

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

PHYSICAL SETTING
EARTH SCIENCE

Tuesday, June 19, 2007 — 9:15 a.m. to 12:15 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 (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*.

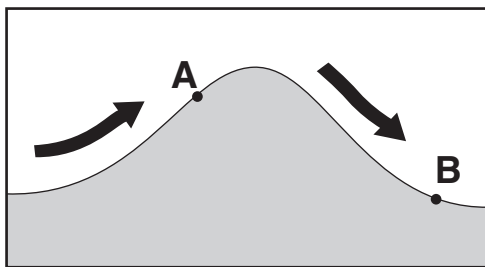
1 The best evidence that Earth spins on its axis is the motion of

- (1) tectonic plates
- (2) *Polaris*
- (3) a wind vane
- (4) a Foucault pendulum

2 When viewed from Earth, the light from very distant galaxies shows a red shift. This is evidence that these distant galaxies are

- (1) revolving around the Sun
- (2) revolving around the Milky Way
- (3) moving away from Earth
- (4) moving toward Earth

3 The arrows on the cross section below show the prevailing wind that flows over a mountain. Points *A* and *B* represent locations on opposite sides of the mountain.



Which statement correctly describes the differences in the climates of locations *A* and *B*?

- (1) Location *A* is warmer and drier than location *B*.
- (2) Location *A* is cooler and wetter than location *B*.
- (3) Location *B* is warmer and wetter than location *A*.
- (4) Location *B* is cooler and drier than location *A*.

4 The average temperature at Earth's equator is higher than the average temperature at Earth's South Pole because the South Pole

- (1) receives less intense insolation
- (2) receives more infrared radiation
- (3) has less land area
- (4) has more cloud cover

5 Which statement best summarizes the general effects of ocean currents at 20° S latitude on coastal regions of South America?

- (1) The east coast and west coast are both warmed.
- (2) The east coast and west coast are both cooled.
- (3) The east coast is warmed and the west coast is cooled.
- (4) The east coast is cooled and the west coast is warmed.

6 Which type of electromagnetic energy has the longest wavelength?

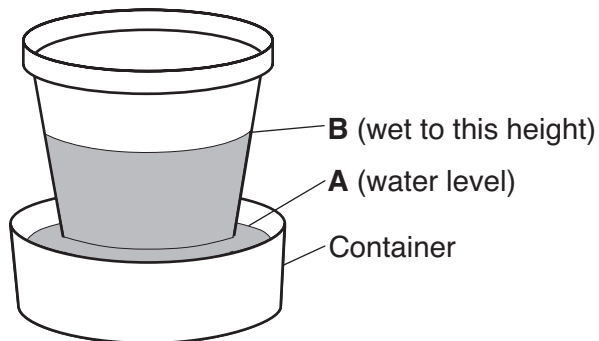
- (1) infrared radiation
- (2) radio wave radiation
- (3) ultraviolet radiation
- (4) x-ray radiation

7 Under which atmospheric conditions will water most likely evaporate at the fastest rate?

- (1) hot, humid, and calm
- (2) hot, dry, and windy
- (3) cold, humid, and windy
- (4) cold, dry, and calm

- 8 Which temperature zone of Earth's atmosphere contains the most water vapor?
- (1) mesosphere (3) thermosphere
 (2) stratosphere (4) troposphere

- 9 The diagram below shows the result of leaving an empty, dry clay flowerpot in a full container of water for a period of time. The water level in the container dropped to level A. The top of the wet area moved to level B.



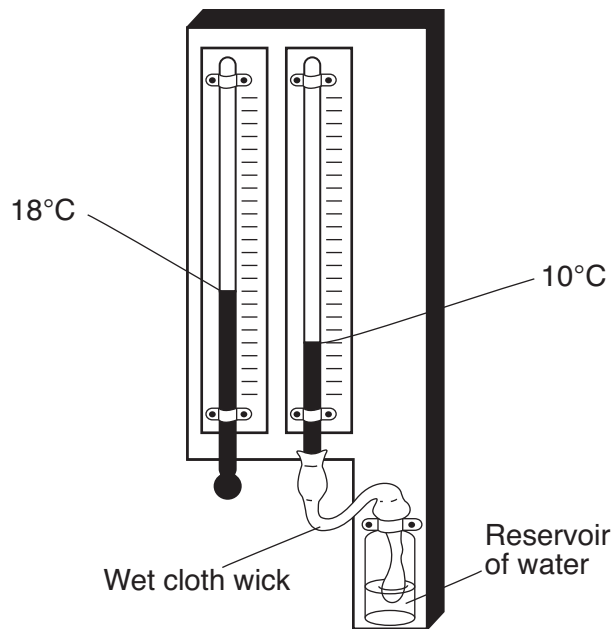
- Level B is higher than level A because water
- (1) is less dense than the clay pot
 (2) is more dense than the clay pot
 (3) traveled upward in the clay pot by capillary action
 (4) traveled downward in the clay pot by capillary action

- 10 Which weather condition most directly determines wind speeds at Earth's surface?
- (1) visibility changes
 (2) amount of cloud cover
 (3) air-pressure gradient
 (4) dewpoint differences

- 11 Which statement best explains why an increase in the relative humidity of a parcel of air generally increases the chance of precipitation?
- (1) The dewpoint is farther from the condensation point, causing rain.
 (2) The air temperature is closer to the dewpoint, making cloud formation more likely.
 (3) The amount of moisture in the air is greater, making the air heavier.
 (4) The specific heat of the moist air is greater than the drier air, releasing energy.

- 12 The two elements that make up the largest percentage by mass of Earth's crust are oxygen and
- (1) silicon (3) hydrogen
 (2) potassium (4) nitrogen

- 13 The weather instrument below can be used to determine relative humidity.



- Based on the temperatures shown, the relative humidity is
- (1) 19% (3) 33%
 (2) 2% (4) 40%

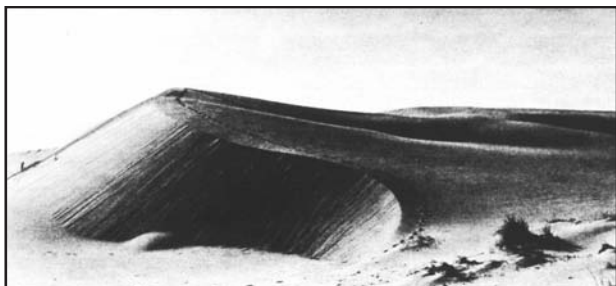
- 14 Which two minerals have cleavage planes at right angles?
- (1) biotite mica and muscovite mica
 (2) sulfur and amphibole
 (3) quartz and calcite
 (4) halite and pyroxene

- 15 Which property would best distinguish sediment deposited by a river from sediment deposited by a glacier?
- (1) mineral composition of the sediment
 (2) amount of sediment sorting
 (3) thickness of sediment layers
 (4) age of fossils found in the sediment

16 Salt deposits are found in the surface bedrock near which New York State location?

- (1) Oswego
- (2) Syracuse
- (3) Old Forge
- (4) Albany

17 The photograph below shows a sand dune that formed in a coastal area.



This sand dune was most likely formed by

- (1) water flowing from the left
- (2) water flowing from the right
- (3) wind blowing from the left
- (4) wind blowing from the right

18 What is the origin of fine-grained igneous rock?

- (1) lava that cooled slowly on Earth's surface
- (2) lava that cooled quickly on Earth's surface
- (3) silt that settled slowly in ocean water
- (4) silt that settled quickly in ocean water

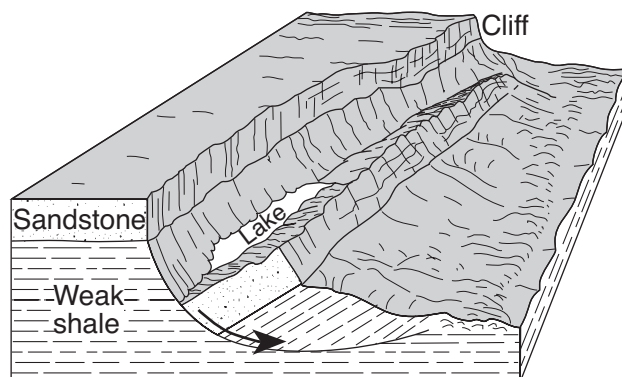
19 Why does the oceanic crust sink beneath the continental crust at a subduction boundary?

