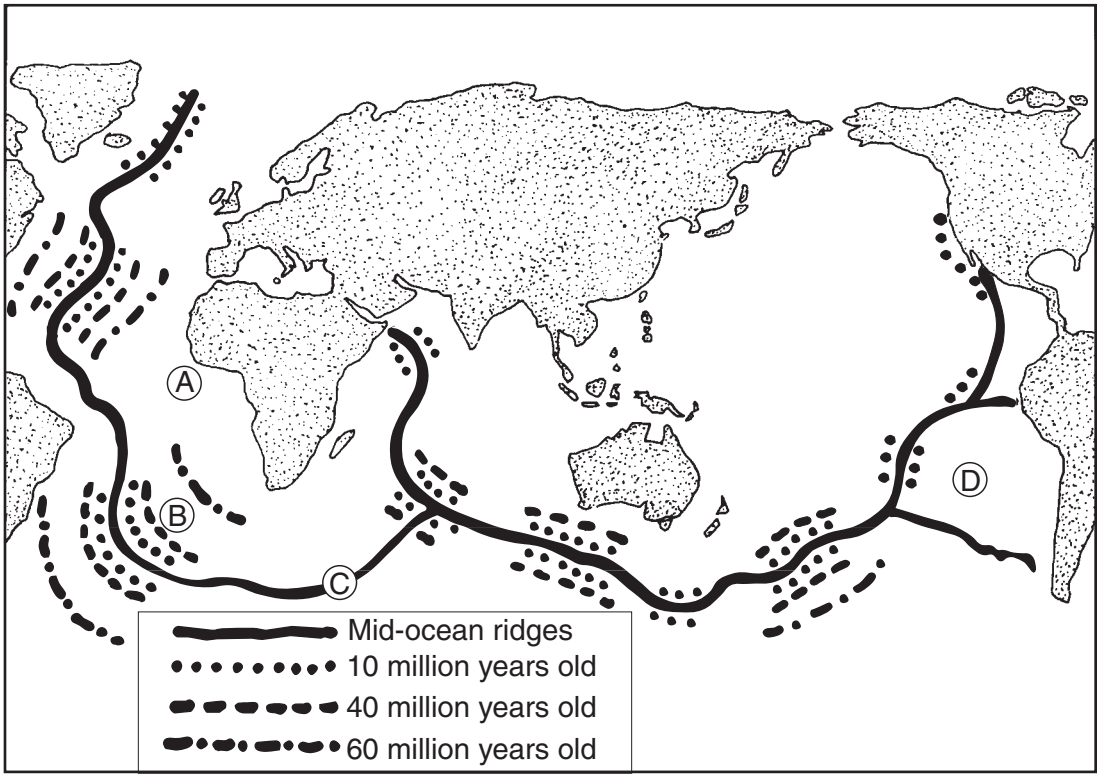
(1) at the Equator
(2) at the South Pole
(3) at the North Pole
(4) in Oswego, New York

43 From sunrise to sunset at location *B*, the length of the observer's shadow will

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

Base your answers to questions 44 through 46 on the map below, which shows the location of mid-ocean ridges and the age of some oceanic bedrock near these ridges. Letters *A* through *D* are locations on the surface of the ocean floor.

Age of Rocks on the Sea Bottom Relative to Ridges



44 What is the most probable age, in millions of years, of the bedrock at location *B*?

(1) 5
(2) 12
(3) 48
(4) 62

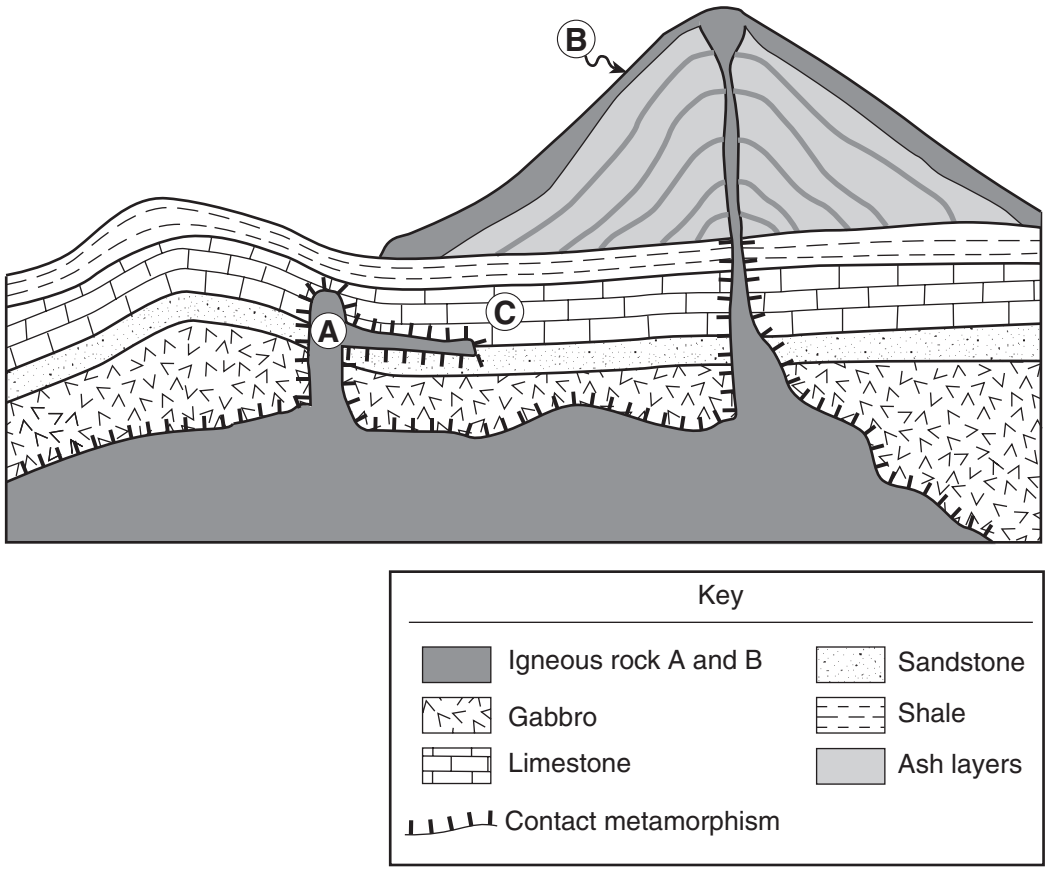
45 Rising convection currents in the asthenosphere would most likely be under location

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

46 The age of oceanic bedrock on either side of a mid-ocean ridge is supporting evidence that at the ridges, tectonic plates are

(1) diverging
(2) converging
(3) locked in place
(4) being subducted

Base your answers to questions 47 and 48 on the geologic cross section below. The large cone-shaped mountain on Earth's surface is a volcano. Letters *A*, *B*, and *C* represent certain rocks.



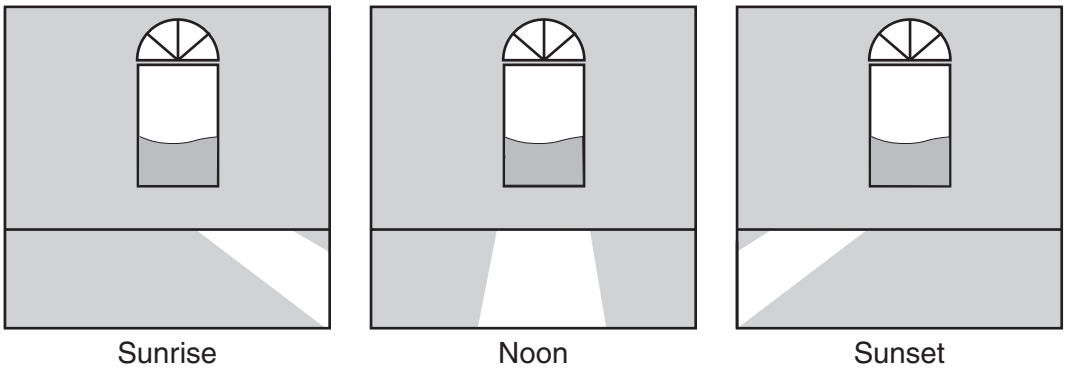
47 Which statement correctly describes the relative ages of rocks *A* and *C* and gives the best supporting evidence from the cross section?

