

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

PHYSICAL SETTING
EARTH SCIENCE

Thursday, August 16, 2007 — 12:30 p.m. to 3:30 p.m., only

This is a test of your knowledge of Earth science. Use that knowledge to answer all questions in this examination. Some questions may require the use of the *Earth Science Reference Tables*. The *Earth Science Reference Tables* are supplied separately. Be certain you have a copy of the *2001 Edition (Revised November 2006)* 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 (Revised November 2006)* must be available for you to use while taking this examination.

The use of any communications device is strictly prohibited when taking this examination. If you use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

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 Scientists can plan to photograph a solar eclipse because most astronomical events are

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

2 The Coriolis effect causes winds in New York State to generally curve

- (1) to the right of the direction of travel
- (2) to the left of the direction of travel
- (3) upward away from Earth's surface
- (4) downward toward Earth's surface

3 In New York State, the constellation Pisces can be seen in the night sky between the middle of summer and the middle of winter. The constellation Scorpio can be seen in the night sky between early spring and early fall. The reason these two constellations can be viewed only at these times is a direct result of Earth's

- (1) spin on its axis
- (2) movement around the Sun
- (3) axis having a 23.5° tilt
- (4) distance from the Sun

4 Approximately how many degrees per day does Earth revolve in its orbit around the Sun?

- (1) 1°
- (2) 13°
- (3) 15°
- (4) 23.5°

5 Compared with our Sun, the star *Betelgeuse* is

- (1) smaller, hotter, and less luminous
- (2) smaller, cooler, and more luminous
- (3) larger, hotter, and less luminous
- (4) larger, cooler, and more luminous

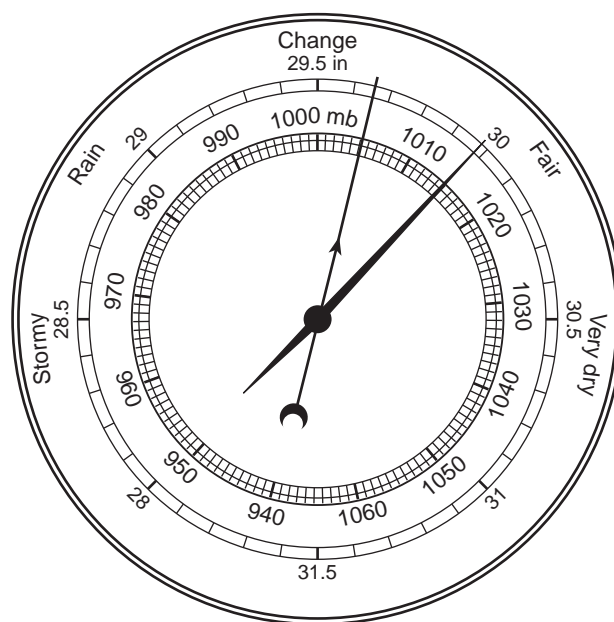
6 Astronomers viewing light from distant galaxies observe a shift of spectral lines toward the red end of the visible spectrum. This shift provides evidence that

- (1) orbital velocities of stars are decreasing
- (2) Earth's atmosphere is warming
- (3) the Sun is cooling
- (4) the universe is expanding

7 How many calories are required to evaporate 1 gram of boiling water?

- (1) 1
- (2) 80
- (3) 540
- (4) 620

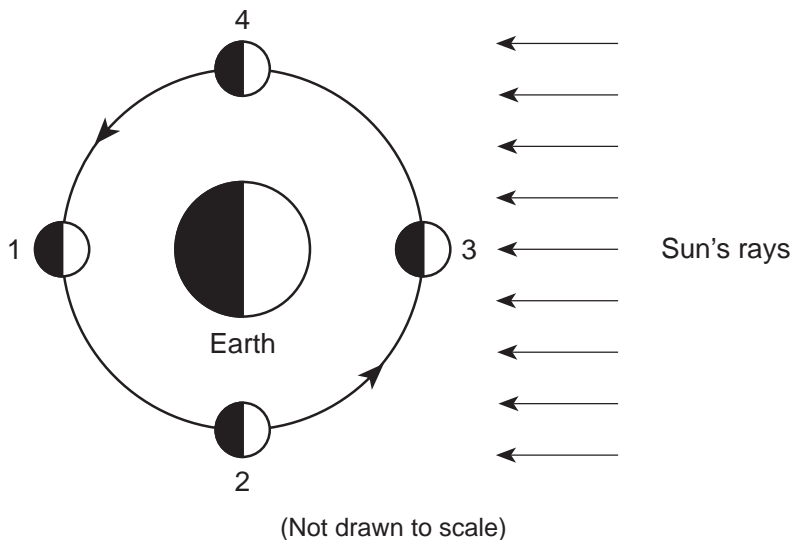
8 A weather instrument is shown below.



Which weather variable is measured by this instrument?

- (1) wind speed
- (2) precipitation
- (3) cloud cover
- (4) air pressure

9 The diagram below represents the Sun's rays striking Earth and the Moon. Numbers 1 through 4 represent positions of the Moon in its orbit around Earth.



The highest tides on Earth occur when the Moon is in positions

- | | |
|-------------|-------------|
| (1) 1 and 3 | (3) 3 and 2 |
| (2) 2 and 4 | (4) 4 and 1 |

10 Most of the solar radiation absorbed by Earth's surface is later radiated back into space as which type of electromagnetic radiation?

- | | |
|-----------------|----------------|
| (1) x ray | (3) infrared |
| (2) ultraviolet | (4) radio wave |

11 In the United States, most tornadoes are classified as intense

- | |
|--|
| (1) low-pressure funnel clouds that spin clockwise |
| (2) low-pressure funnel clouds that spin counterclockwise |
| (3) high-pressure funnel clouds that spin clockwise |
| (4) high-pressure funnel clouds that spin counterclockwise |

12 Which type of air mass is associated with warm, dry atmospheric conditions?

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

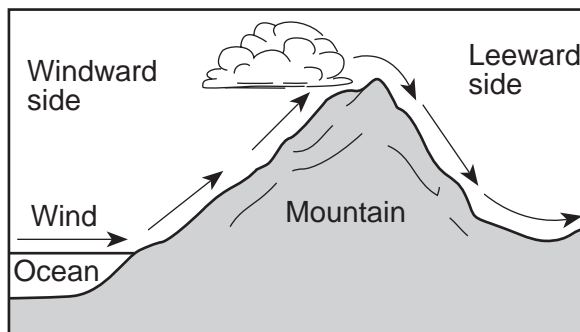
13 The approximate latitude of Utica, New York, is

- | | |
|--------------|--------------|
| (1) 43°05' N | (3) 75°15' E |
| (2) 43°05' S | (4) 75°15' W |

14 Earth's surface winds generally blow from regions of higher

- | |
|---|
| (1) air temperature toward regions of lower air temperature |
| (2) air pressure toward regions of lower air pressure |
| (3) latitudes toward regions of lower latitudes |
| (4) elevations toward regions of lower elevations |

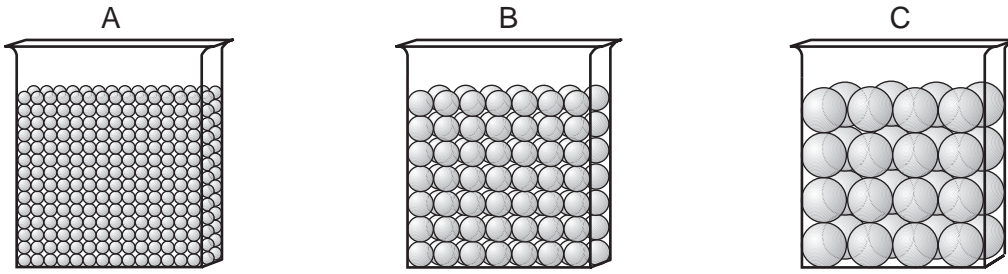
15 The diagram below shows how prevailing winds cause different weather conditions on the windward and leeward sides of a mountain range.



Clouds usually form on the windward sides of mountains because this is where air

- | | |
|---------------------|---------------------|
| (1) rises and cools | (3) sinks and cools |
| (2) rises and warms | (4) sinks and warms |

16 The diagrams below represent three containers, A, B, and C, which were filled with equal volumes of uniformly sorted plastic beads. Water was poured into each container to determine porosity and infiltration time.



(Not drawn to scale)

Which data table best represents the porosity and infiltration time of the beads in the three containers?

Beaker	Porosity (%)	Infiltration Time (sec)
A	40	5.2
B	40	2.8
C	40	0.4

(1)

Beaker	Porosity (%)	Infiltration Time (sec)
A	20	5.2
B	30	2.8
C	40	0.4

(3)

Beaker	Porosity (%)	Infiltration Time (sec)
A	40	0.4
B	40	2.8
C	40	5.2

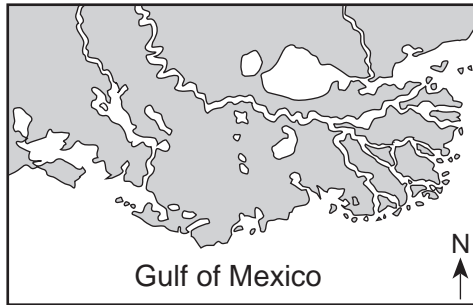
(2)

Beaker	Porosity (%)	Infiltration Time (sec)
A	20	0.4
B	30	2.8
C	40	5.2

(4)

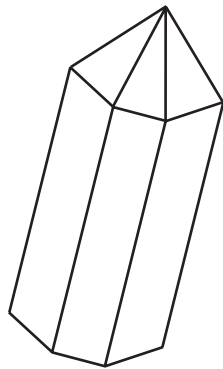
- 17 Which ocean current brings warm water to the western coast of Africa?
- (1) Agulhas Current
 - (2) North Equatorial Current
 - (3) Canaries Current
 - (4) Guinea Current

- 18 The map below shows the large delta that formed as the Mississippi River emptied into the Gulf of Mexico.

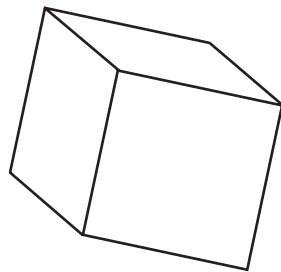


Which process was primarily responsible for the formation of the delta?

- (1) glacial erosion
 - (2) cementation of sediment
 - (3) deposition of sediment
 - (4) mass movement
- 19 The diagrams below show the crystal shapes of two minerals.