- (1) The oceanic crust has a greater density.
- (2) The oceanic crust is pulled downward by Earth's magnetic field.
- (3) The continental crust has a more mafic composition.
- (4) The continental crust is pulled upward by the Moon's gravity.

20 Based on fossil evidence, most scientists infer that

- (1) life has not changed significantly throughout Earth's history
- (2) life has evolved from complex to simple forms
- (3) many organisms that lived on Earth have become extinct
- (4) mammals developed early in the Precambrian time period

21 The block diagram below shows a displacement of rock layers.



Which process describes the downward sliding of the rock material?

- (1) tidal changes
- (2) glacial erosion
- (3) mass movement
- (4) lava flow

22 The presence of which index fossil in the surface bedrock most likely indicates that a forest environment once existed in the region?

- (1) *Aneurophyton*
- (2) *Cystiphyllum*
- (3) *Centroceras*
- (4) *Bothriolepis*

23 Which two types of rock are most commonly found as outcrops in New York State's Newark Lowlands landscape region?

- (1) rock salt and gypsum
- (2) limestone and granite
- (3) gneiss and quartzite
- (4) conglomerate and sandstone

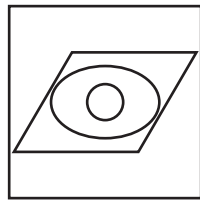
24 Which processes most likely formed the shale bedrock found near Ithaca, New York?

- (1) uplift and solidification
- (2) burial and compaction
- (3) heat and pressure
- (4) melting and recrystallization

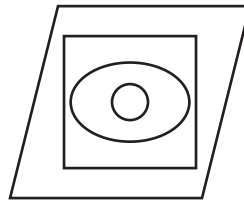
25 The symbols below are used to represent different regions of space.

Universe = □ Earth = ○ Galaxy = ▱ Solar system = ⊙

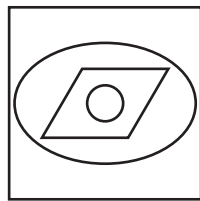
Which diagram shows the correct relationship between these four regions? [If one symbol is within another symbol, that means it is part of, or included in, that symbol.]



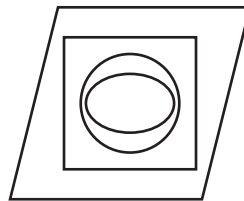
(1)



(3)

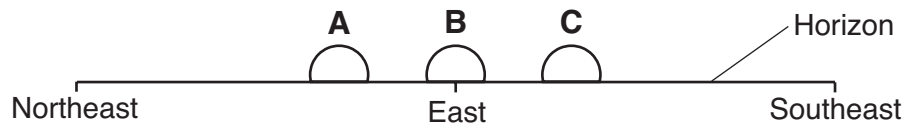


(2)



(4)

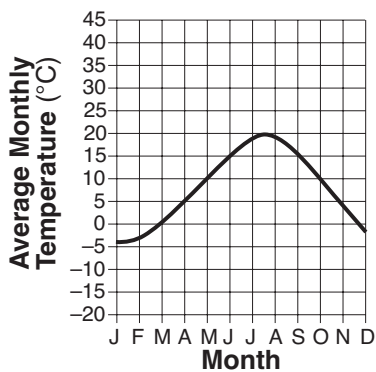
26 A student in New York State looked toward the eastern horizon to observe sunrise at three different times during the year. The student drew the following diagram that shows the positions of sunrise, A, B, and C, during this one-year period.



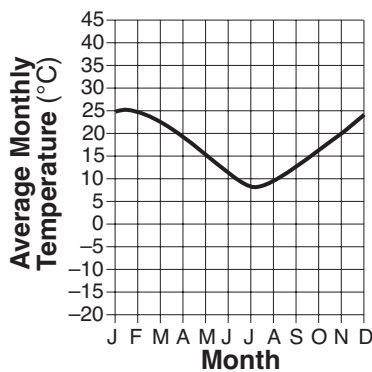
Which list correctly pairs the location of sunrise to the time of the year?

- | | |
|--|--|
| (1) A—June 21
B—March 21
C—December 21 | (3) A—March 21
B—June 21
C—December 21 |
| (2) A—December 21
B—March 21
C—June 21 | (4) A—June 21
B—December 21
C—March 21 |

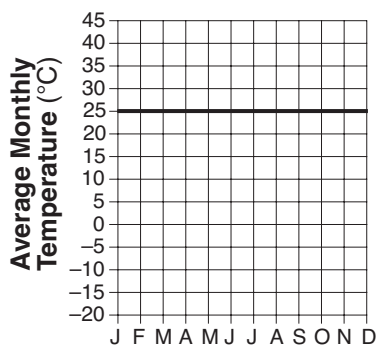
27 Which graph best represents the average monthly temperatures for one year at a location in the Southern Hemisphere?



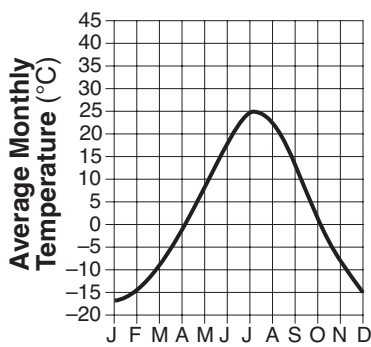
(1)



(3)

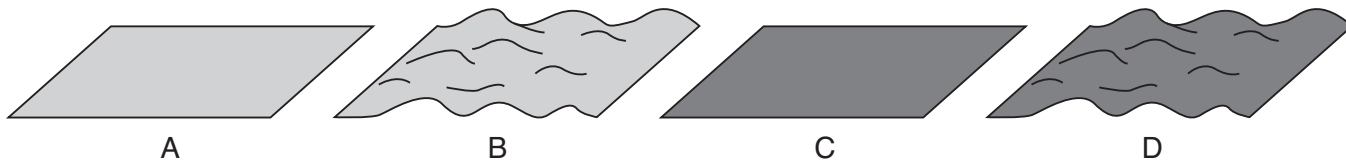


(2)



(4)

28 The diagram below shows four surfaces of equal area that absorb insolation.

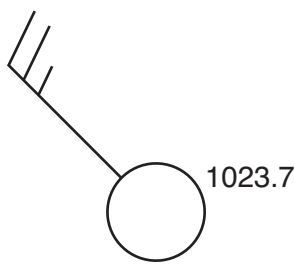


Which letter represents the surface that most likely absorbs the greatest amount of insolation?

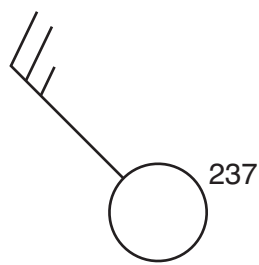
- (1) A
- (2) B

- (3) C
- (4) D

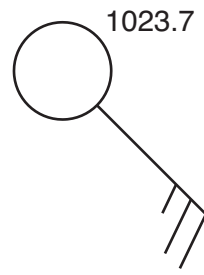
29 Which station model shows the correct form for indicating a northwest wind at 25 knots and an air pressure of 1023.7 mb?



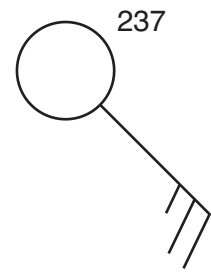
(1)



(2)



(3)



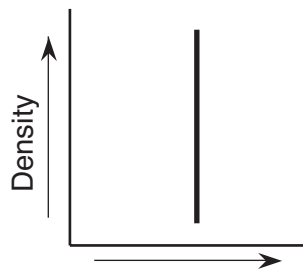
(4)

30 The data table below shows the mass and volume of three samples of the same mineral. [The density column is provided for student use.]

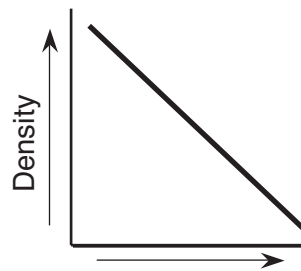
Data Table

Sample	Mass (g)	Volume (cm ³)	Density (g/cm ³)
A	50	25	
B	100	50	
C	150	75	

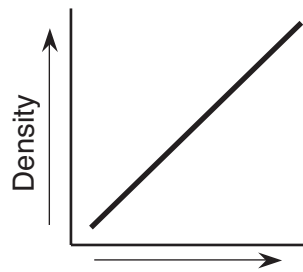
Which graph best represents the relationship between the density and the volume of these mineral samples?