(1) *A* is younger than *C*, because *A* is a lower sedimentary rock layer.
(2) *A* is younger than *C*, because the intrusion of *A* metamorphosed part of rock layer *C*.
(3) *A* is older than *C*, because *A* has older index fossils.
(4) *A* is older than *C*, because the intrusion of *A* cuts across rock layer *C*.

48 Rock *B* is most likely which type of igneous rock?

(1) granite
(2) peridotite
(3) pegmatite
(4) basalt

Base your answers to questions 49 and 50 on the diagram below, which shows sunlight entering a room through the same window at three different times on the same winter day.



49 The apparent change in the Sun's position shown in the diagram is best explained by

(1) the Sun rotating at a rate of 15° per hour
(2) Earth rotating at a rate of 15° per hour
(3) the Sun's axis tilted at an angle of $23\frac{1}{2}°$
(4) Earth's axis tilted at an angle of $23\frac{1}{2}°$

50 This room is located in a building in New York State. On which side of the building is the window located?

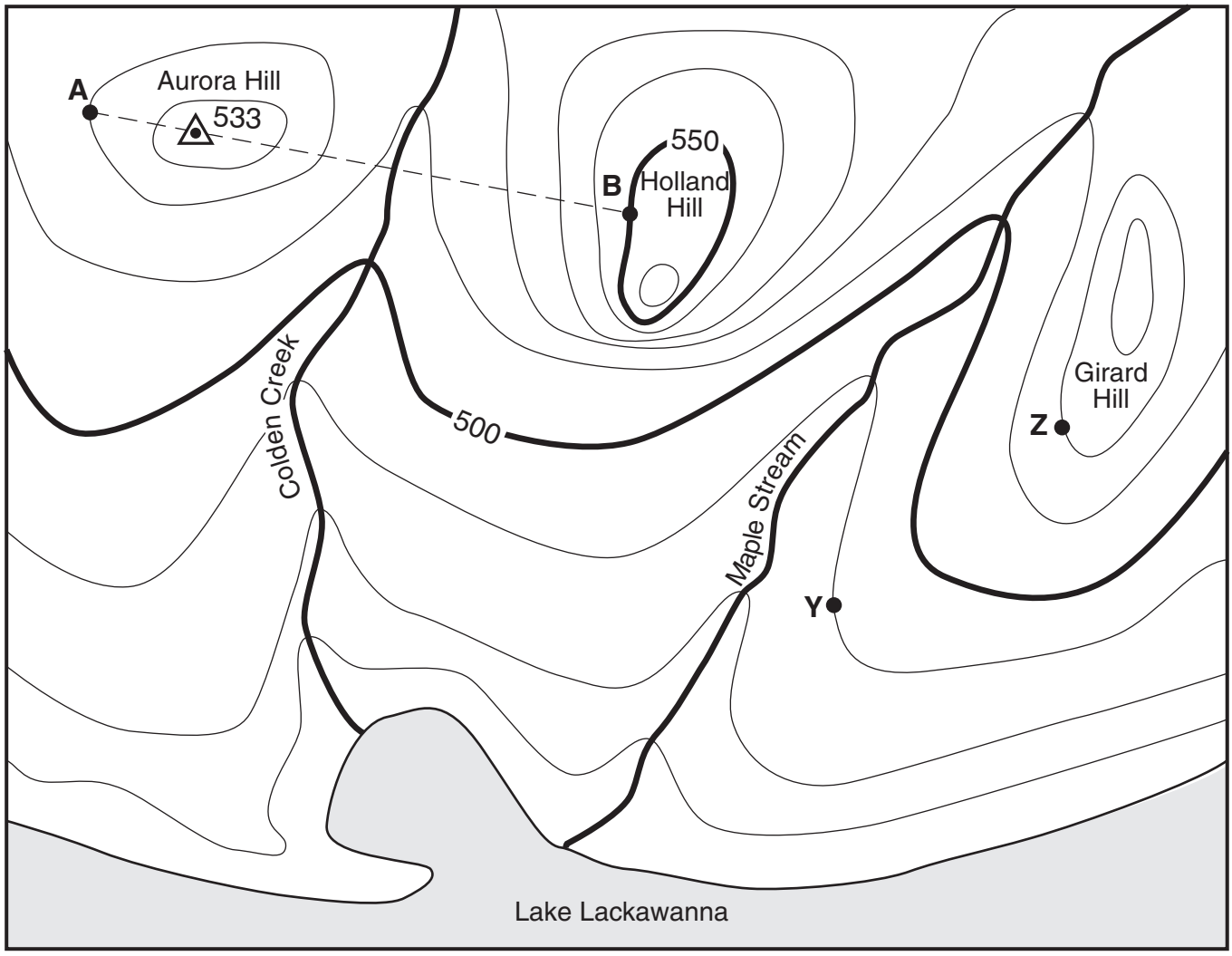
(1) north
(2) south
(3) east
(4) west

Part B–2

Answer all questions in this part.

Directions (51–60): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables.*

Base your answers to questions 51 through 54 on the topographic map below. Points *A*, *B*, *Y*, and *Z* are reference points on the topographic map. The symbol ▲533 represents the highest elevation on Aurora Hill.



51 State the general compass direction in which Maple Stream is flowing. [1]

52 Calculate the gradient between points *Y* and *Z* on the map, and label the answer with the correct units. [2]

53 Describe the evidence shown on the map that indicates that the southern side of Holland Hill has the steepest slope. [1]

54 On the grid provided *in your answer booklet,* construct a topographic profile from point *A* to point *B* by following the directions below.

a Plot the elevation along line *AB* by marking with an **X** *each* point where a contour line is crossed by line *AB*. Points *A* and *B* have been plotted for you. [2]

b Complete the profile by correctly connecting the plotted points with a smooth, curved line. [1]

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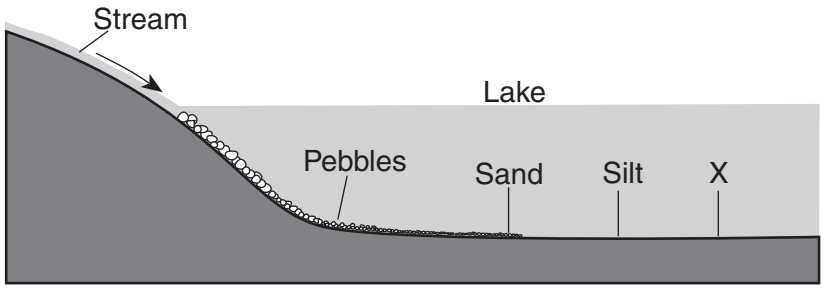
55 The cross section below illustrates the normal pattern of sediments deposited where a stream enters a lake. Letter *X* represents a particular type of sediment.



(Not drawn to scale)

a Briefly explain why deposition of sediment usually occurs where a stream enters a lake. [1]

b Name the type of sediment most likely represented by letter *X*. [1]

Base your answers to questions 56 and 57 on the temperature field map provided *in your answer booklet.* The map shows air temperatures, in degrees Fahrenheit, recorded at the same time at weather stations across North America. The air temperature at location *A* has been deliberately left blank.