Quartz



Halite

Quartz and halite have different crystal shapes primarily because

- (1) light reflects from crystal surfaces
- (2) energy is released during crystallization
- (3) of impurities that produce surface variations
- (4) of the internal arrangement of the atoms

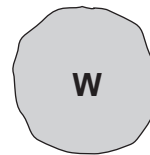
- 20 A student created the table below by classifying six minerals into two groups, A and B, based on a single property.

Group A	Group B
olivine	pyrite
garnet	galena
calcite	graphite

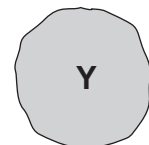
Which property was used to classify these minerals?

- (1) color
 - (2) luster
 - (3) chemical composition
 - (4) hardness
- 21 Which igneous rock has a vesicular texture and contains the minerals potassium feldspar and quartz?
- (1) andesite
 - (2) pegmatite
 - (3) pumice
 - (4) scoria
- 22 Dolostone is classified as which type of rock?
- (1) land-derived sedimentary rock
 - (2) chemically formed sedimentary rock
 - (3) foliated metamorphic rock
 - (4) nonfoliated metamorphic rock

- 23 A stream is transporting the particles W, X, Y, and Z, shown below.



Density = 3.8 g/mL



Density = 2.4 g/mL



Density = 3.8 g/mL



Density = 2.4 g/mL

Which particle will most likely settle to the bottom first as the velocity of this stream decreases?

- (1) W
- (2) X
- (3) Y
- (4) Z

32 The time line below represents the entire geologic history of Earth.



Which letter best represents the first appearance of humans on Earth?

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

33 Three extinct organisms are shown in the diagrams below.



Cystiphyllum,
a solitary coral



Baragwanathia,
a lycopod — an
early land plant

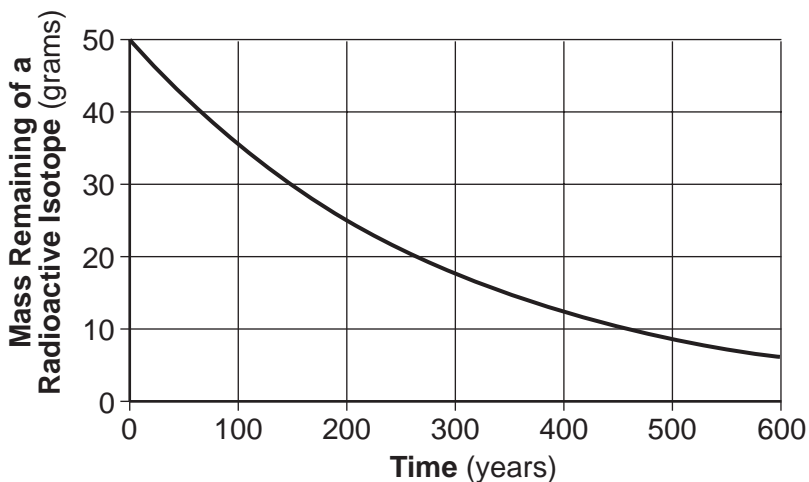


Palaeophonus,
a scorpion — one of
the first land animals

Which other life-form reached its peak development during the same period in geologic history that these three life-forms first appeared on Earth?

- (1) dinosaurs
- (2) stromatolites
- (3) mastodons
- (4) eurypterids

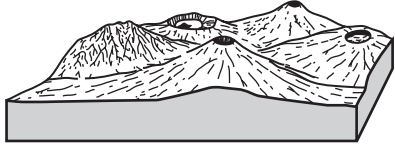
34 The graph below shows the radioactive decay of a 50-gram sample of a radioactive isotope.



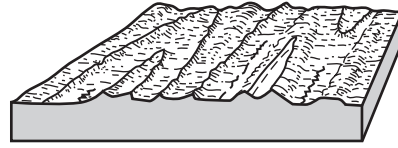
According to the graph, what is the half-life of this isotope?

- (1) 100 years
- (2) 150 years
- (3) 200 years
- (4) 300 years

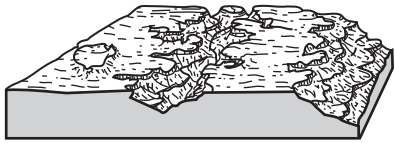
35 Which diagram represents a landscape where fine-grained igneous bedrock is most likely to be found?



(1)



(3)



(2)



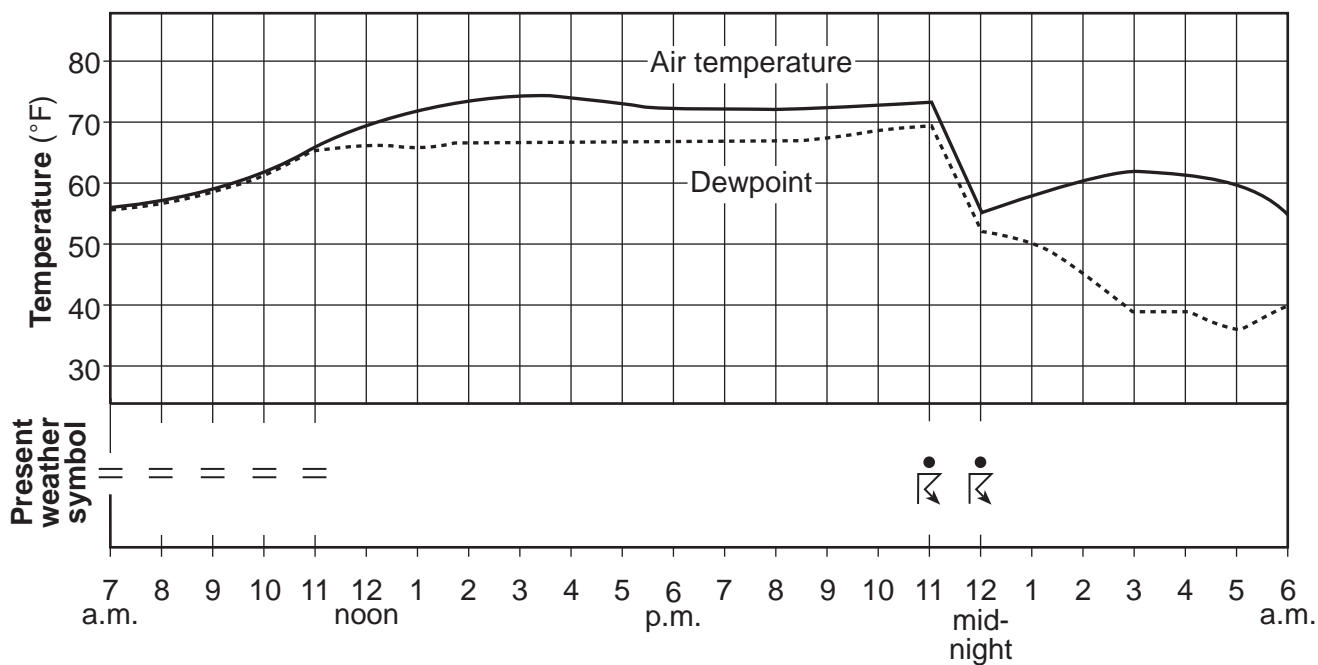
(4)

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.

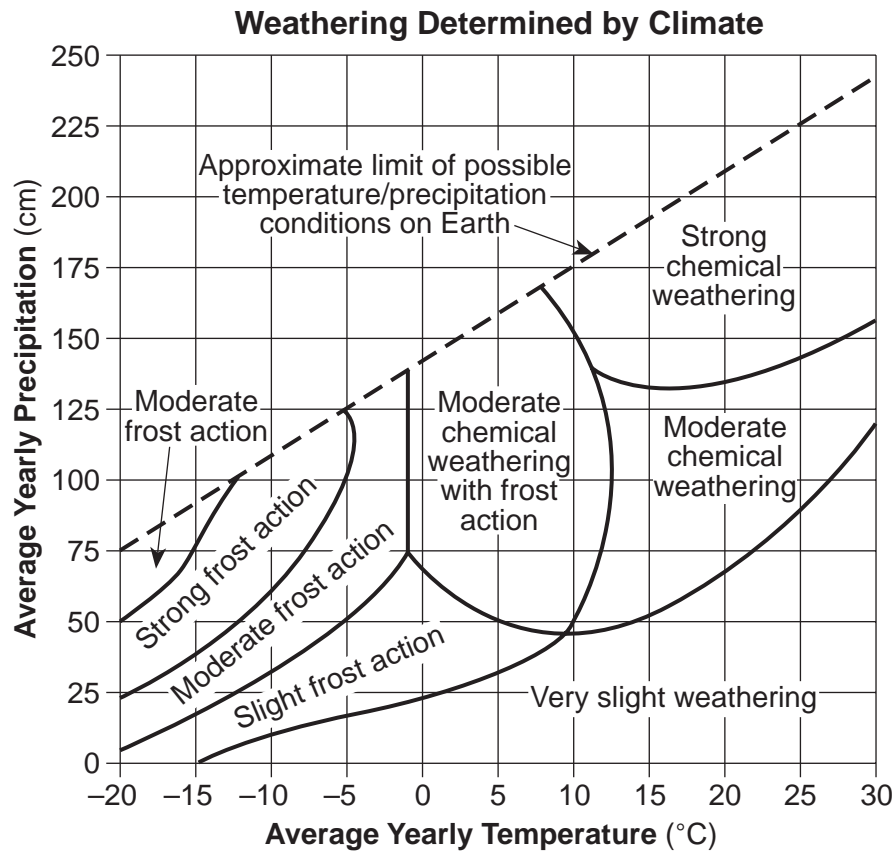
Base your answers to questions 36 and 37 on the graph below, which shows air temperature, dewpoint, and present weather conditions for a 23-hour period at Dallas, Texas.