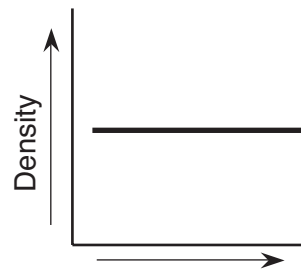
(1)



(3)

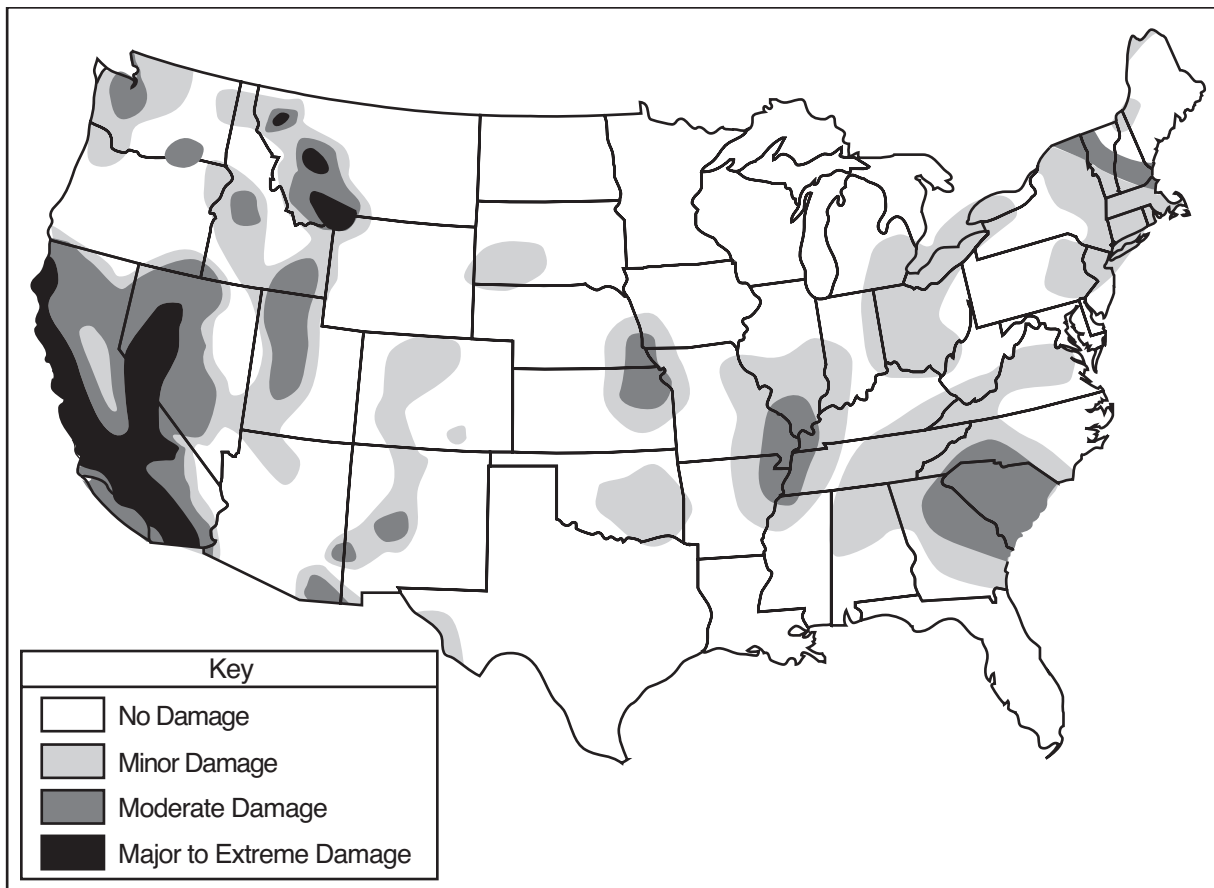


(2)



(4)

Base your answers to questions 31 and 32 on the map below, which shows the risk of damage from seismic activity in the United States.



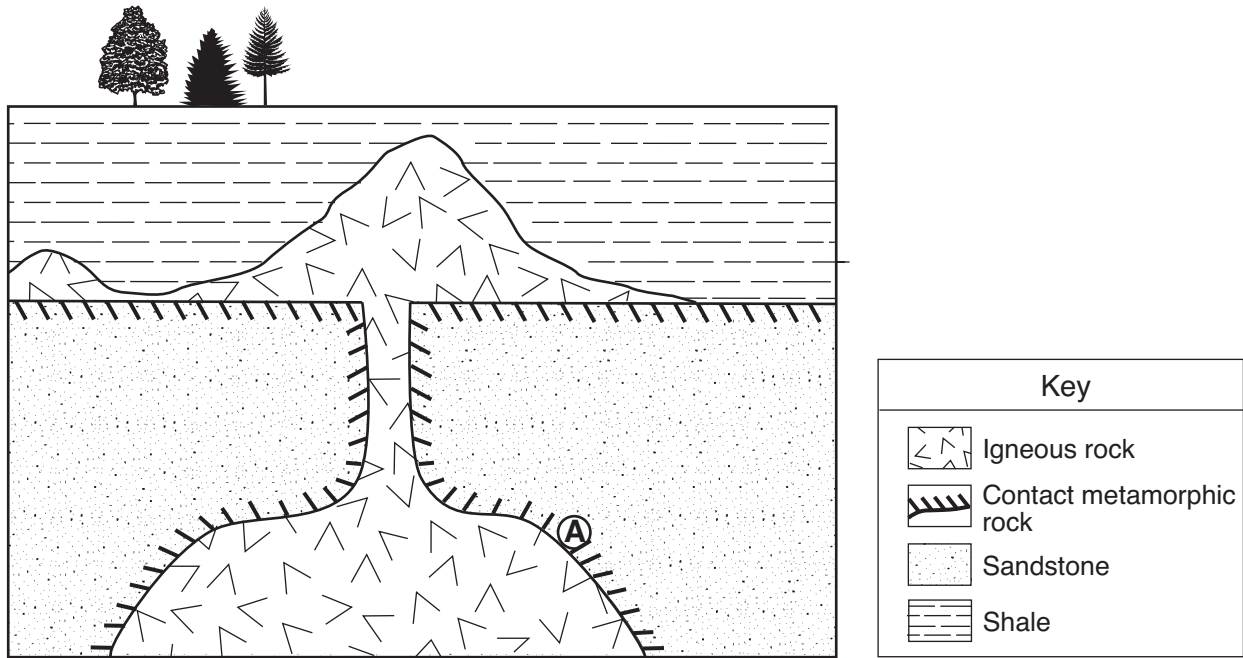
31 In the United States, most of the major damage expected from a future earthquake is predicted to occur near a

- (1) divergent plate boundary, only
- (2) convergent plate boundary, only
- (3) mid-ocean ridge and a divergent plate boundary
- (4) transform plate boundary and a hot spot

32 Which New York State location has the greatest risk of earthquake damage?

- (1) Binghamton
 - (2) Buffalo
 - (3) Plattsburgh
 - (4) Elmira
-

Base your answers to questions 33 and 34 on the geologic cross section below. Location A is within the metamorphic rock.



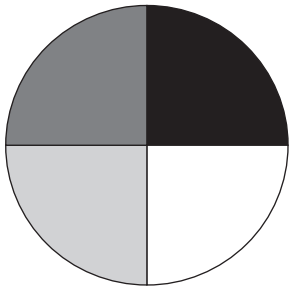
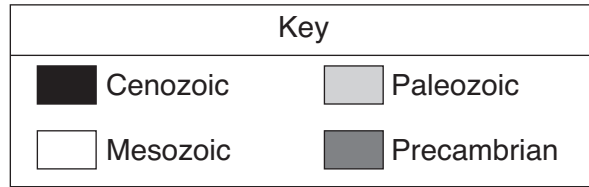
33 The metamorphic rock at location A is most likely

- (1) marble
- (2) quartzite
- (3) phyllite
- (4) slate

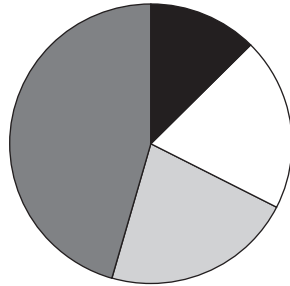
34 Which rock is the youngest?