56 On the map provided *in your answer booklet,* use smooth, curved solid lines to draw the 30°F, 40°F, and 50°F isotherms. [2]

57 What is the most probable air temperature at location *A*? [1]

Base your answers to questions 58 through 60 on the information, data table, and diagram below and on your knowledge of Earth science.

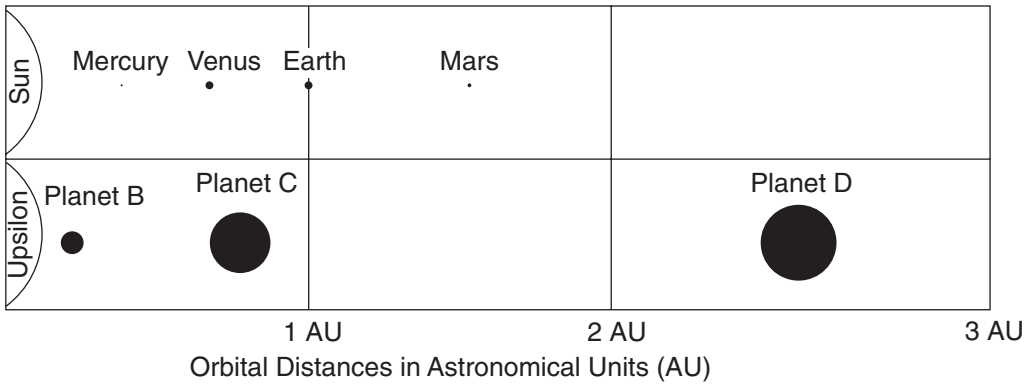
Astronomers have discovered strong evidence for the existence of three large extrasolar (outside our solar system) planets that orbit *Upsilon Andromedae,* a star located 44 light years from Earth. The three planets are called planet *B,* planet *C,* and planet *D*. Some of the information gathered about these three new planets is shown in the table below. The period of revolution for planet *C* has been deliberately left blank.

Characteristics of Planets *B*, *C*, and *D* Orbiting Star *Upsilon Andromedae*

Planet	Mass	Distance from *Upsilon Andromedae*	Period of Revolution
B	$\frac{3}{4}$ of the mass of Jupiter	0.06 AU	4.6 Earth days
C	2 times the mass of Jupiter	0.83 AU	
D	4 times the mass of Jupiter	2.50 AU	3.5 to 4.0 Earth years

[1 AU = average distance of Earth from the Sun]

The diagram below compares a part of our solar system to the *Upsilon Andromedae* planetary system. Planet distances from their respective star and the relative size of each planet are drawn to scale. [The scale for planet distances is not the same scale used for planet size.]



58 Planet *D's* diameter is 10 times greater than Earth's diameter. What planet in our solar system has a diameter closest in size to the diameter of planet *D*? [1]

59 As planet *B* travels in its orbit, describe the change in orbital velocity of planet *B* as the distance between *Upsilon Andromedae* and planet *B decreases.* [1]

60 If our solar system had a planet located at the same distance from the Sun as planet *C* is from *Upsilon Andromedae*, what would be its approximate period of revolution? [1]

Part C

Answer all questions in this part.

Directions (61–75): 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 61 and 62 on the information below and on your knowledge of Earth science.

Howe Caverns

Many scientists believe that the formation of the rocks in which Howe Caverns is now found began millions of years ago. At that time, an ocean covered the eastern region of New York State. Hundreds of feet of calcium carbonate ($CaCO_3$) sediments were deposited in layers along the edge of this ocean. These layers eventually formed the sedimentary rock limestone, which makes up the walls of today's Howe Caverns.

Much later, tectonic forces raised this region of New York State above sea level exposing the rock to weathering and erosion. These tectonic forces cracked the thick limestone, creating pathways for groundwater to infiltrate and gradually increase the size of the cracks. Eventually some of the larger cracks provided pathways for the underground stream, which carved the winding passages of Howe Caverns seen today.

61 State *two* processes that caused these sediments to become limestone. [2]

62 Identify one method that could be used to determine that the walls of Howe Caverns are made of limestone. [1]

Base your answers to questions 63 through 66 on the passage and map below and on your knowledge of Earth science. The passage provides some information about the sediments under Portland, Oregon, and the map shows where Portland is located.

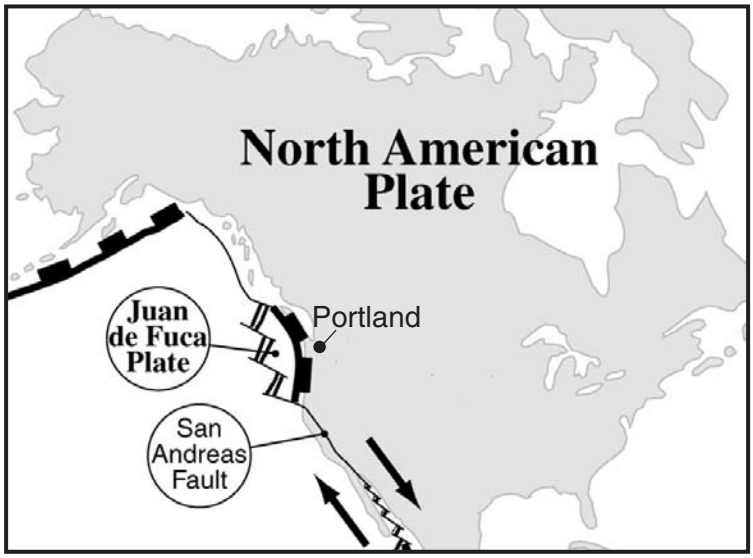
Bad seismic combination under Portland: Earthquake faults and jiggly sediment

Using a technique called seismic profiling, researchers have found evidence of ancient earthquake faults under Portland, Oregon. The faults may still be active, a USGS [United States Geological Survey] seismologist will announce tomorrow.

The research also turned up a 250-foot deep layer of silt and mud, deep under the city, which may have been caused by a catastrophic ice dam break some 15,000 years ago.

The two findings could together mean bad news, as soft sediment is known to amplify ground shaking during strong earthquakes. In the 1989 San Francisco earthquake, much of the damage to buildings was caused by liquefaction, a shaking and sinking of sandy, water-saturated soil along waterways. . . .

— Robert Roy Britt
excerpted from
"Bad sesimic combination under Portland:
Earthquake faults and jiggly sediment"
explorezone.com 05/03/99



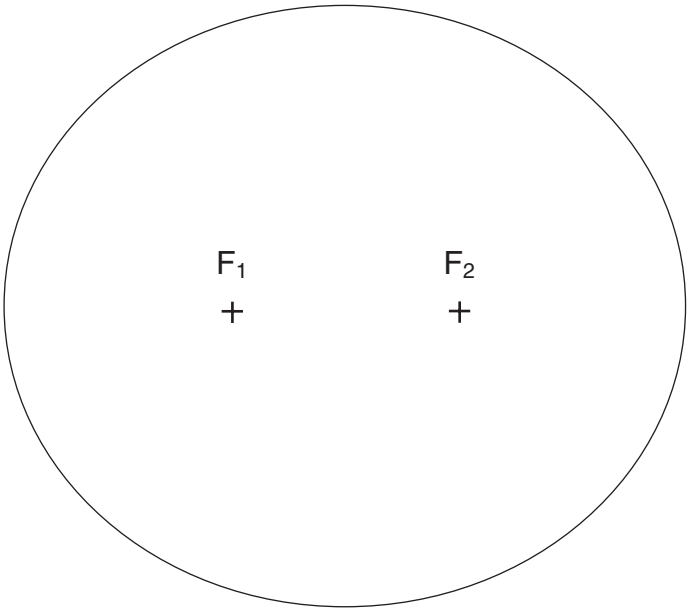
63 Explain why Portland is likely to experience a major earthquake. [1]

64 Why is the presence of a layer of silt and mud deep under the city a danger to Portland? [1]

65 Describe one precaution that can be taken to prevent or reduce property damage in preparation for a future earthquake in Portland. [1]

66 What type of tectonic plate boundary is shown at the San Andreas Fault? [1]

Base your answers to questions 67 and 68 on the diagram of the ellipse below.