- 36 The thunderstorm that occurred between 11 p.m. and 12 midnight was most likely the result of
- (1) the arrival of a warm front
 - (2) the arrival of a cold front
 - (3) an increase in the difference between air temperature and dewpoint
 - (4) an increase in both air temperature and dewpoint

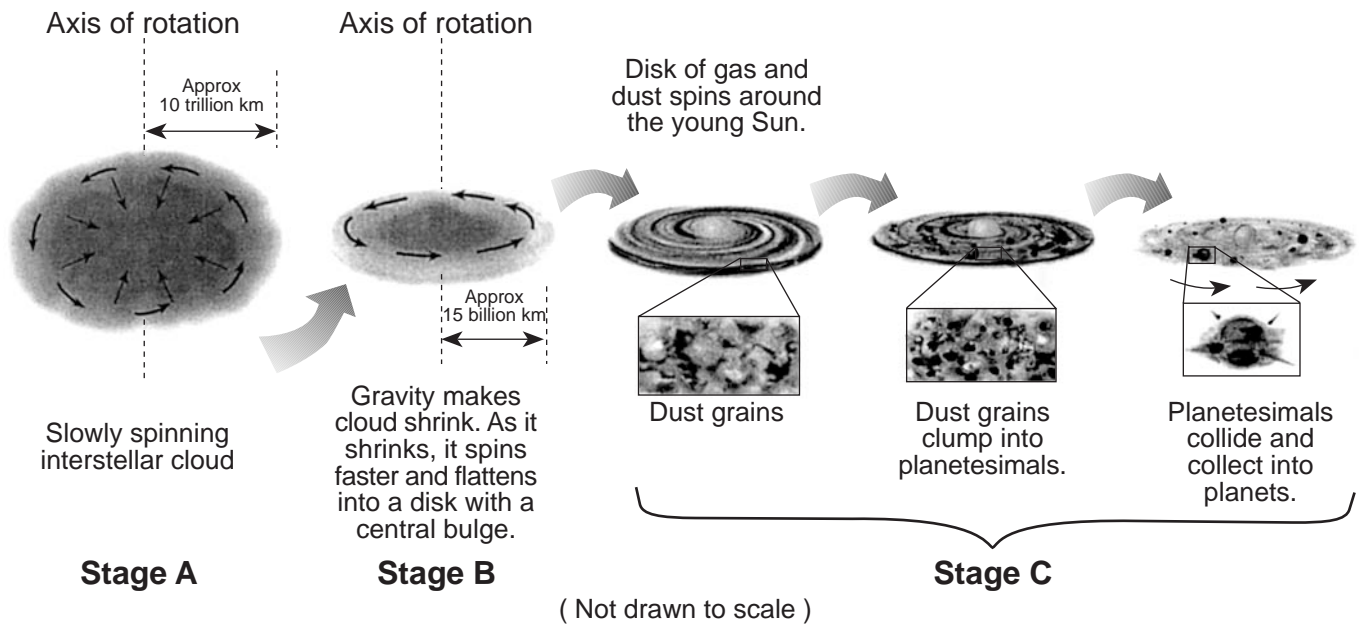
- 37 Which weather condition was reported at Dallas when the air temperature was equal to the dewpoint?
- (1) fog
 - (2) rain
 - (3) thunderstorm
 - (4) drizzle
-

Base your answers to questions 40 and 41 on the graph below, which shows the effect that average yearly precipitation and temperature have on the type of weathering that will occur in a particular region.



- 40 Which type of weathering is most common where the average yearly temperature is 5°C and the average yearly precipitation is 45 cm?
- (1) moderate chemical weathering
 - (2) very slight weathering
 - (3) moderate chemical weathering with frost action
 - (4) slight frost action
- 41 The amount of chemical weathering will increase if
- (1) air temperature decreases and precipitation decreases
 - (2) air temperature decreases and precipitation increases
 - (3) air temperature increases and precipitation decreases
 - (4) air temperature increases and precipitation increases

Base your answers to questions 42 and 43 on the diagram below, which shows an inferred sequence in which our solar system formed from a giant interstellar cloud of gas and debris. Stage A shows the collapse of the gas cloud, stage B shows its flattening, and stage C shows the sequence that led to the formation of planets.



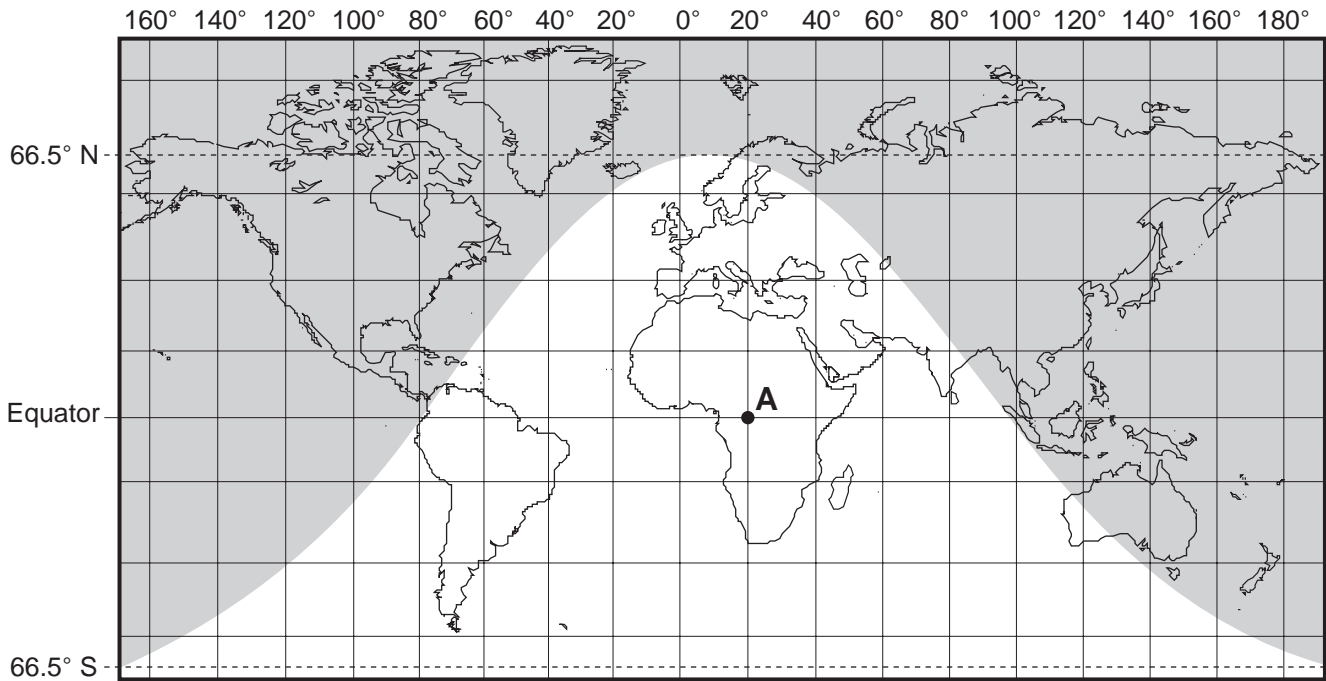
42 From stage B to stage C, the young Sun was created

- (1) when gravity caused the center of the cloud to contract
- (2) when gravity caused heavy dust particles to split apart
- (3) by outgassing from the spinning interstellar cloud
- (4) by outgassing from Earth's interior

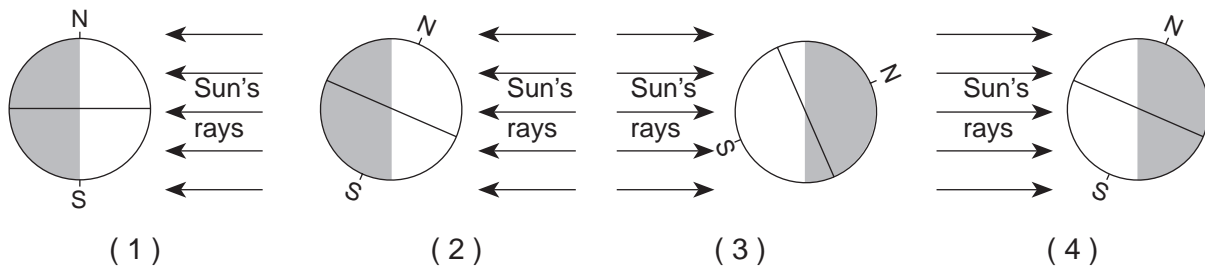
43 After the young Sun formed, the disk of gas and dust

- | | |
|-------------------------------|------------------------------------|
| (1) became spherical in shape | (3) became larger in diameter |
| (2) formed a central bulge | (4) eventually formed into planets |
-

Base your answers to questions 44 through 46 on the world map below. The shaded portion of the map indicates areas of night, and the unshaded portion indicates areas of daylight on a certain day of the year. Dashed latitude lines represent the Arctic Circle (66.5° N) and the Antarctic Circle (66.5° S). Point A is a location on Earth's surface.



44 Which diagram shows the position of Earth relative to the Sun's rays on this day?



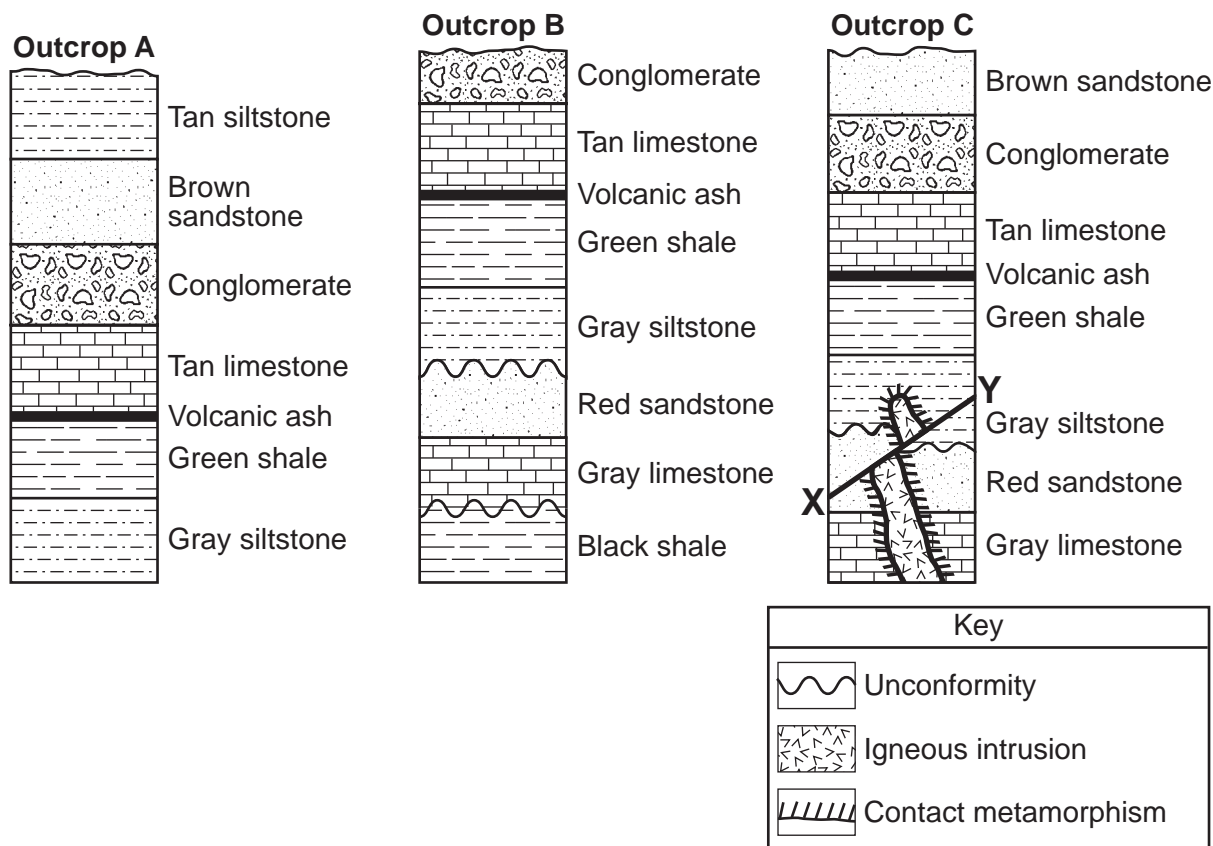
45 Approximately how many hours of daylight would occur at position A on this day?