- (1) shale
 - (2) sandstone
 - (3) igneous rock
 - (4) rock at location A
-

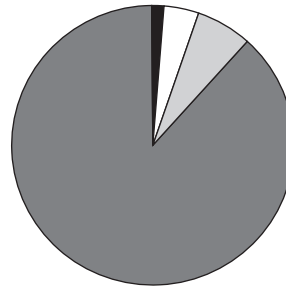
35 Which pie graph best represents the percentage of total time for the four major divisions of geologic time?



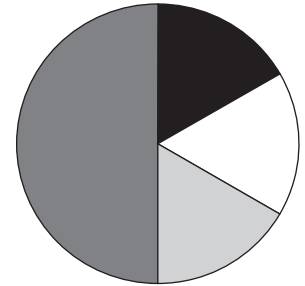
(1)



(2)



(3)



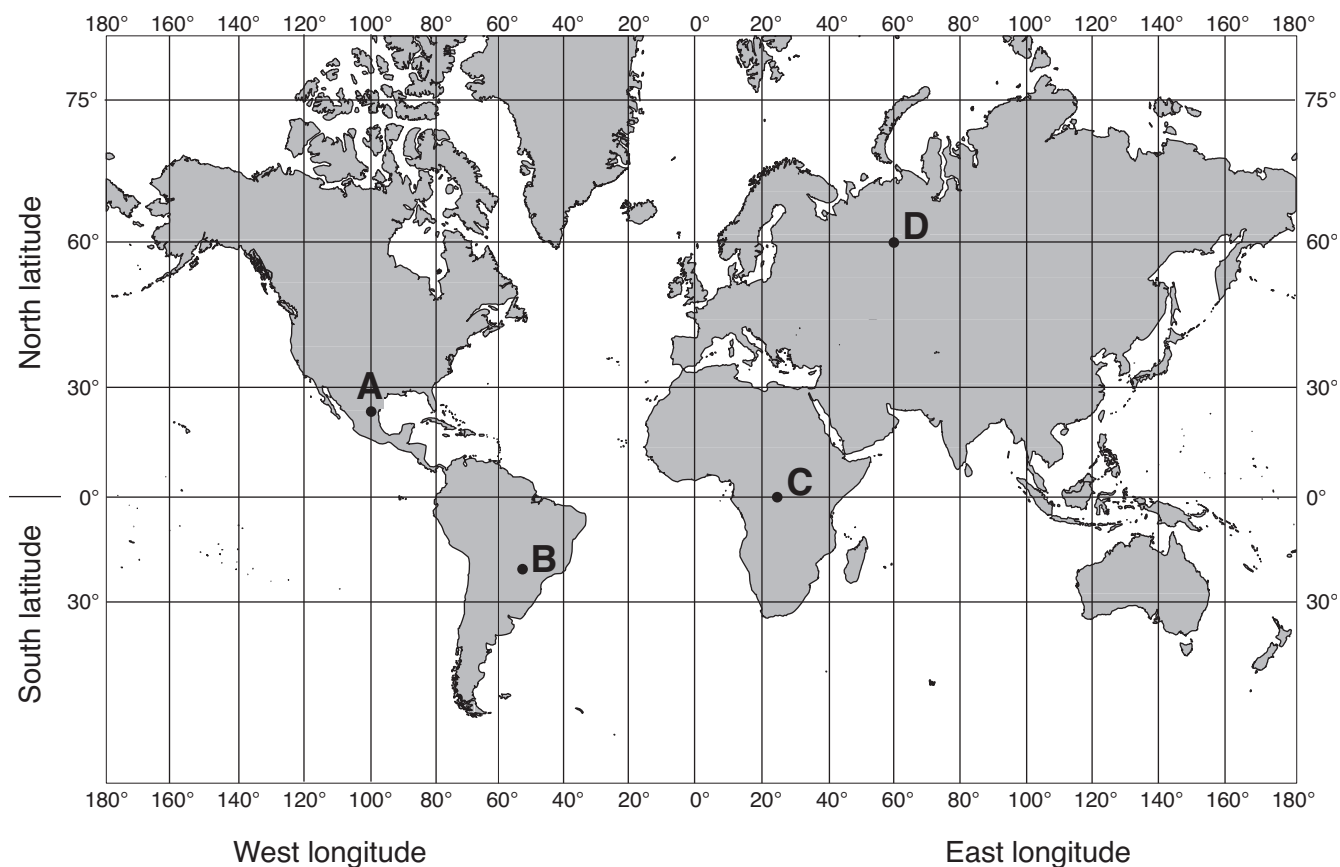
(4)

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 through 38 on the world map below. Letters A through D represent locations on Earth's surface.



36 At which location could an observer *not* see *Polaris* in the night sky at any time during the year?

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

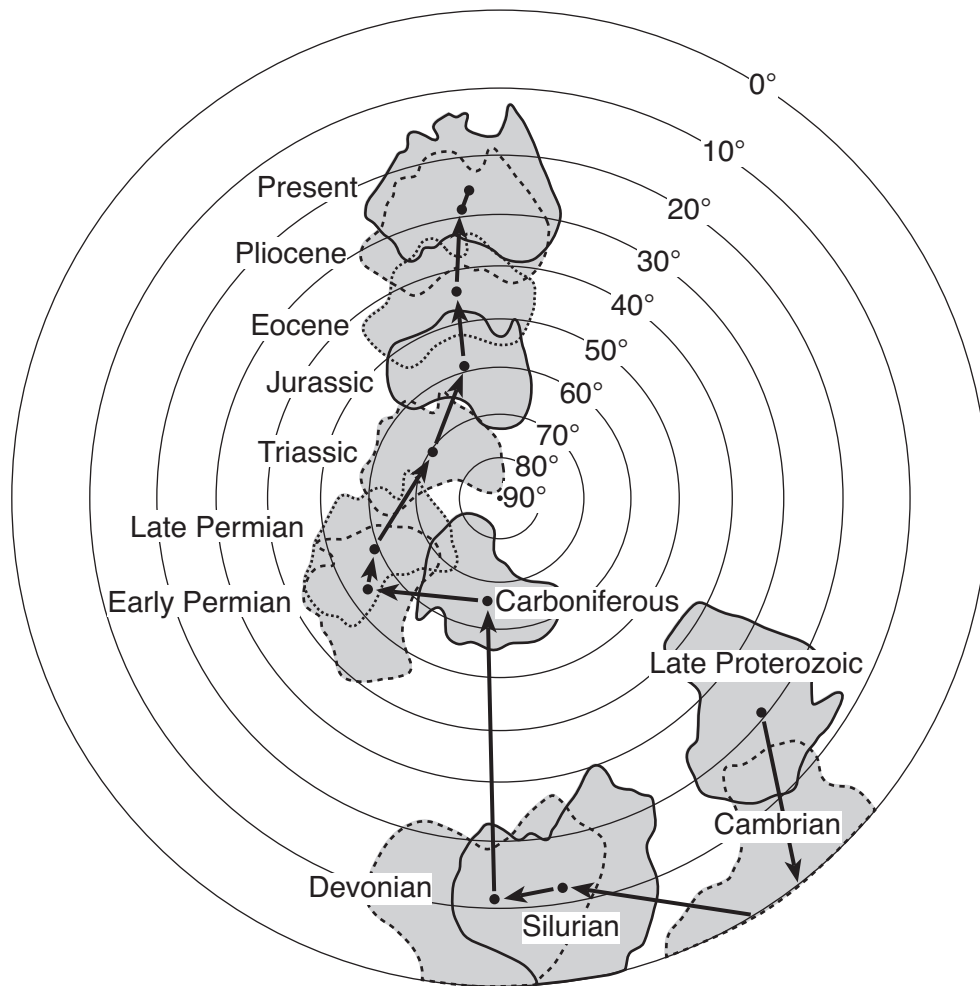
37 Which location receives 12 hours of daylight and 12 hours of darkness on June 21?