67 Calculate the eccentricity of the ellipse to the *nearest thousandth*. [1]

68 State how the eccentricity of the given ellipse compares to the eccentricity of the orbit of Mars. [1]

Base your answers to questions 69 through 72 on your knowledge of Earth science and on the table below, which lists the seven brightest stars, numbered 1 through 7, in the constellation Orion. This constellation can be seen in the winter sky by an observer in New York State. The table shows the celestial coordinates for the seven numbered stars of Orion.

Location of the Seven Brightest Stars in Orion

Star Number	Celestial Longitude (measured in hours)	Celestial Latitude (measured in degrees)
1	5.9	+7.4
2	5.4	+6.3
3	5.2	–8.2
4	5.8	–9.7
5	5.7	–1.9
6	5.6	–1.2
7	5.5	–0.3

69 On the grid provided *in your answer booklet*, graph the data shown in the table by following the steps below.

a Mark with an **X**, the position of *each* of the seven stars. Write the number of the plotted star beside each **X**. The first star has been plotted for you. [2]

b Show the apparent shape of Orion by connecting the **X**s in the following order:

5 – 1 – 2 – 7 – 3 – 4 – 5 – 6 – 7 [1]

70 Star 1 plotted on the grid is the star *Betelgeuse*. Star 3 plotted on the grid is the star *Rigel*. How do the temperature and luminosity of *Betelgeuse* compare to the temperature and luminosity of *Rigel*? [1]

71 The seven stars of the constellation Orion that were plotted are located within our galaxy. Name the galaxy in which the plotted stars of Orion are located. [1]

72 State one reason why an observer in New York State can never observe the constellation Orion at midnight during July but can observe the constellation Orion at midnight during January. [1]

Base your answers to questions 73 through 75 on your knowledge of Earth science and on the data table below, which shows the industrial uses of wollastonite, a mineral mined in the eastern Adirondack Mountains of New York State.

Industrial Uses of Wollastonite in the United States

Industrial Uses of Wollastonite	Percent of Total Use
Plastics	37
Ceramics	28
Metallurgy	10
Paint	10
Asbestos substitute	9
Miscellaneous	6

73 On the pie graph provided *in your answer booklet*, complete the graph to show the percent of *each* industrial use of wollastonite. Label *each* section of the pie graph with its industrial use. The percent for Miscellaneous and for Asbestos substitute has been drawn and labeled for you. [2]

74 Wollastonite forms during the intense metamorphism of a sandy limestone. The expression below shows part of the process that results in the formation of wollastonite.

$$\underset{\text{Mineral 1}}{CaCO_3} + \underset{\text{Mineral 2}}{SiO_2} \xrightarrow{\text{Metamorphism}} \underset{\text{Wollastonite}}{CaSiO_2} + \underset{\text{Carbon dioxide}}{CO_2}$$

a Name the *two* minerals involved in the formation of wollastonite. [1]

b What *two* conditions normally cause intense metamorphism? [1]

75 Identify the geologic age of the New York State Adirondack Mountain bedrock in which wollastonite deposits are found. [1]

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 19, 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

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, June 19, 2003 — 1:15 to 4:15 p.m., only

ANSWER BOOKLET

Student ..... Sex: ☐ Male ☐ Female

Teacher .....

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

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

	Performance Test Score (Maximum Score: 23)

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

Total Written Test Score (Maximum Raw Score: 85)

Final Score (from conversion chart)

Raters' Initials:

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

Part B–2

For Raters Only

51 _____ **51** ☐

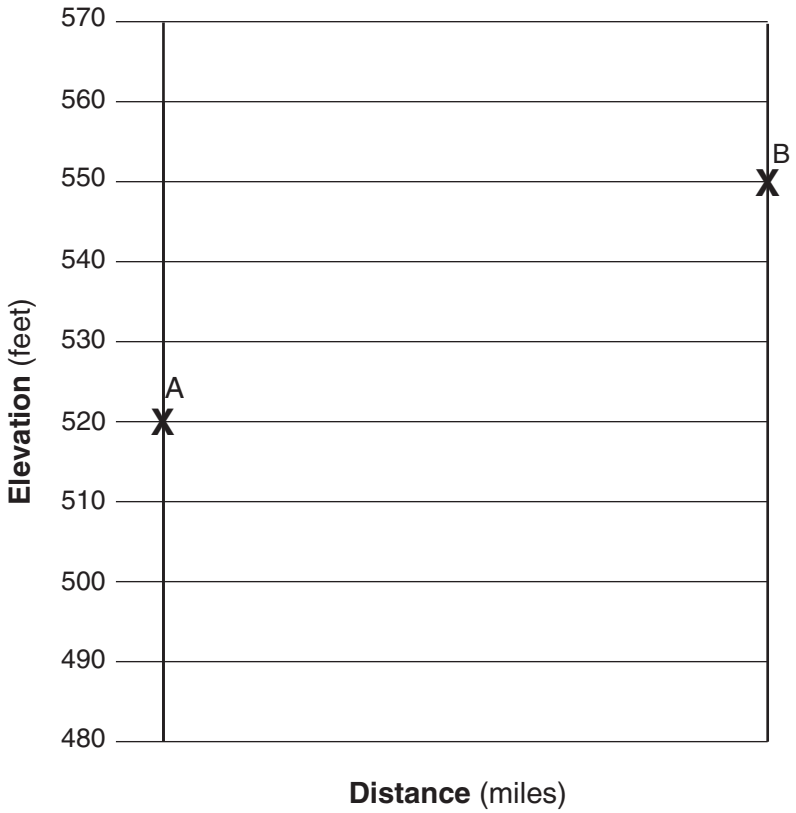
52 Gradient = _____ **52** ☐

53 _____ **53** ☐

_____

For Raters Only

54 ***a*** and ***b***



54*a* ☐

b ☐

55 ***a*** _____

_____

55*a* ☐

b _____

b ☐

[b]