- (1) 6 (3) 12
 (2) 9 (4) 15

46 On this day, the duration of daylight from the equator to the Arctic Circle

- (1) decreases, only (3) decreases, then increases
 (2) increases, only (4) increases, then decreases

Base your answers to questions 47 through 50 on the cross sections of three rock outcrops, A, B, and C. Line XY represents a fault. Overturning has not occurred in the rock outcrops.



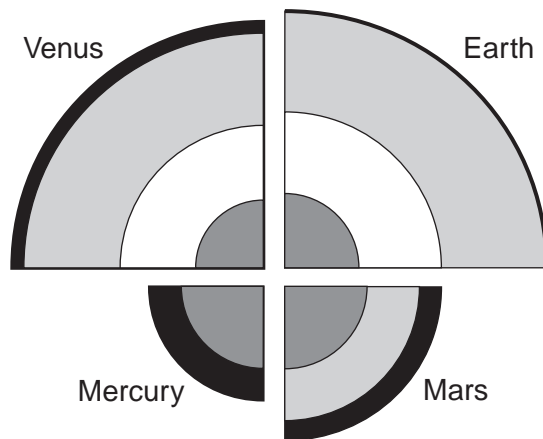
- 47 The volcanic ash layer is considered a good time marker for correlating rocks because the volcanic ash layer
- (1) has a dark color
 - (2) can be dated using carbon-14
 - (3) lacks fossils
 - (4) was rapidly deposited over a wide area
- 48 Which sedimentary rock shown in the outcrops is the youngest?
- (1) black shale
 - (2) conglomerate
 - (3) tan siltstone
 - (4) brown sandstone
- 49 What is the youngest geologic feature in the three bottom layers of outcrop C?
- (1) fault
 - (2) igneous intrusion
 - (3) unconformity
 - (4) zone of contact metamorphism
- 50 Which processes were primarily responsible for the formation of most of the rock in outcrop A?
- (1) melting and solidification
 - (2) heating and compression
 - (3) compaction and cementation
 - (4) weathering and erosion





Part B-2

Answer all questions in this part.

Directions (51–64): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *Earth Science Reference Tables*.

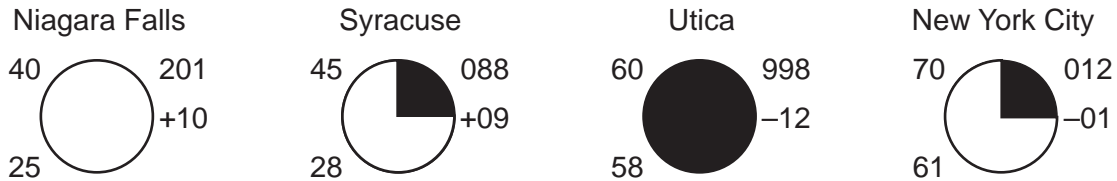
Base your answers to questions 51 through 53 on the diagram below, which shows the inferred internal structure of the four terrestrial planets, drawn to scale.



Key	
	Solid iron core
	Silicate mantle
	Liquid iron core
	Silicate crust

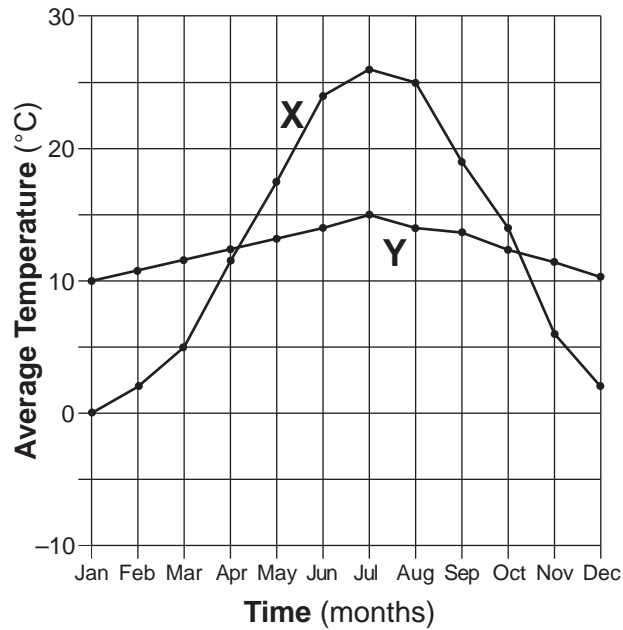
- 51 How are the crusts of Mars, Mercury, Venus, and Earth similar in composition? [1]
- 52 Identify the *two* planets that would allow an S-wave from a crustal quake to be transmitted through the core to the opposite side of the planet. [1]
- 53 Explain why the densities of these terrestrial planets are greater than the densities of the Jovian planets. [1]
-

Base your answers to questions 54 through 56 on the information on the four station models shown below. The weather data were collected at Niagara Falls, Syracuse, Utica, and New York City at the same time.



- 54 What was the air pressure in Niagara Falls? [1]
- 55 Explain how the weather conditions shown on the station models suggest that Utica had the greatest chance of precipitation. [1]
- 56 New York City was experiencing a wind blowing from the south at 10 knots with hazy conditions limiting visibility to $\frac{3}{4}$ of a mile. On the station model for New York City *in your answer booklet*, place, in the proper location and format, the information below. [2]
- wind direction
 - wind speed
 - present weather
 - visibility
-

Base your answers to questions 57 through 59 on the graph below, which shows the average monthly temperatures for a year for city X and city Y. Both cities are located at the same latitude.

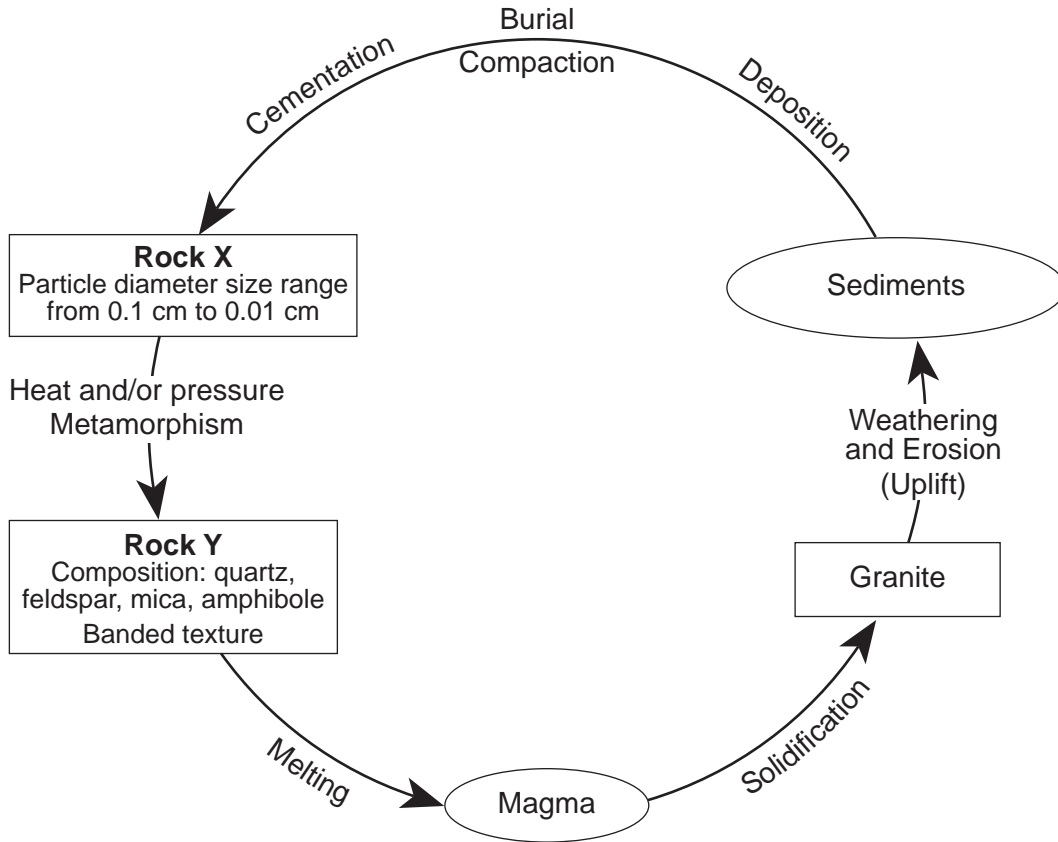


57 What was the range in the average monthly temperatures for city Y during the year? [1]

58 Explain why city X has a greater difference between summer and winter temperatures than city Y. [1]

59 What evidence shown on the graph indicates that both cities, X and Y, are located in the Northern Hemisphere? [1]

Base your answers to questions 60 through 62 on the diagram below, which represents a part of the rock cycle. The igneous rock, granite, and the characteristics of sedimentary rock X and metamorphic rock Y are shown.

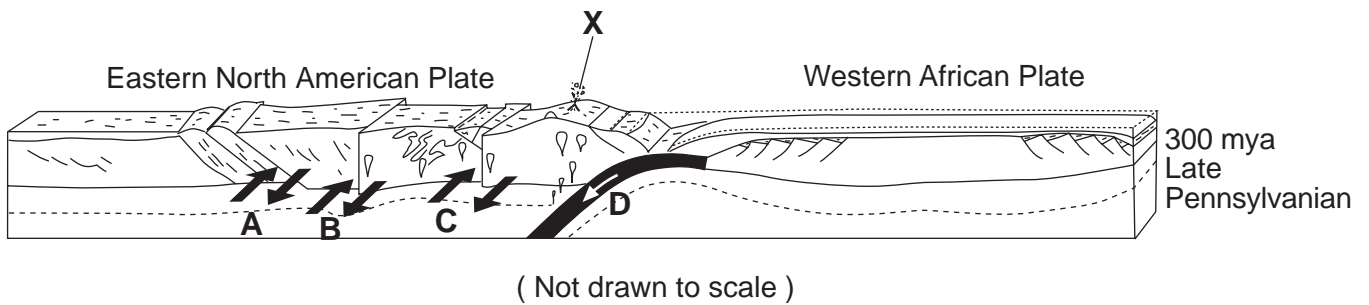


60 Identify sedimentary rock X. [1]

61 Identify metamorphic rock Y. [1]

62 Complete the table *in your answer booklet*, with descriptions of the observable characteristics used to identify granite. [1]

Base your answers to questions 63 and 64 on the block diagram below. The diagram shows the tectonic plate boundary between Africa and North America 300 million years ago, as these two continents united into a single landmass. The arrows at letters A, B, C, and D represent relative crustal movements. Letter X shows the eruption of a volcano at that time.