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

38 At which location on December 21 is the Sun directly overhead at solar noon?

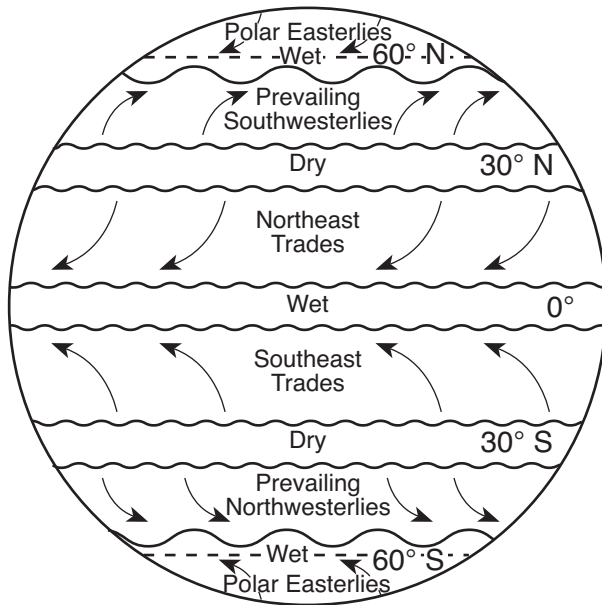
- | | |
|-------|-------|
| (1) A | (3) C |
| (2) B | (4) D |

Base your answers to questions 43 and 44 on the map below, which shows Earth's Southern Hemisphere and the inferred tectonic movement of the continent of Australia over geologic time. The arrows between the dots show the relative movement of the center of the continent of Australia. The parallels of latitude from 0° to 90° south are labeled.



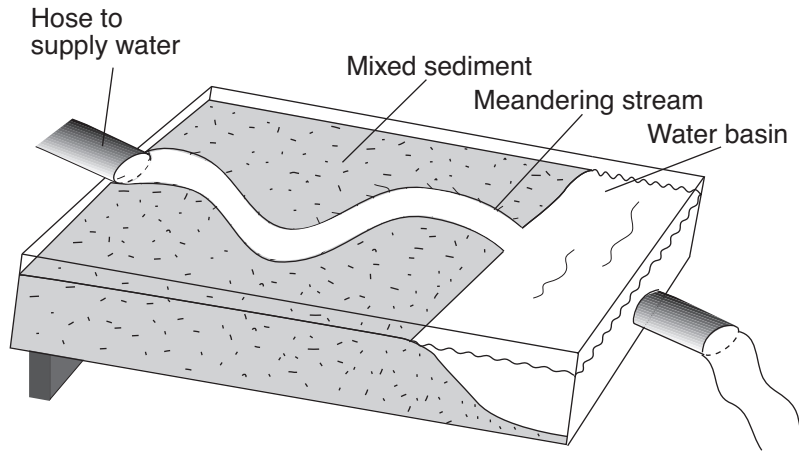
- 43 The geographic position of Australia on Earth's surface has been changing mainly because
- (1) the gravitational force of the Moon has been pulling on Earth's landmasses
 - (2) heat energy has been creating convection currents in Earth's interior
 - (3) Earth's rotation has spun Australia into different locations
 - (4) the tilt of Earth's axis has changed several times
- 44 During which geologic time interval did Australia most likely have a warm, tropical climate because of its location?
- | | |
|-------------------|------------------|
| (1) Cambrian | (3) Late Permian |
| (2) Carboniferous | (4) Eocene |

Base your answers to questions 45 through 47 on the map below, which shows Earth's planetary wind belts.

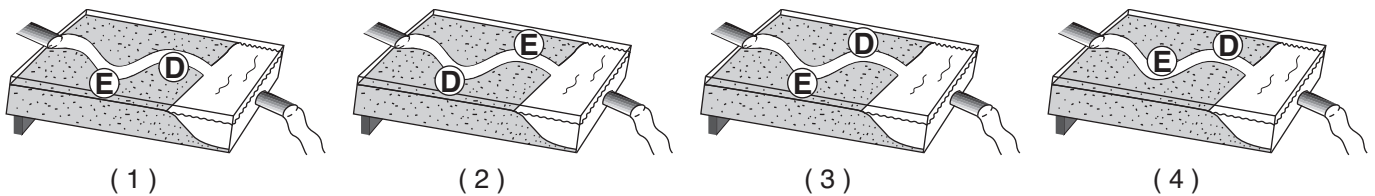


- 45 The curving of these planetary winds is the result of
- (1) Earth's rotation on its axis
 - (2) the unequal heating of Earth's atmosphere
 - (3) the unequal heating of Earth's surface
 - (4) Earth's gravitational pull on the Moon
- 46 Which wind belt has the greatest effect on the climate of New York State?
- (1) prevailing northwesterlies
 - (2) prevailing southwesterlies
 - (3) northeast trades
 - (4) southeast trades
- 47 Which climatic conditions exist where the trade winds converge?
- (1) cool and wet
 - (2) cool and dry
 - (3) warm and wet
 - (4) warm and dry
-

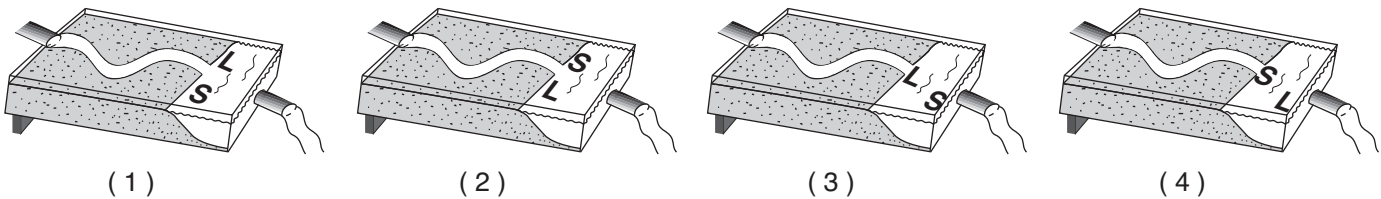
Base your answers to questions 48 through 50 on the diagram below, which shows a model used to investigate the erosional-depositional system of a stream. The model was tilted to create a gentle slope, and a hose supplied water to form the meandering stream shown.



48 Which diagram best represents where erosion, *E*, and deposition, *D*, are most likely occurring along the curves of the meandering stream?



49 Which diagram best represents the arrangement of large, *L*, and small, *S*, sediment deposited as the stream enters the water basin?



50 How can the model be changed to increase the amount of sediment transported by the stream?

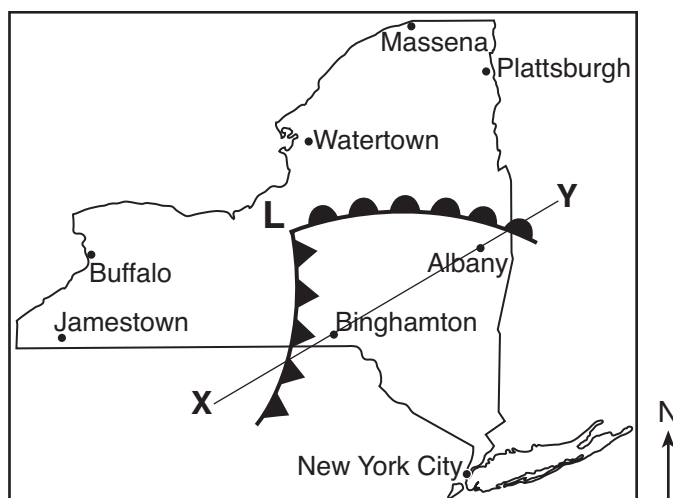
- (1) decrease the temperature of the sediment
- (2) decrease the slope
- (3) increase the size of the sediment
- (4) increase the rate of the water flow

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 weather map below. The weather map shows a low-pressure system in New York State during July. The **L** represents the center of the low-pressure system. Two fronts extend from the center of the low. Line *XY* on the map is a reference line.



51 The cross section *in your answer booklet* shows a side view of the area along line *XY* on the map. On lines 1 and 2 in the cross section, place the appropriate two-letter air-mass symbols to identify the most likely type of air mass at *each* of these locations. [1]

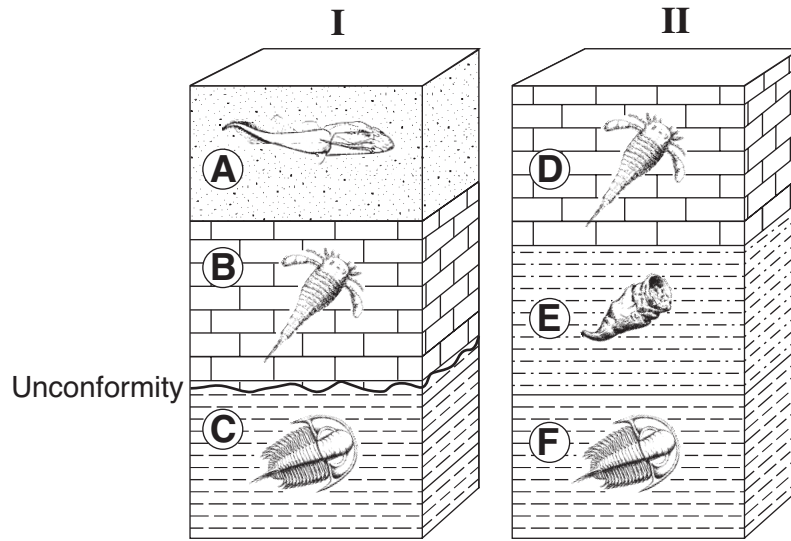
52 The forecast for one city located on the map is given below:

“In the next hour, skies will become cloud covered. Heavy rains are expected with possible lightning and thunder. Temperatures will become much cooler.”