For Raters Only

56

56 ☐

57 _____ **°F** **57** ☐

58 _____ **58** ☐

59 _____ **59** ☐

_____

60 _____ **days** **60** ☐

☐

Total Score for Part B–2

Part C

For Raters Only

61 Process 1: _____

Process 2: _____ **61**

62 _____ **62**

_____

63 _____ **63**

_____

64 _____ **64**

_____

65 _____ **65**

_____

66 _____ **66**

67 Eccentricity = _____ **67**

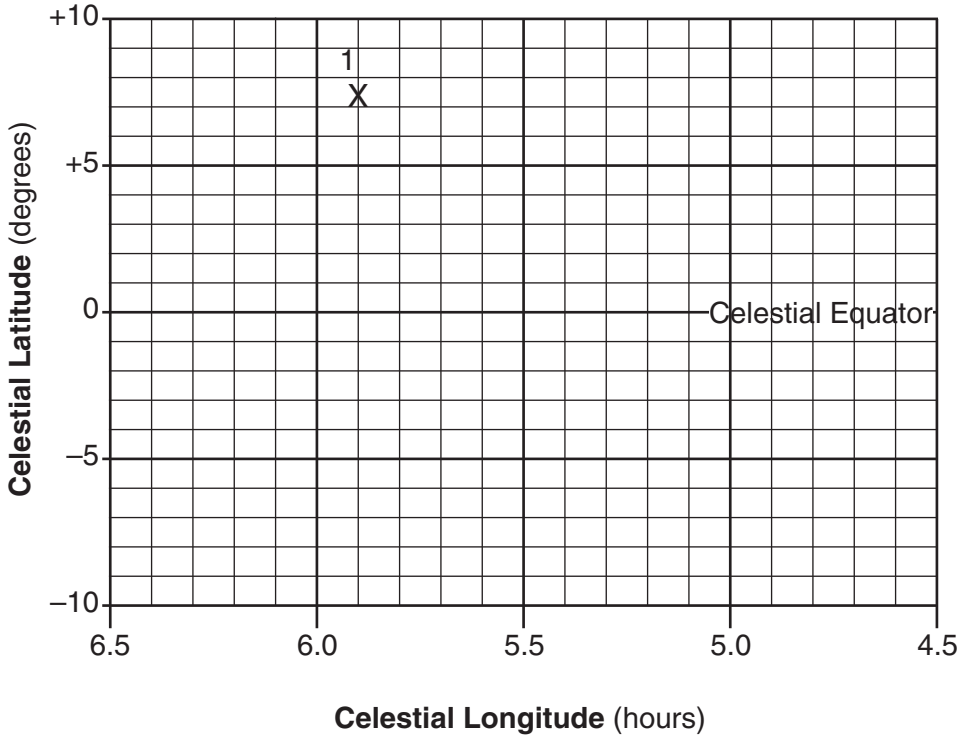
68 _____ **68**

_____

_____

For Raters Only

69 ***a*** and ***b***



69*a* ☐

b ☐

70 _____

_____

70 ☐

71 _____ **71** ☐

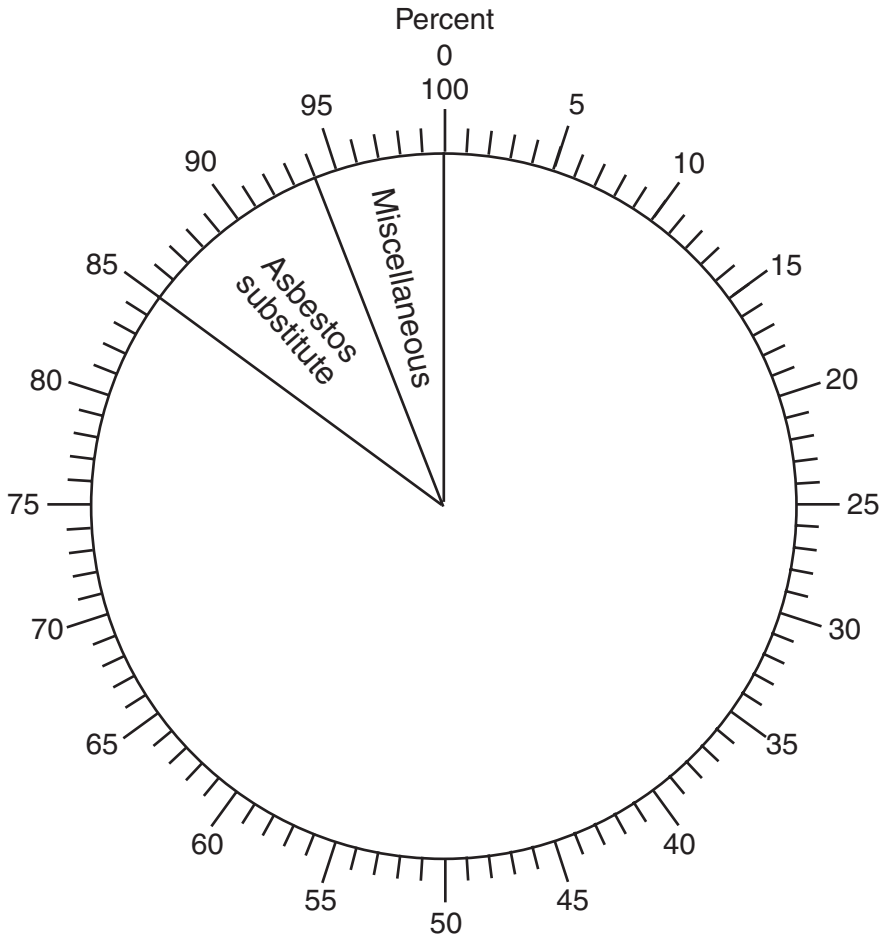
72 _____

_____

72 ☐

For Raters Only

73



73 ☐

74 ***a*** _____ and _____ **74*a*** ☐

b _____ and _____ ***b*** ☐

75 _____ **75** ☐

☐

Total Score for Part C

FOR TEACHERS ONLY

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

PS–ES PHYSICAL SETTING/EARTH SCIENCE

Thursday, June 19, 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

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

Part B–1

36 1	44 3
37 3	45 3
38 4	46 1
39 2	47 2
40 3	48 4
41 1	49 2
42 3	50 2
43 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 **south southwest** or **SSW** or **south** or **S** or **southwest** or **SW**.

52 [2] Allow 1 credit for **6** or **6.0** (±0.3).

and

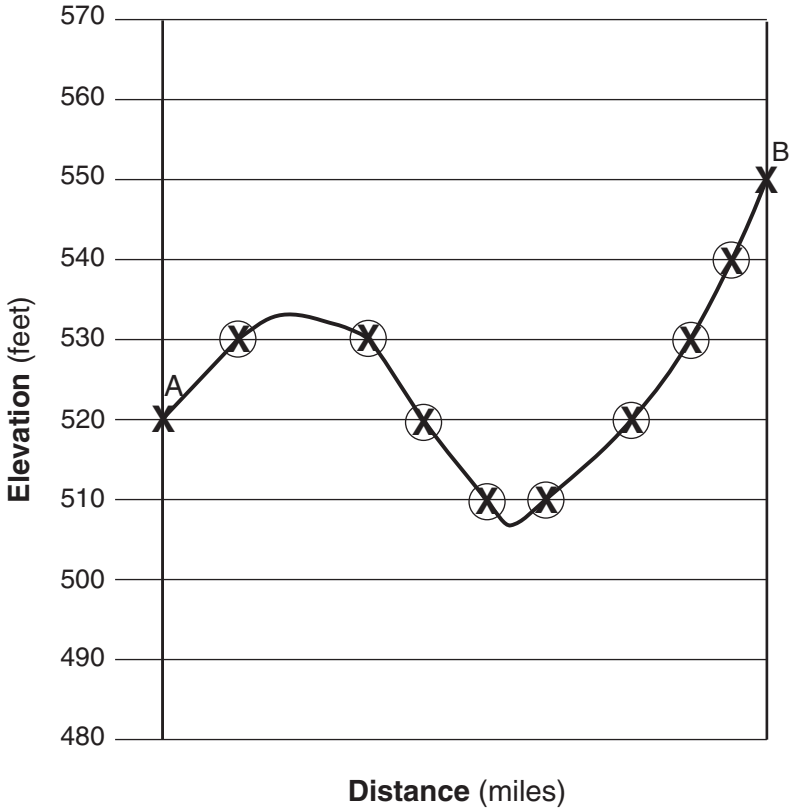
Allow 1 credit for **feet/mile** or **ft/mi**.

53 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Contour lines are closer together on the southern section of the hill.