63 Identify the type of tectonic plate motion represented by the arrow shown at *D*. [1]

64 Identify the type of tectonic motion represented by the arrows shown at *A*, *B*, and *C*.
[1]

Part C

Answer all questions in this part.

Directions (65–82): 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 diagram in your answer booklet. The diagram shows the positions of Halley's Comet and Asteroid 134340 at various times in their orbits. Specific orbital positions are shown for certain years.

- 65 The eccentricity of the asteroid's orbit is 0.250. On the orbital diagram *in your answer booklet*, mark the position of the second focus of the asteroid's orbit by placing an **X** on the major axis at the proper location. [1]
- 66 Determine which was traveling faster, Halley's Comet or the asteroid, between the years 1903 and 1908. State *one* reason for your choice. [1]
- 67 Explain why Halley's Comet is considered to be part of our solar system. [1]
-

Base your answers to questions 70 through 74 on the passage and the cross section below. The passage describes the geologic history of the Pine Bush region near Albany, New York. The cross section shows the bedrock and overlying sediment along a southwest to northeast diagonal line through a portion of this area. Location A shows an ancient buried stream channel and location B shows a large sand dune.

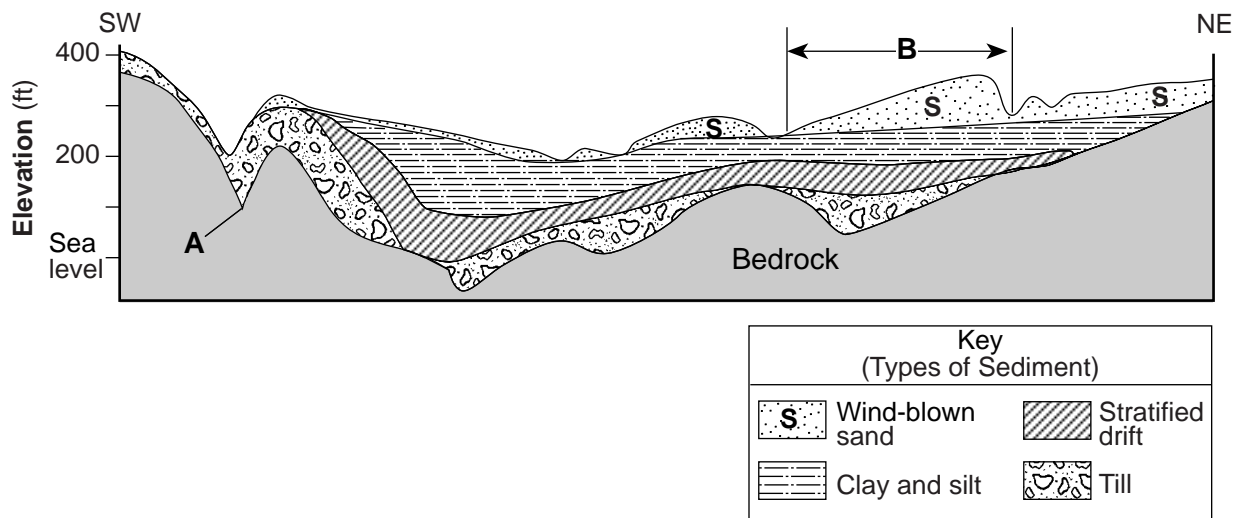
The Pine Bush Region

The Pine Bush region, just northwest of Albany, New York, is a 40-square mile area of sand dunes and wetlands covered by pitch pine trees and scrub oak bushes. During the Ordovician Period, this area was covered by a large sea. Layers of mud and sand deposited in this sea were compressed into shale and sandstone bedrock.

During most of the Cenozoic Era, running water eroded stream channels into the bedrock. One of these buried channels is shown at location A in the cross section. Over the last one million years of the Cenozoic Era, this area was affected by glaciation. During the last major advance of glacial ice, soil and bedrock were eroded and later deposited as till (a mixture of boulders, pebbles, sand, and clay).

About 20,000 years ago, the last glacier in New York State began to melt. The meltwater deposited pebbles and sand, forming the stratified drift. During the 5000 years it took to melt this glacier, the entire Pine Bush area became submerged under a large 350-foot-deep glacial lake called Lake Albany. Delta deposits of cobbles, pebbles, and sand formed along the lake shorelines, and beds of silt and clay were deposited farther into the lake.

Lake Albany drained about 12,000 years ago, exposing the lake bottom. Wind erosion created the sand dunes that cover much of the Pine Bush area today.



70 According to the passage, how old is the bedrock shown in the cross section? [1]

71 What evidence shown at location A suggests that the channel in the bedrock was eroded by running water? [1]

- 72 List, from oldest to youngest, the *four* types of sediment shown above the bedrock in the cross section. [1]
- 73 Explain why the till layer is composed of unsorted sediment. [1]
- 74 How does the shape of the sand dune at location *B* provide evidence that the prevailing winds that formed this dune were blowing from the southwest? [1]
-

Base your answers to questions 75 through 77 on the data table below. A student recorded the hours of daylight and the altitude of the Sun at noon on the twenty-first day of every month for one year in Buffalo, New York.

Data Table

Date	Hours of Daylight	Altitude of the Sun at Noon (°)
January 21	9.5	32.3
February 21	10.8	40.1
March 21	12.0	47.3
April 21	13.7	55.1
May 21	14.8	62.5
June 21	15.3	70.4
July 21	14.8	63.3
August 21	13.7	55.5
September 21	12.1	47.7
October 21	10.8	39.9
November 21	9.5	32.1
December 21	9.0	24.4

- 75 On the graph *in your answer booklet*, draw a line to represent the general relationship between the altitude of the Sun at noon and the number of hours of daylight throughout the year at Buffalo. [1]
- 76 The sky model diagram *in your answer booklet* shows the apparent path of the Sun on March 21 for an observer in Buffalo, New York. Draw a line to represent the apparent path of the Sun from sunrise to sunset at Buffalo on May 21. Be sure your path indicates the correct altitude of the noon Sun and begins and ends at the correct positions on the horizon. [2]
- 77 On the same sky model diagram *in your answer booklet*, place an asterisk (*) at the apparent position of the *North Star* as seen from Buffalo. [1]
-

Base your answers to questions 78 through 80 on the field map in your answer booklet, which shows an area of a state park where an underground gasoline tank leaked and contaminated the groundwater. Groundwater-monitoring wells were installed to determine the extent of the contamination. The concentration of contaminants in parts per million (ppm) in each of the wells is indicated on the map.

78 On the field map *in your answer booklet*, draw the 50-ppm, 100-ppm, and 150-ppm isolines. The 0-ppm isoline has been drawn for you. [1]

79 State the relationship between the distance from the gasoline tank and the concentration of contaminants in the groundwater. [1]

80 Park officials do not want to see another incident of groundwater contamination from gasoline tanks. State *one* action that park officials could take to prevent gasoline from contaminating the groundwater in the future. [1]

Base your answers to questions 81 and 82 on the hardness of the minerals talc, quartz, halite, sulfur, and fluorite.

81 On the grid *in your answer booklet*, construct a bar graph to represent the hardness of these minerals. [1]

82 Which mineral shown on the grid would be the best abrasive? State *one* reason for your choice. [1]

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Thursday, August 16, 2007 — 12:30 to 3:30 p.m., only

ANSWER SHEET

Student Sex: Male Female Grade

Teacher School

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

Part A

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

Part A Score

Part B-1

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

Part B-1 Score

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

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

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

Signature

Tear Here

PHYSICAL SETTING EARTH SCIENCE

Thursday, August 16, 2007 — 12:30 to 3:30 p.m., only

ANSWER BOOKLET

Male

Student..... Sex: Female

Teacher

School..... Grade

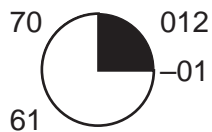
Answer all questions in Part B-2 and Part C. Record your answers in this booklet.

<input type="text"/>	Performance Test Score (Maximum Score: 23)	
.....		
Part	Maximum Score	Student's Score
A	35	
B-1	15	
B-2	15	
C	20	
Total Written Test Score (Maximum Raw Score: 85)		<input type="text"/>
Final Score (from conversion chart)		<input type="text"/>
Raters' Initials: Rater 1 Rater 2		

Part B-2		For Raters Only
51	_____	51 <input type="text"/>
52	_____ and _____	52 <input type="text"/>
53	_____ _____	53 <input type="text"/>
54	_____ mb	54 <input type="text"/>
55	_____ _____	55 <input type="text"/>