State the name of the city for which this forecast was given. [1]

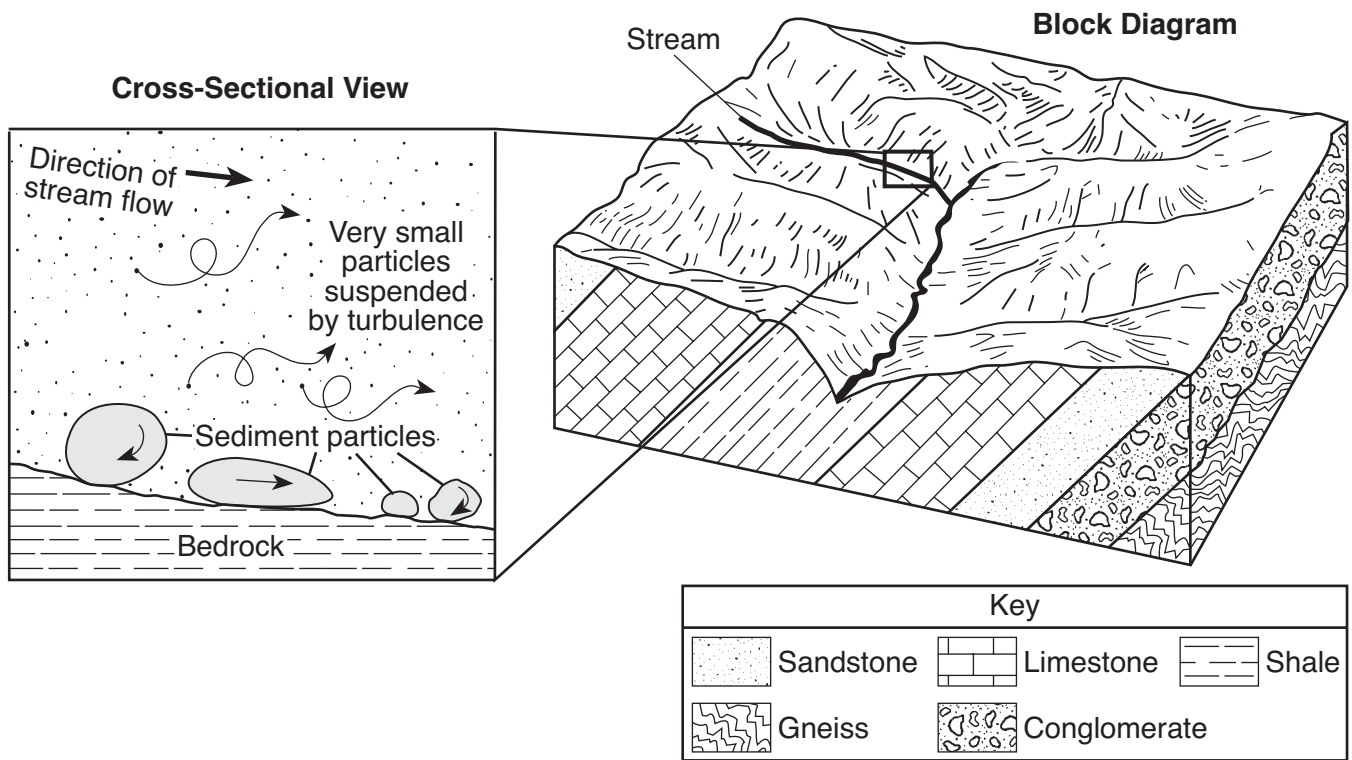
53 Identify *one* action that people should take to protect themselves from lightning. [1]

Base your answers to questions 54 through 57 on the diagrams below, which represent two bedrock outcrops, I and II, found several kilometers apart in New York State. Rock layers are lettered A through F. Drawings represent specific index fossils.



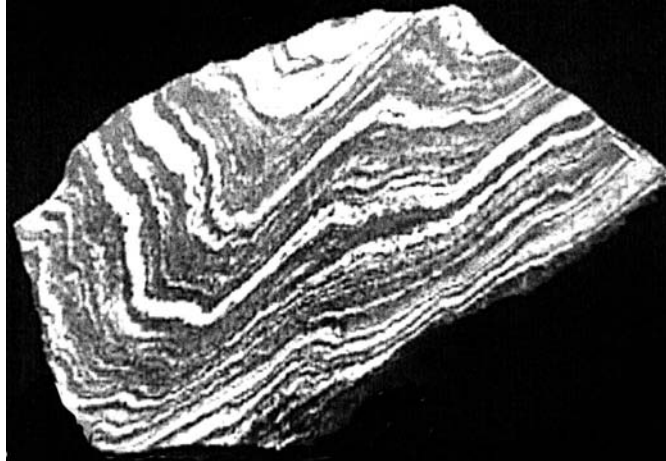
- 54 During which geologic time period was rock layer C deposited? [1]
- 55 Identify *two* processes that produced the unconformity in outcrop I. [1]
- 56 Describe *one* characteristic a fossil must have in order to be considered a good index fossil. [1]
- 57 Explain why carbon-14 can *not* be used to find the geologic age of these index fossils. [1]
-

Base your answers to questions 58 through 61 on the cross section and block diagram below. The cross section shows an enlarged view of the stream shown in the block diagram. The sediments in the cross section are drawn to actual size. Arrows show the movement of particles in the stream. The block diagram represents a region of Earth's surface and the bedrock beneath the region.



- 58 After measuring the actual size, identify the name of the largest particle shown on the stream bottom in the cross section. [1]
- 59 What process is responsible for producing the rounded shape of the particles shown on the stream bottom in the cross section? [1]
- 60 Identify the type of rock shown in the block diagram that appears to be the most easily eroded. [1]
- 61 How does the shape of a valley eroded by a glacier differ from the shape of the valley shown in the block diagram? [1]
-

Base your answers to questions 62 through 64 on the photograph of a sample of gneiss below.



- 62 What observable characteristic could be used to identify this rock sample as gneiss?
[1]
- 63 Identify *two* minerals found in gneiss that contain iron and magnesium. [1]
- 64 A dark-red mineral with a glassy luster was also observed in this gneiss sample.
Identify the mineral and state *one* possible use for this mineral. [1]
-

Part C

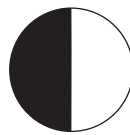
Answer all questions in this part.

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 69 on the data table below, which shows the percentage of the lighted side of the Moon visible from Earth for the first fourteen days of July 2003.