The south side has the greatest change in elevation per mile.

54 [3] The correct profile is shown below.



a Allow 2 credits if seven or eight student-plotted **X**s are plotted correctly.

Allow only 1 credit if only four to six student-plotted **X**s are plotted correctly.

Note: The center of each student-plotted **X** must fall within the Ⓧ on the scoring grid.

Allow credit even if the student uses a symbol other than **X**.

b Allow 1 credit if the student-plotted **X**s are properly connected with a smooth, curved line. The Aurora hilltop must be greater than 530 but less than 535. The low point of the profile must be less than 510 feet but greater than 500 feet.

55 [2] ***a*** Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The stream velocity decreases.

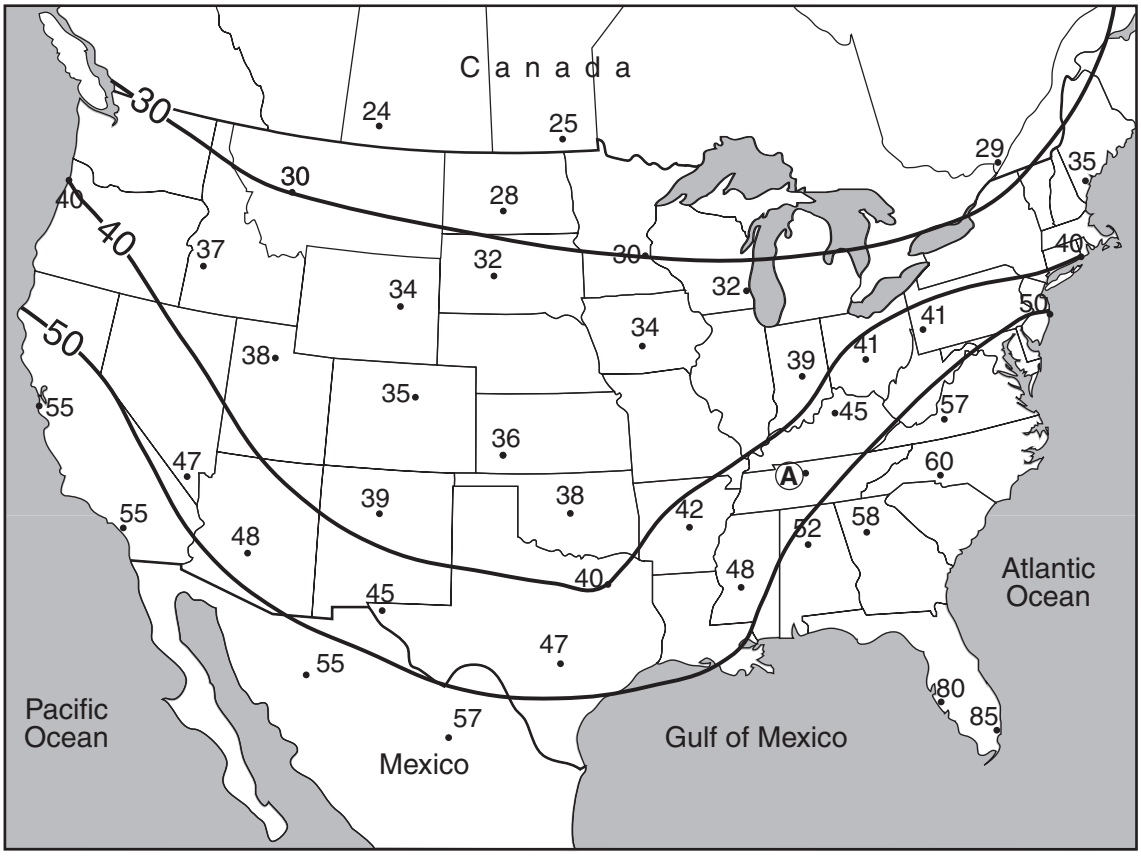
The still water of the lake slows the stream current.

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

silt

clay

56 [2] An example of correctly drawn isotherms is shown below.



Allow 2 credits for correctly drawing all three required isotherms. If the student draws more than the three required isotherms, *all* must be correct to receive 2 credits.

Allow only 1 credit for correctly drawing only two required isotherms.

or

Allow only 1 credit for correctly drawing all three required isotherms, but any additional isotherms drawn are incorrect.

Note: Allow credit even if the isotherms extend to the border of the map.

57 [1] Allow 1 credit for any temperature value between the student-drawn isotherms adjacent to point *A*. Allow credit for the isotherm value only if the isotherm passes through point *A*.

58 [1] Allow 1 credit for **Saturn.**

59 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

As the distance between them decreases, the orbital velocity increases.

It speeds up.

increases

60 [1] Allow 1 credit for any answer from 224.7 days to less than 365.26 days.

Part C

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

61 [2] Allow 2 credits, 1 credit for *each* of two correct responses. Acceptable responses include, but are not limited to, these examples:

cementation

compaction

deposition

burial

pressure caused by overlying sediments

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

acid test

Limestone bubbles when acid is placed on it.

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

Tectonic plates are shifting in this region.

The ancient faults detected under Portland may still be active.

Soft sediment causes minor earthquakes to become major earthquakes.

Portland is located near a plate boundary.

Note: Do *not* allow credit for hot spot.

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

Soft sediment can amplify earthquake ground movement.

Buildings can be damaged by liquefaction within those sediments during the earthquakes.

Structures can collapse, tilt, or sink during an earthquake.

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

Reinforce buildings to provide greater stability.

Make buildings more flexible.

Redesign or reconstruct highway overpasses.

Rewrite or enforce strict building codes.

Restrict building in surface areas identified as more susceptible to earthquake damage.

66 [1] Allow 1 credit for **transform plate boundary** or **transform fault** or **transform.**

Note: Do *not* allow credit for faulting, fault, or hot spot.

67 [1] Allow 1 credit for **0.333** (±0.026) or **.333** (±0.026).

Note: Do *not* allow credit if units are included with the numerical answer.

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

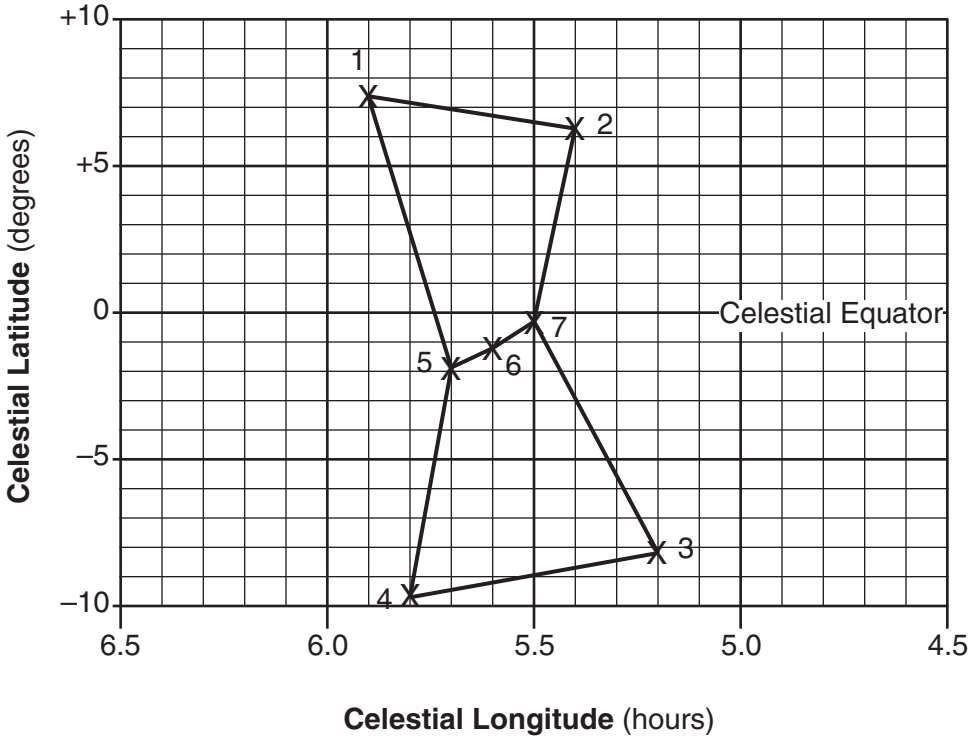
The given ellipse has a higher eccentricity than the orbit of Mars.