For Raters
Only

56



56

57 _____ °C to _____ °C

57

58 _____

58

59 _____

59

60 _____

60

61 _____

61

62

Characteristic of Granite	Description
Texture	
Color	
Density	

62

63 _____

63

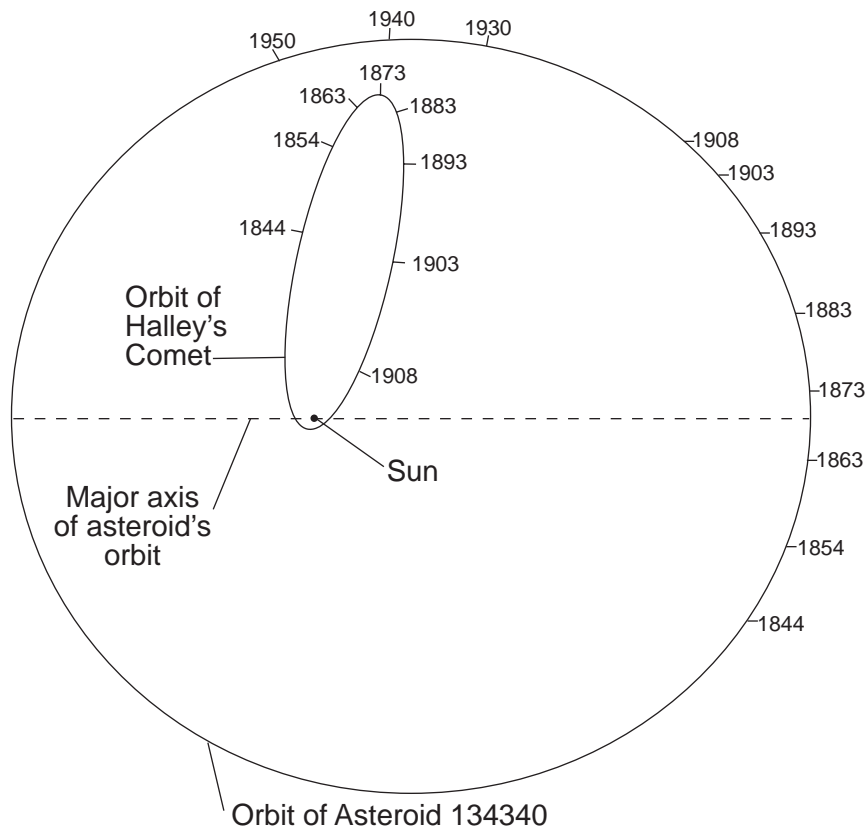
64 _____

64

Total Score for
Part B-2

Part C

65



65

66 Traveling faster: _____

Reason: _____

66

67 _____

67

**For Raters
Only**

68 Rate of change = _____

68

69 _____

69

70 _____ million years

70

71 _____

71

72 Oldest 1. _____



2. _____

3. _____

Youngest 4. _____

72

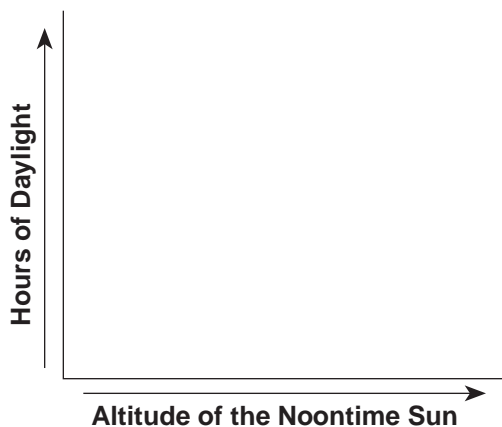
73 _____

73

74 _____

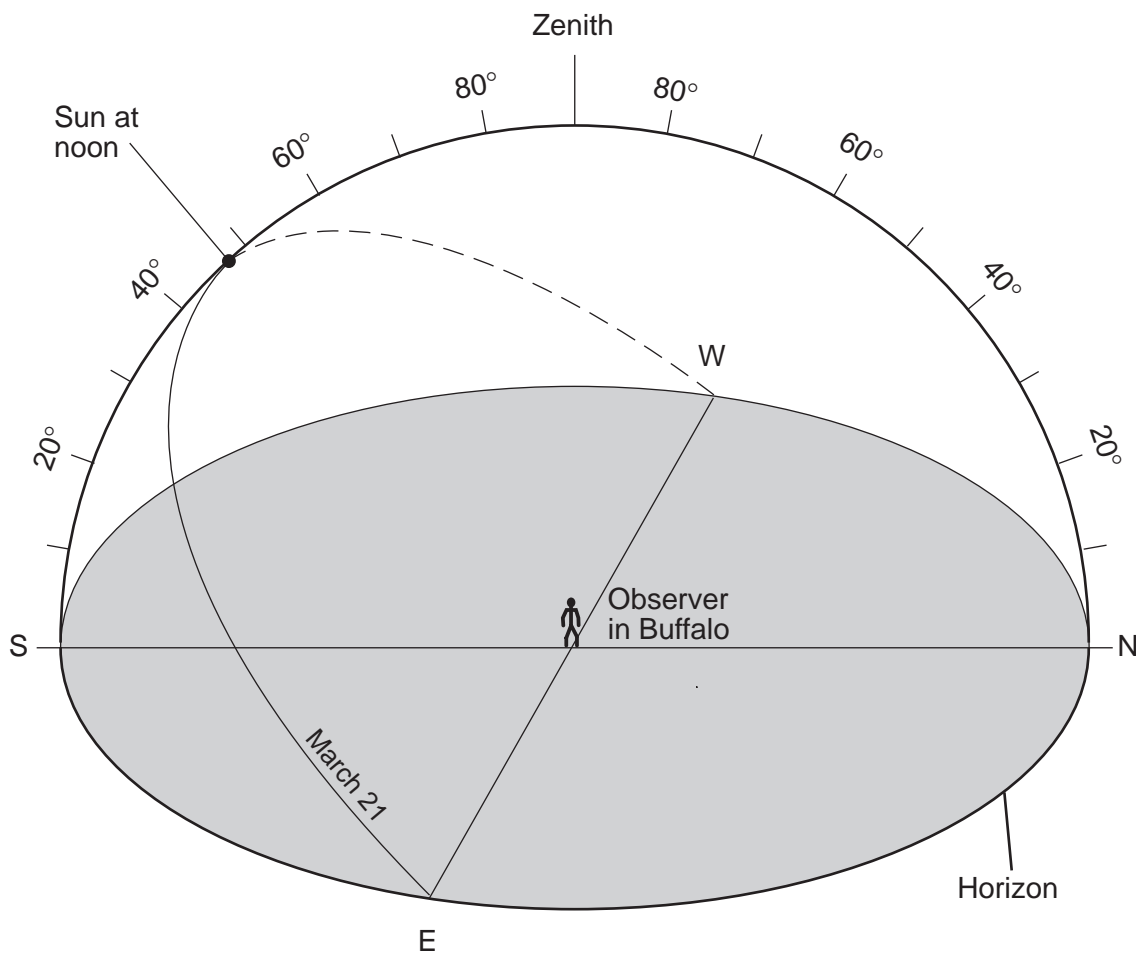
74

75



75

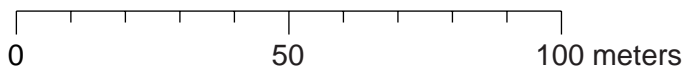
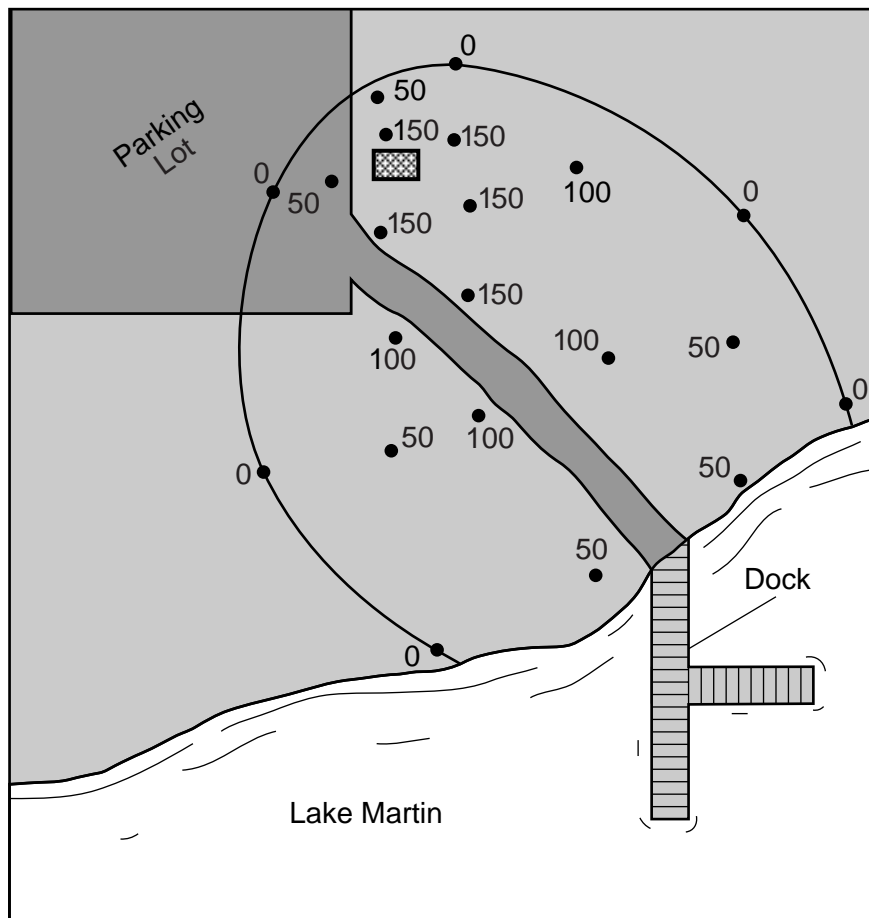
76-77



76

77

Area of State Park



Key	
●	Groundwater-monitoring well
▨	Underground gasoline tank



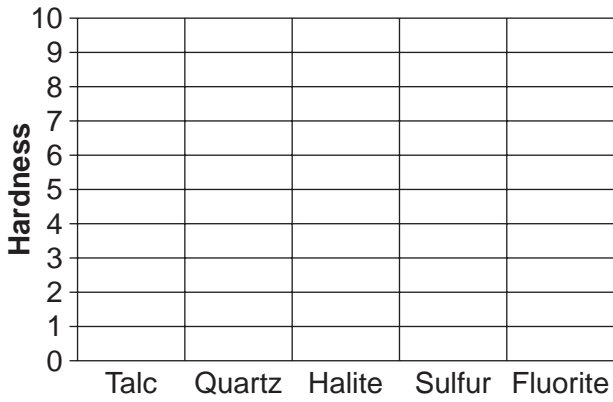
79 _____

79

80 _____

80

81



81

82 Mineral: _____

82

Reason: _____

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, August 16, 2007 — 12:30 to 3:30 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site <http://www.emsc.nysed.gov/osa/> and select the link "Examination Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents examination period.

Part A and Part B-1

Allow 1 credit for each correct response.

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

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Physical Setting/Earth Science examination. Additional information about scoring is provided in the publication *Information Booklet for 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 check mark each incorrect or omitted answer. In the box provided at the end of each part, record the number of questions the student answered correctly for that part.

At least two science teachers must participate in the scoring of each student's responses to the Part B–2 and Part C open-ended questions. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score all the open-ended questions on a student's answer paper.

Students' responses must be scored strictly according to the Scoring Key and Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the rating guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the rating guide. In the student's answer booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

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

Raters should enter the scores earned for Part A, Part B–1, Part B–2, and Part C on the appropriate lines in the box printed on the answer booklet and then should add these four scores and enter the total in the box labeled "Total Written Test Score." The student's score for the Earth Science Performance Test should be entered in the space provided. Then, the student's raw scores on the performance test and written test should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Thursday, August 16, 2007. 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 for that administration be used to determine the student's final score.

Part B–2

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

51 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The crusts have a silicate composition.
- The crusts contain the elements oxygen and silicon.