Date	Percentage of Lighted Side of the Moon Visible From Earth (%)
July 1	1
July 2	5
July 3	10
July 4	17
July 5	26
July 6	37
July 7	48
July 8	59
July 9	70
July 10	80
July 11	89
July 12	95
July 13	98
July 14	100

65 On what July date listed in the table did the Moon appear as shown below? [1]



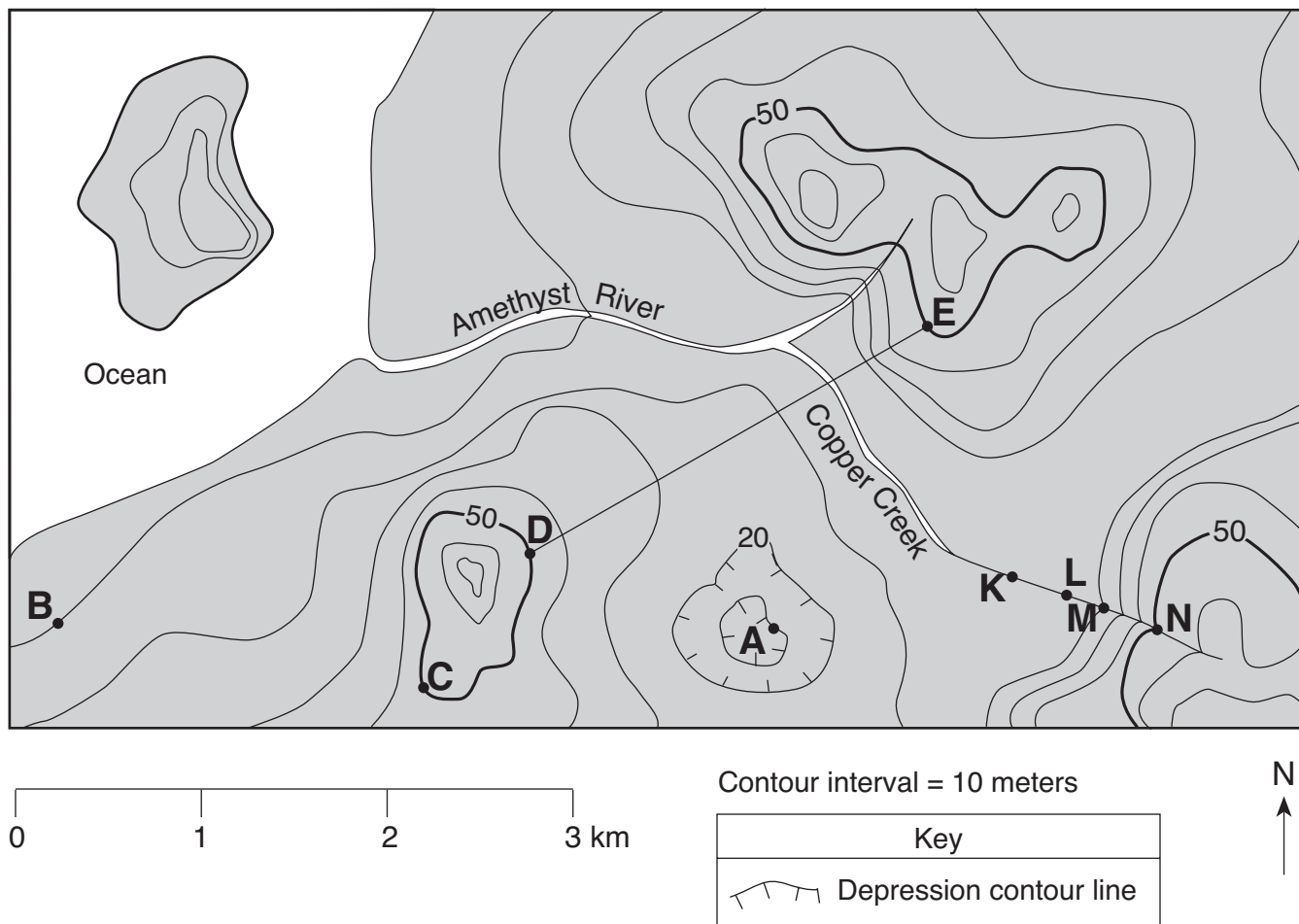
66 What motion of the Moon causes the percentage of the lighted side of the Moon visible from Earth to change from July 1 to July 14? [1]

67 A full Moon phase was observed on July 14. On what day in August was the next full Moon phase observed? [1]

68 The diagram *in your answer booklet* shows the orbit of the Moon around Earth. Place an **X** on the orbit to show where the Moon was in its orbit on July 14, 2003. [1]

69 Why are the phases of the Moon considered to be cyclic? [1]

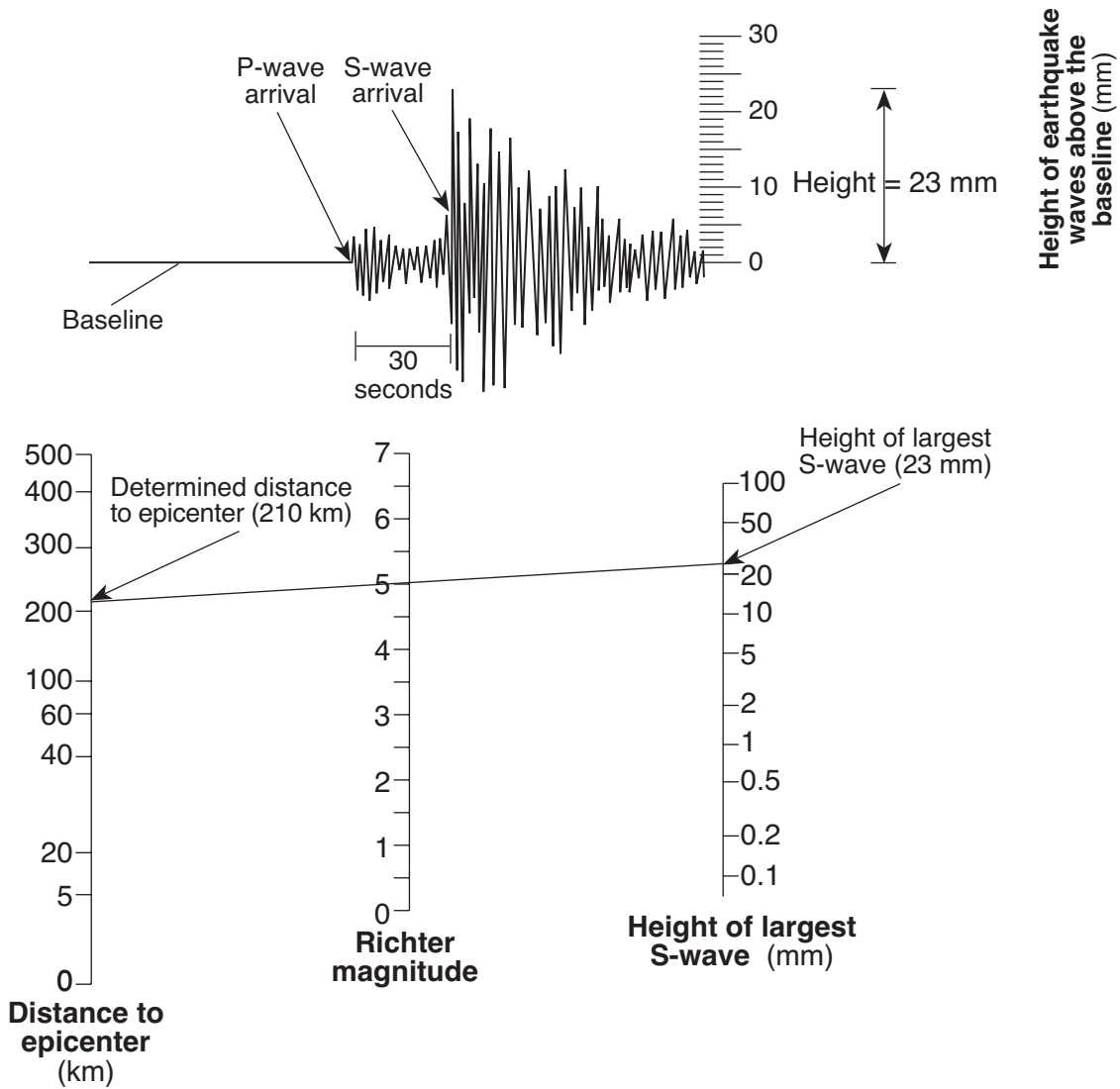
Base your answers to questions 70 through 73 on the topographic map shown below. Letters A, B, C, D, and E represent locations on Earth's surface. Letters K, L, M, and N are locations along Copper Creek. Elevations are measured in meters.



- 70 What is the elevation of location A? [1]
- 71 Calculate the gradient between points B and C and label your answer with the correct units. [2]
- 72 On the grid in your answer booklet, construct a topographic profile along line DE by plotting an **X** for the elevation of each contour line that crosses line DE. Connect the **X**s with a smooth, curved line to complete the profile. [2]
- 73 Explain how the map indicates that Copper Creek flows faster between points N and M than between points L and K. [1]
-

Base your answers to questions 74 through 76 on the example of a seismogram and set of instructions for determining the Richter magnitude of an earthquake below. The example shows the Richter magnitude of an earthquake 210 kilometers from a seismic station.