The orbit of Mars is more circular than the given ellipse.

or

Allow 1 credit for a correct response based on the student-determined eccentricity.

69 [3] The correctly plotted graph is shown below.



a Allow 2 credits if all six student-plotted **X**s are plotted and numbered correctly.

Allow only 1 credit if only four or five student-plotted **X**s are plotted and numbered correctly.

or

Allow only 1 credit if all six student-plotted **X**s are plotted correctly but not numbered.

Note: Each **X** must be on the correct vertical line of celestial longitude and be within ±0.5 of the correct celestial latitude.

Allow credit even if the student uses a symbol other than **X**.

b Allow 1 credit for connecting the **X**s in the order specified. Allow this credit even if the **X**s are located incorrectly.

or

Allow 1 credit if the student has drawn the apparent shape of Orion even if the **X**s are not numbered.

70 [1] Allow 1 credit for a correct response. Both temperature and luminosity must be included to receive credit. Acceptable responses include, but are not limited to, this example:

Betelgeuse is cooler and less luminous than *Rigel.*

71 [1] Allow 1 credit for **Milky Way** or **Milky Way Galaxy.**

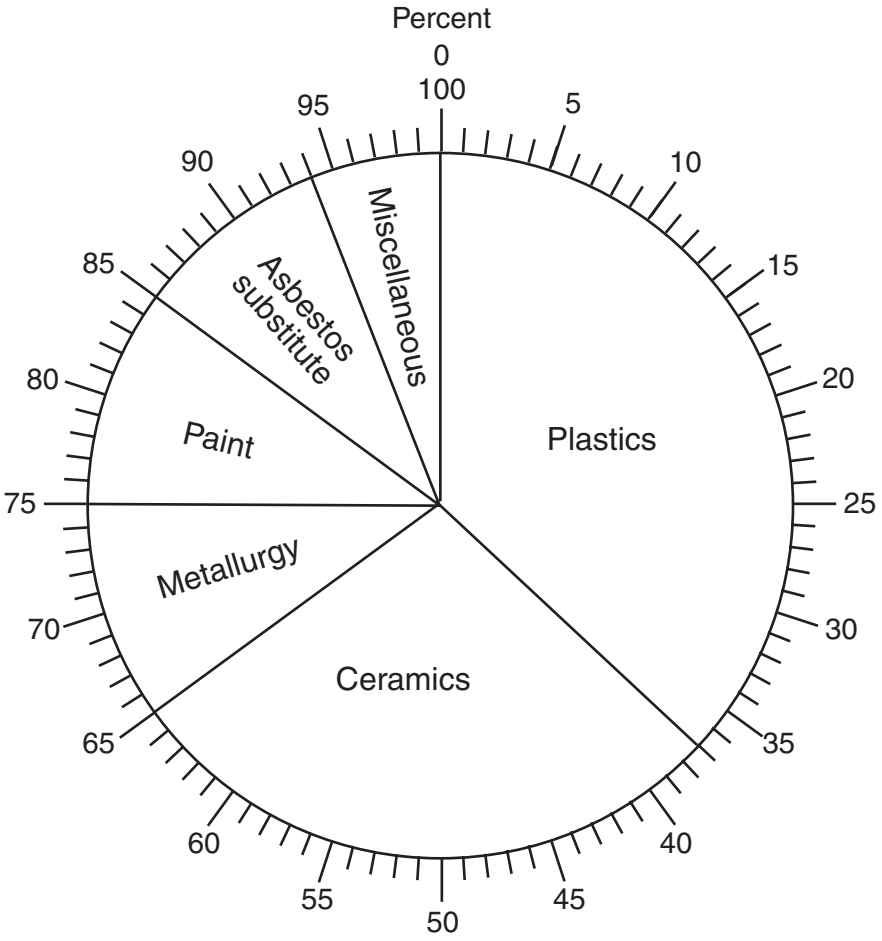
72 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Earth revolves in its orbit.

Orion is only visible during the daytime in July.

The Sun is between Earth and Orion in July.

73 [2] An example of a correctly drawn graph is shown below.



Allow 2 credits if all four student-graphed sections are drawn and labeled correctly. Sections may be graphed in any order.

Allow only 1 credit if only two or three student-graphed sections are drawn and labeled correctly.

or

Allow only 1 credit if all four student-graphed sections are drawn correctly but are not labeled.

74 [2] ***a*** Allow 1 credit for **calcite** and **quartz.**

b Allow 1 credit for **heat** and **pressure.**

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

Proterozoic

Middle Proterozoic

Late Proterozoic

Precambrian

about 1000 million years

between 1600 and 1000 million years ago

Regents Examination in Physical Setting/Earth Science — June 2003
Chart for Determining the Final Examination Score
(Use for June 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 85.

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
85	100	99	98	97	97	97	97	96	96	95	95	94	94	93	92	92	91	90	89	89	88	87	86	85
84	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
83	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
82	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
81	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
80	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
79	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	83	82
78	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
77	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
76	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
75	94	93	92	92	91	91	91	90	90	89	89	88	88	87	86	86	85	84	84	83	82	81	80	79
74	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
73	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
72	92	91	90	90	90	89	89	88	88	88	87	87	86	85	85	84	83	83	82	81	80	79	78	77
71	92	90	89	89	89	88	88	88	87	87	86	86	85	85	84	83	83	82	81	80	79	78	77	77
70	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
69	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
68	90	89	88	87	87	87	86	86	86	85	85	84	83	83	82	82	81	80	79	78	78	77	76	75
67	89	88	87	86	86	86	85	85	85	84	84	83	83	82	81	81	80	79	78	78	77	76	75	74
66	88	87	86	86	85	85	85	84	84	83	83	82	82	81	80	80	79	78	78	77	76	75	74	73
65	87	86	85	85	84	84	84	83	83	82	82	81	81	80	80	79	78	78	77	76	75	74	73	72
64	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71
63	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71
62	85	84	82	82	82	82	81	81	80	80	79	79	78	78	77	76	76	75	74	73	72	72	71	70
61	85	84	82	82	82	82	81	81	80	80	79	79	78	78	77	76	76	75	74	73	72	72	71	70
60	84	83	82	81	81	81	80	80	80	79	79	78	77	77	76	76	75	74	73	72	72	71	70	69
59	83	82	81	80	80	80	80	79	79	78	78	77	77	76	75	75	74	73	72	72	71	70	69	68
58	82	81	80	80	79	79	79	78	78	77	77	76	76	75	75	74	73	72	72	71	70	69	68	67
57	81	80	79	79	79	78	78	77	77	77	76	76	75	74	74	73	72	72	71	70	69	68	67	66
56	80	79	78	78	78	77	77	77	76	76	75	75	74	73	73	72	71	71	70	69	68	67	66	65
55	80	79	77	77	77	76	76	76	75	75	74	74	73	73	72	71	71	70	69	68	67	66	66	65
54	79	78	77	76	76	76	75	75	74	74	74	73	72	72	71	70	70	69	68	67	67	66	65	64
53	78	77	76	75	75	75	74	74	74	73	73	72	72	71	70	70	69	68	67	67	66	65	64	63
52	77	76	75	75	74	74	74	73	73	72	72	71	71	70	69	69	68	67	67	66	65	64	63	62
51	76	75	74	74	73	73	73	72	72	71	71	70	70	69	69	68	67	66	66	65	64	63	62	61
50	75	74	73	73	73	72	72	71	71	71	70	70	69	68	68	67	66	66	65	64	63	62	61	60
49	74	73	71	71	71	71	70	70	69	69	68	68	67	67	66	65	65	64	63	62	61	61	60	59
48	73	72	71	70	70	70	69	69	69	68	68	67	66	66	65	65	64	63	62	61	61	60	59	58
47	72	71	70	69	69	69	68	68	68	67	67	66	66	65	64	64	63	62	61	61	60	59	58	57
46	71	70	69	69	68	68	68	67	67	66	66	65	65	64	63	63	62	61	61	60	59	58	57	56
45	70	69	68	68	67	67	67	66	66	65	65	64	64	63	63	62	61	61	60	59	58	57	56	55
44	69	68	67	67	67	66	66	66	65	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54
43	69	68	66	66	66	65	65	65	64	64	63	63	62	62	61	60	60	59	58	57	56	55	55	54