52 [1] Allow 1 credit for *both* Mercury *and* Mars.

53 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The terrestrial planets are rocky and composed of heavier elements.
- The terrestrial planets are closer to the Sun.
- The Jovian planets are not rocky and are composed of lighter elements.

54 [1] Allow 1 credit for 1020.1 mb.

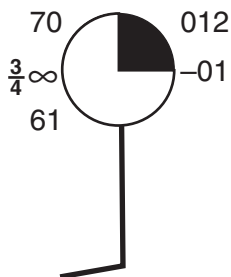
55 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The air temperature is closest to the dewpoint in Utica.
- The air pressure in Utica is lowest.
- The amount of cloud cover is 100% in Utica.
- The relative humidity is highest in Utica.
- Air pressure is decreasing in Utica.

56 [2] Allow 2 credits allocated as follows:

- Allow 2 credits if three or four variables are placed in their proper locations and in the correct format.
- Allow 1 credit if only two variables are placed in their proper locations and in the correct format.

Example of a 2-credit response:



Note: The feather for the wind speed may be placed on either side of the staff.

57 [1] Allow 1 credit for 10°C to 15°C.

58 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- City X is located farther inland from the ocean.
- City Y is located closer to a large body of water.

59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Both cities have their highest temperatures in June, July, and August.

60 [1] Allow 1 credit for sandstone.

61 [1] Allow 1 credit for gneiss.

62 [1] Allow 1 credit for a correct description of *two* or more characteristics. Acceptable responses include, but are not limited to:

Characteristic of Granite	Description
Texture	coarse nonvesicular 1 mm to 10 mm
Color	light colored white pink gray
Density	low 2.7 g/cm ³

63 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- subduction
- convergence

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

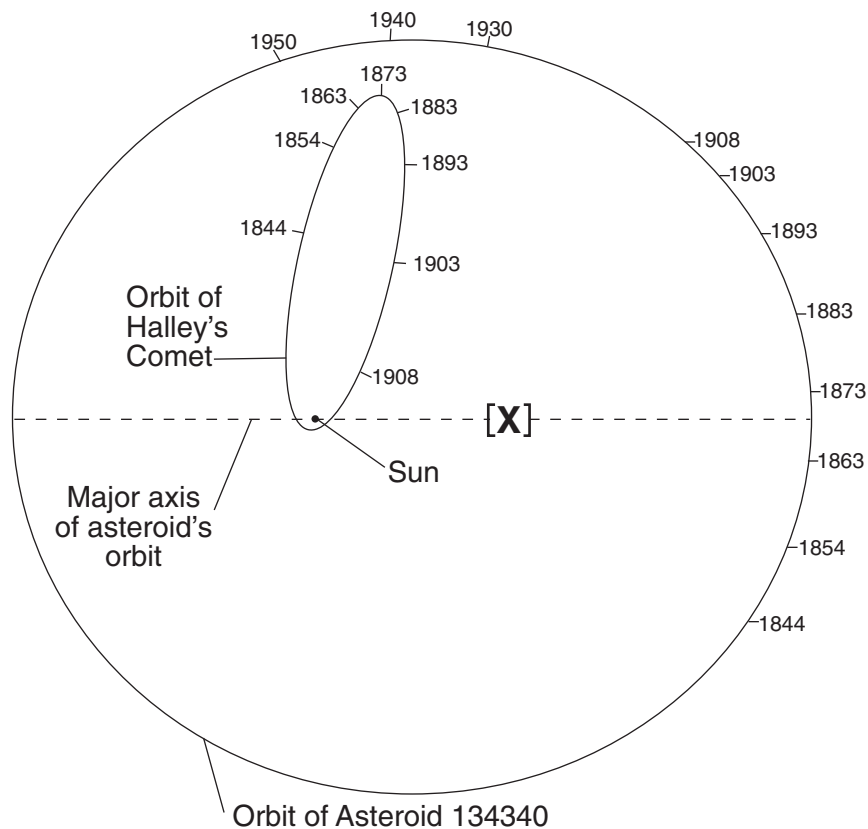
- transform movement
- faulting
- The plates slide past each other.

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 if the center of the student's **X** is within the bracket shown below.

Example of a 1-credit response:



66 [1] Allow 1 credit for Halley's Comet and an acceptable reason. Acceptable reasons include, but are not limited to:

- The comet traveled a greater distance during that time.
- Halley's orbit is closer to the Sun.

67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

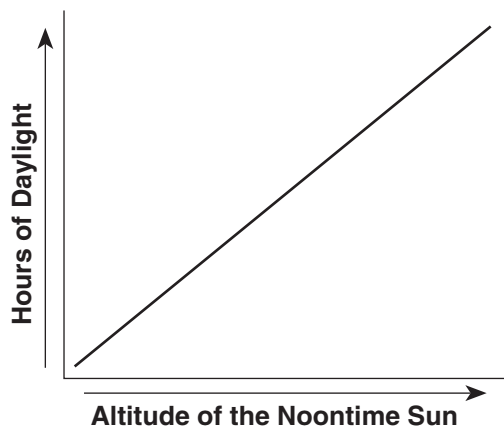
- Halley's Comet orbits the Sun.

68 [2] Allow 2 credits, allocated as follows:

- Allow 1 credit for any value from 2.8 to 3.2.
- Allow 1 credit for the correct units. Acceptable units include, but are not limited to:
 - mb/h
 - millibars/hour

- 69 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- passage of a low-pressure system
 - passage of a cold front
 - arrival of a warm air mass followed by the arrival of a cold air mass
- 70 [1] Allow 1 credit for any response from 490 to 443 million years.
- 71 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The channel at A has a V-shape.
 - Running water produces V-shaped channels.
- 72 [1] Allow 1 credit for the correct order below:
1. till
 2. stratified drift
 3. clay and silt
 4. wind-blown sand
- 73 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Glacial deposits are unsorted.
 - Till is a direct ice deposit.
- 74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The gentle slope of the dune is on the southwest side.
 - The windward side has a less steep slope.
 - The steeper side is leeward.
- 75 [1] Allow 1 credit for a line on the graph showing that, as the altitude of the noontime Sun increases, the hours of daylight increase.

Example of a 1-credit response:

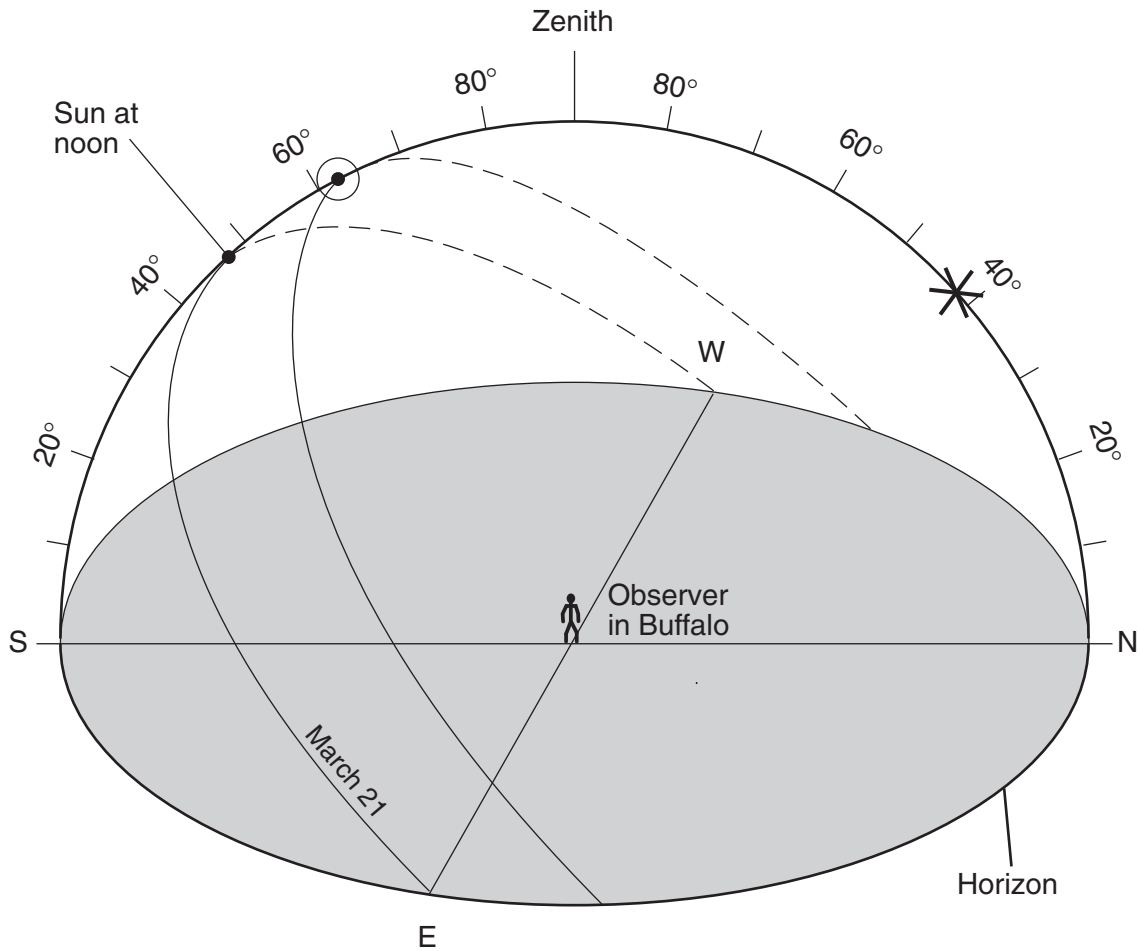


76 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit if the Sun’s apparent path is drawn so the altitude of the Sun at noon is within the circle shown below.
- Allow 1 credit for a path that starts north of east on the horizon and ends north of west on the horizon.

77 [1] Allow 1 credit if the center of the asterisk is between 40° and 45° .