Regents Examination in Physical Setting/Earth Science — June 2003
Chart for Determining the Final Examination Score
(Use for June 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
42	68	67	65	65	65	65	64	64	63	63	62	62	61	61	60	59	59	58	57	56	55	55	54	53
41	66	65	64	63	63	63	63	62	62	61	61	60	60	59	58	58	57	56	55	55	54	53	52	51
40	65	64	63	63	62	62	62	61	61	60	60	59	59	58	58	57	56	55	55	54	53	52	51	50
39	64	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	55	55	54	53	52	51	50	49
38	63	62	61	61	61	60	60	60	59	59	58	58	57	56	56	55	54	54	53	52	51	50	49	48
37	62	61	60	59	59	59	58	58	57	57	57	56	55	55	54	53	53	52	51	50	50	49	48	47
36	61	60	59	58	58	58	57	57	57	56	56	55	55	54	53	53	52	51	50	50	49	48	47	46
35	60	59	58	58	57	57	57	56	56	55	55	54	54	53	52	52	51	50	50	49	48	47	46	45
34	59	58	57	57	56	56	56	55	55	54	54	53	53	52	52	51	50	49	49	48	47	46	45	44
33	58	56	55	55	55	54	54	54	53	53	52	52	51	51	50	49	49	48	47	46	45	44	43	43
32	57	56	54	54	54	54	53	53	52	52	51	51	50	50	49	48	48	47	46	45	44	44	43	42
31	56	55	54	53	53	53	52	52	52	51	51	50	49	49	48	48	47	46	45	44	44	43	42	41
30	54	53	52	52	51	51	51	50	50	49	49	48	48	47	46	46	45	44	44	43	42	41	40	39
29	53	52	51	51	50	50	50	49	49	48	48	47	47	46	46	45	44	44	43	42	41	40	39	38
28	52	51	50	50	50	49	49	49	48	48	47	47	46	45	45	44	43	43	42	41	40	39	38	37
27	51	50	48	48	48	48	47	47	46	46	45	45	44	44	43	42	42	41	40	39	38	38	37	36
26	50	49	48	47	47	47	46	46	46	45	45	44	43	43	42	42	41	40	39	38	38	37	36	35
25	49	48	47	46	46	46	46	45	45	44	44	43	43	42	41	41	40	39	38	38	37	36	35	34
24	47	46	45	45	45	44	44	43	43	43	42	42	41	40	40	39	38	38	37	36	35	34	33	32
23	46	45	44	44	44	43	43	43	42	42	41	41	40	39	39	38	37	37	36	35	34	33	32	31
22	45	44	43	42	42	42	41	41	40	40	40	39	38	38	37	36	36	35	34	33	33	32	31	30
21	44	43	42	41	41	41	40	40	40	39	39	38	38	37	36	36	35	34	33	33	32	31	30	29
20	42	41	40	40	39	39	39	38	38	37	37	36	36	35	35	34	33	32	32	31	30	29	28	27
19	41	40	39	39	39	38	38	37	37	37	36	36	35	34	34	33	32	32	31	30	29	28	27	26
18	40	39	37	37	37	37	36	36	35	35	34	34	33	33	32	31	31	30	29	28	27	27	26	25
17	39	38	37	36	36	36	35	35	35	34	34	33	32	32	31	31	30	29	28	27	27	26	25	24
16	37	36	35	35	34	34	34	33	33	32	32	31	31	30	29	29	28	27	27	26	25	24	23	22
15	36	35	34	34	33	33	33	32	32	31	31	30	30	29	29	28	27	27	26	25	24	23	22	21
14	35	34	32	32	32	31	31	31	30	30	29	29	28	28	27	26	26	25	24	23	22	21	21	20
13	34	33	31	31	31	31	30	30	29	29	28	28	27	27	26	25	25	24	23	22	21	21	20	19
12	32	31	30	29	29	29	29	28	28	27	27	26	26	25	24	24	23	22	21	21	20	19	18	17
11	30	29	28	28	28	27	27	26	26	26	25	25	24	23	23	22	21	21	20	19	18	17	16	15
10	29	28	27	27	27	26	26	26	25	25	24	24	23	22	22	21	20	20	19	18	17	16	15	14
9	28	27	26	25	25	25	24	24	23	23	23	22	21	21	20	19	19	18	17	16	16	15	14	13
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	22	21	21	21	20	20	20	19	19	18	18	17	17	16	15	15	14	13	12	11	10	9	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	15	15	15	14	14	14	13	13	12	12	11	11	10	9	9	8	7	6	5	4	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

June 2003 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	21,22	52	67,69,73
Math Key Idea 2	28,34	37,38,53,58,59	68
Math Key Idea 3	7	53,57	
Sci. Inq. Key Idea 1		36,48,50	72
Sci. Inq. Key Idea 2			62
Sci. Inq. Key Idea 3	4,7,10,11,15, 25,29,30,31,32, 33,34	37,38,48,58	61,66,70,74,75
Eng. Des. Key Idea 1			65
Standard 2			
Key Idea 1	19		
Key Idea 2			
Key Idea 3	24		
Standard 6			
Key Idea 1		50,55	
Key Idea 2	5,6,12,13,17, 20,27	39,40,41,42,43, 44,45,46,47,50, 51,52,54,56,57	69,73
Key Idea 3		51,52,53,54,55, 60	68
Key Idea 4		59	
Key Idea 5	14	43,59	63,64,72
Key Idea 6			65
Standard 7			
Key Idea 1			65
Key Idea 2	24		63,64,65
Standard 4			
Performance Indicator 1	1,2,4,5,10,11, 12,15,16,35	39,40,41,42,43, 47,48,49,50,58, 59,60	67,68,69,70,71, 72,75
Performance Indicator 2	3,6,7,8,9,13,14, 17,18,19,20,21, 22,23,24,26,27, 28,31,34	36,37,38,41,44, 45,46,51,52,53, 54,55,56,57	61,63,64,65,66
Performance Indicator 3	25,29,30,32,33	48	61,62,73,74
Reference Tables			
ESRT 2001 edition	4,7,9,10,11,13, 15,22,25,28,29, 30,31,32,33,34	37,38,45,46,48, 52,55,58,60	61,62,66,67,68, 70,74,75