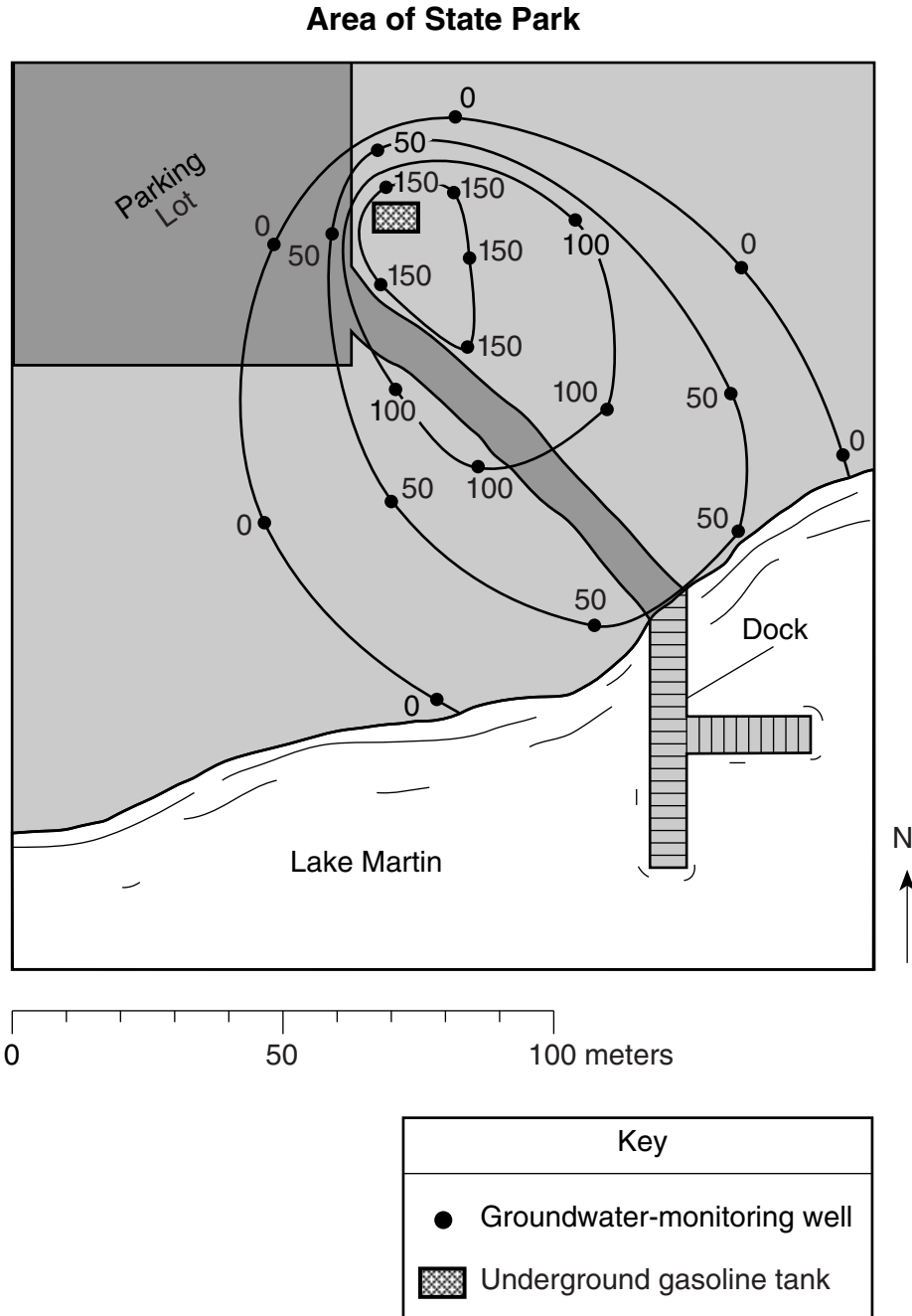
Example of a 3-credit response for questions 76 and 77:



78 [1] Allow 1 credit for *three* correctly drawn isolines.

Note: If the student draws additional isolines, all must be correct to receive credit. Allow credit even if the isolines extend into Lake Martin.

Example of a 1-credit response:



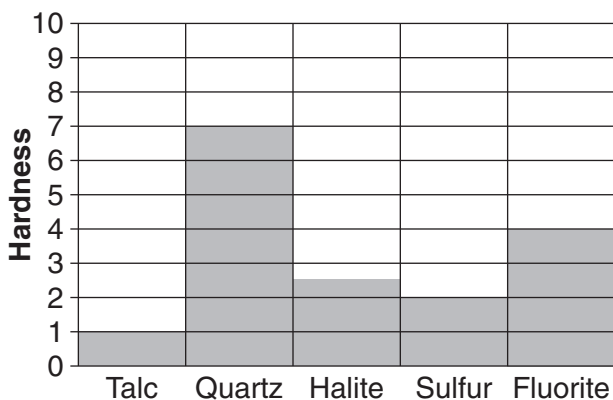
79 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- As distance from the tank increases, the concentration of contaminants in the groundwater decreases.
- An inverse relationship exists between the distance from the tank and the concentration of contaminants in the groundwater.

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Place the tank above ground to observe leaks more easily.
- Build an extra liner around the tank.
- Replace tanks regularly.

81 [1] Allow 1 credit if all *five* bars are correctly drawn.



82 [1] Allow 1 credit for quartz and an acceptable reason. Acceptable reasons include, but are not limited to:

- hardest mineral shown
- hardness of 7
- Quartz has the same hardness as garnet, which is used as an abrasive.

Map to Core Curriculum

August 2007 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1			65, 68
Math Key Idea 2	4, 26, 34	57	66, 75, 81
Math Key Idea 3	39		65, 79
Science Inquiry Key Idea 1	14, 23, 27, 29, 35	50, 53, 58	67, 69, 71
Science Inquiry Key Idea 2	16		
Science Inquiry Key Idea 3	5		
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1		55	
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1	18, 20, 26, 30, 35	47, 55	73, 70
Key Idea 2	4, 8, 9, 17, 19, 21, 22, 24, 25, 28, 32, 35	36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 49, 51, 52, 54, 56, 60, 61, 62, 63, 64	65, 66, 67, 68, 71, 72, 74, 76, 77, 78, 81
Key Idea 3	32		65, 66
Key Idea 4			
Key Idea 5	1, 3, 15, 23, 24, 25, 31, 33, 34	36, 38, 39, 41, 48, 49, 55, 58, 59	69, 74, 76, 78, 79, 82
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			80
Standard 4			
Key Idea 1	1, 2, 3, 4, 5, 6, 9, 13, 16, 29, 32, 33, 34	42, 43, 44, 47, 48, 49, 51, 53, 57, 58	65, 66, 67, 70, 72, 75, 76, 77, 78, 79, 80
Key Idea 2	7, 8, 10, 11, 12, 14, 15, 17, 18, 23, 24, 25, 26, 27, 28, 30, 31, 35	36, 37, 38, 39, 40, 41, 44, 45, 52, 54, 55, 56, 57, 58, 59, 63, 64	68, 69, 71, 73, 74, 78, 79, 80
Key Idea 3	19, 20, 21, 22	50, 51, 60, 61, 62	81, 82
Reference Tables			
ESRT 2001 Edition	5, 7, 12, 13, 17, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33	37, 38, 39, 54, 55, 56, 60, 61, 62, 63	65, 68, 70, 77, 81, 82

Regents Examination in Physical Setting/Earth Science

August 2007

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

The *Chart for Determining the Final Examination Score for the August 2007 Regents Examination in Physical Setting/Earth Science* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Thursday, August 16, 2007. Conversion charts provided for previous administrations of the Regents Examination in Physical Setting/Earth Science must NOT be used to determine students' final scores for this administration.

Submitting On-line Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an on-line evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to www.emsc.nysed.gov/osa/exameval.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the SUBMIT button at the bottom of the page to submit the completed form.

Regents Examination in Earth Science – August 2007

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

To determine the student's final score, locate the student's Total Performance Test Score across the top of the chart and the Total Written Test Score down the side of the chart. The point where the two scores intersect is the student's final examination score. For example, a student receiving a Total Performance Test Score of 10 and Total Written Test Score of 72 would receive a final examination score of 86.

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

**Total Performance Test Score
August 2007 Examination in Earth Science – continued**

		Total Performance Test Score																								
		23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Total Written Test Score	43	69	68	67	67	67	66	66	66	65	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54	
	42	69	68	66	66	66	65	65	65	64	64	63	63	62	62	61	60	60	59	58	57	56	55	55	54	
	41	67	66	65	64	64	64	63	63	63	62	62	61	60	60	59	59	58	57	56	55	55	54	53	52	
	40	66	65	64	63	63	63	63	62	62	61	61	60	60	59	58	58	57	56	55	55	54	53	52	51	
	39	65	64	63	63	62	62	62	62	61	61	60	60	59	59	58	58	57	56	55	55	54	53	52	51	50
	38	64	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	55	55	54	53	52	51	50	49	48
	37	63	62	60	60	60	59	59	59	58	58	57	57	56	56	55	54	54	53	52	51	50	49	49	48	47
	36	62	61	60	59	59	59	58	58	57	57	57	56	55	55	54	53	53	52	51	50	50	49	48	47	46
	35	61	60	59	58	58	58	57	57	57	56	56	55	55	54	53	53	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	43
	33	58	57	56	56	56	55	55	54	54	54	53	53	52	51	51	50	49	49	48	47	46	45	44	43	42
	32	58	56	55	55	55	54	54	54	53	53	52	52	51	51	50	49	49	48	47	46	45	44	43	42	41
	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	40
	30	55	54	53	52	52	52	51	51	51	50	50	49	49	48	47	47	46	45	44	44	43	42	41	40	39
	29	54	53	52	52	51	51	51	50	50	49	49	48	48	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	36
	27	52	51	49	49	49	48	48	48	47	47	46	46	45	45	44	43	43	42	41	40	39	38	37	36	35
	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	34
	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	33
	24	47	46	45	45	45	44	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	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	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	28
	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	26
	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	25
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	24	
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	23	
16	37	36	35	35	34	34	34	33	33	32	32	31	31	30	29	29	28	27	26	26	25	24	23	22	21	
15	35	34	33	33	33	32	32	32	31	31	30	30	29	28	28	27	26	26	25	24	23	22	21	20	19	
14	35	34	32	32	32	31	31	31	30	30	29	29	28	28	27	26	26	25	24	23	22	21	20	19	18	
13	33	32	31	30	30	30	29	29	29	28	28	27	26	26	25	25	24	23	22	21	21	20	19	18	17	
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	16	
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	14	
10	29	28	26	26	26	25	25	25	24	24	23	23	22	22	21	20	20	19	18	17	16	15	14	13	12	
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	12	
8	26	25	24	24	23	23	23	22	22	21	21	20	20	19	18	18	17	16	16	15	14	13	12	11	10	
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	9	
6	24	22	21	21	21	20	20	20	19	19	19	18	17	17	16	15	15	14	13	12	11	10	9	8	7	
5	22	21	20	19	19	19	18	18	18	17	17	16	15	15	14	14	13	12	11	10	10	9	8	7	6	
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	5	
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	3	
2	18	17	15	15	15	14	14	14	14	13	13	12	12	11	11	10	9	9	8	7	6	5	4	3	2	
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	1	
0	15	14	13	12	12	12	12	11	11	10	10	9	9	8	7	7	6	5	4	4	3	2	1	0	0	