Example of a Seismogram of an Earthquake

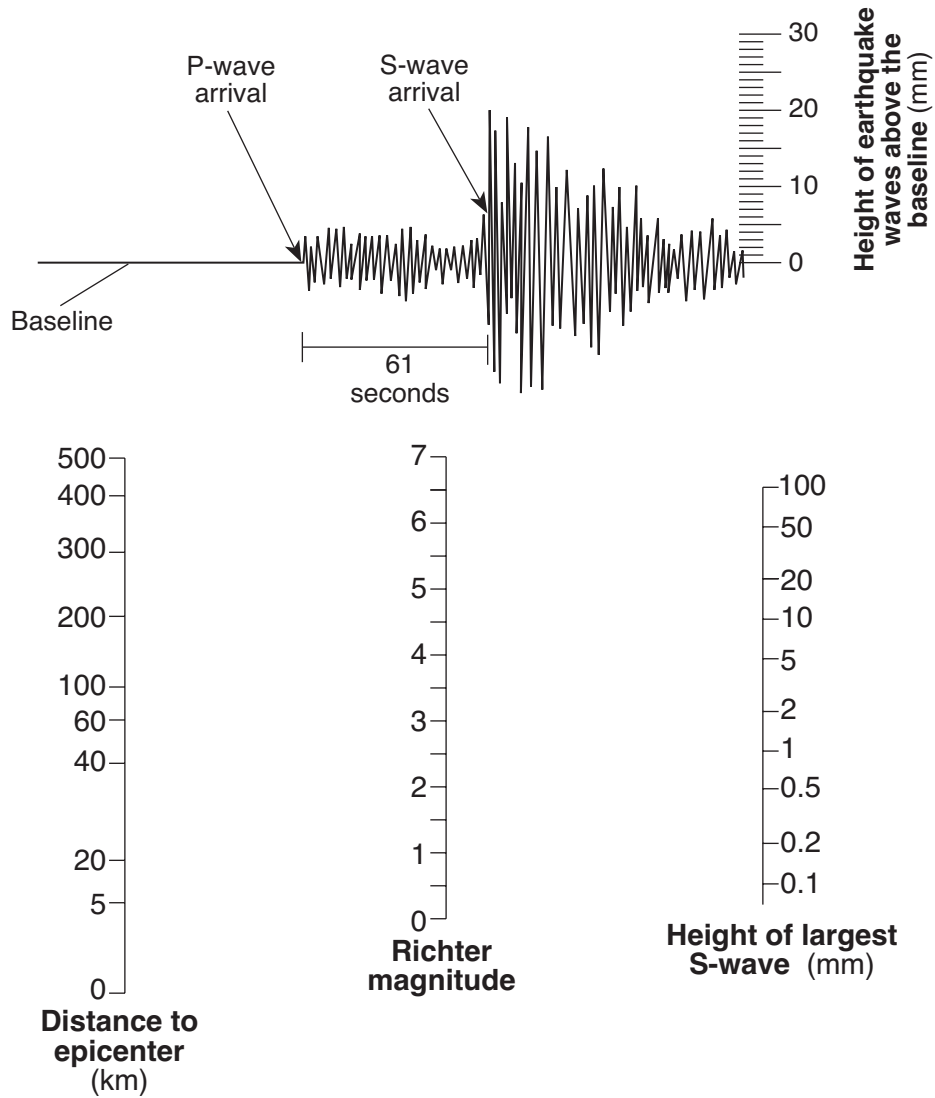


Instructions for determining Richter magnitude:

- Determine the distance to the epicenter of the earthquake. (The distance in the example is 210 kilometers.)
- Measure the maximum wave height of the S-wave recorded on the seismogram. (The height in the example is 23 millimeters.)
- Place a straightedge between the distance to the epicenter (210 kilometers) and the height of the largest S-wave (23 millimeters) on the appropriate scales. Draw a line connecting these two points. The magnitude of the earthquake is determined by where the line intersects the Richter magnitude scale. (The magnitude of this example is 5.0.)

- 74 Using the set of instructions on page 22 and the seismogram and scales below, determine the Richter magnitude of an earthquake that was located 500 kilometers from this seismic station. Record your answer *in your answer booklet*. [1]

Seismogram of an Earthquake



- 75 Identify the information shown on the seismogram that was used to determine that the distance to the epicenter was 500 kilometers. [1]

- 76 How long did it take the first S-wave to travel 500 kilometers to reach this seismic station? [1]
-

Base your answers to questions 77 through 81 on the passage below and on the map in your answer booklet. The passage describes the Gakkel Ridge found at the bottom of the Arctic Ocean. The map shows the location of the Gakkel Ridge.

The Gakkel Ridge

In the summer of 2001, scientists aboard the U.S. Coast Guard icebreaker *Healy* visited one of the least explored places on Earth. The scientists studied the 1800-kilometer-long Gakkel Ridge at the bottom of the Arctic Ocean near the North Pole. The Gakkel Ridge is a section of the Arctic Mid-Ocean Ridge and extends from the northern end of Greenland across the Arctic Ocean floor toward Russia. At a depth of about 5 kilometers below the ocean surface, the Gakkel Ridge is one of the deepest mid-ocean ridges in the world. The ridge is believed to extend down to Earth's mantle, and the new seafloor being formed at the ridge is most likely composed of huge slabs of mantle rock. Bedrock samples taken from the seafloor at the ridge were determined to be the igneous rock peridotite.

The Gakkel Ridge is also the slowest moving mid-ocean ridge. Some ridge systems, like the East Pacific Ridge, are rifting at a rate of about 20 centimeters per year. The Gakkel Ridge is rifting at an average rate of less than 1 centimeter per year. This slow rate of movement means that there is less volcanic activity along the Gakkel Ridge than along other ridge systems. However, heat from the underground magma slowly seeps up through cracks in the rocks of the ridge at structures scientists call hydrothermal (hot water) vents. During the 2001 cruise, a major hydrothermal vent was discovered at 87° N latitude 45° E longitude.

- 77 On the map *in your answer booklet*, place an **X** on the location of the major hydrothermal vent described in the passage. [1]
- 78 Describe the relative motion of the two tectonic plates on either side of the Gakkel Ridge. [1]
- 79 The Gakkel Ridge is a boundary between which two tectonic plates? [1]
- 80 Identify *one* feature, other than hydrothermal vents, often found at mid-ocean ridges like the Gakkel Ridge that indicates heat from Earth's interior is escaping. [1]
- 81 State the *two* minerals that were most likely found in the igneous bedrock samples collected at the Gakkel Ridge. [1]
-
- 82 The diagram *in your answer booklet* shows a view of the ground from directly above a flagpole in New York State at solar noon on a particular day of the year. The flagpole's shadow at solar noon is shown. Draw the position and relative length of the shadow that would be cast by this flagpole three hours later. [2]
-

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING
EARTH SCIENCE

Tuesday, June 19, 2007 — 9:15 a.m. to 12:15 p.m., only

ANSWER SHEET

Student Sex: Male Female Grade

Teacher School

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

Part A

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

Part A Score

Part B-1

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

Part B-1 Score

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

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

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

Signature

Tear Here

PHYSICAL SETTING EARTH SCIENCE

Tuesday, June 19, 2007 — 9:15 a.m. to 12:15 p.m., only

ANSWER BOOKLET

Male

Student..... Sex: Female

Teacher

School..... Grade

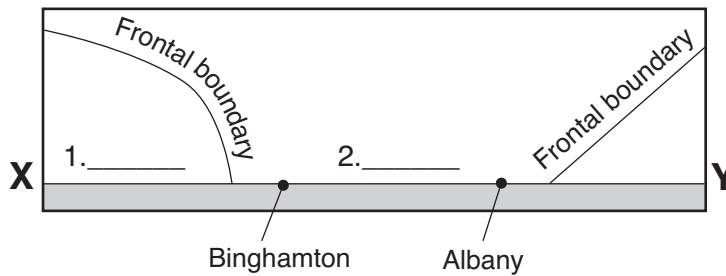
Answer all questions in Part B-2 and Part C. Record your answers in this booklet.

<input type="text"/>		Performance Test Score (Maximum Score: 23)
.....		
Part	Maximum Score	Student's Score
A	35	
B-1	15	
B-2	14	
C	21	
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

52 _____

52

53 _____

53

54 _____ Period

54

55 (1) _____

55

(2) _____

56 _____

56

**For Raters
Only**

57 _____

57

58 _____

58

59 _____

59

60 _____

60

61 _____

61

62 _____

62

63 _____ and _____

63

64 Mineral: _____

64

Use: _____

**Total Score for
Part B-2**

Part C

65 July _____

65

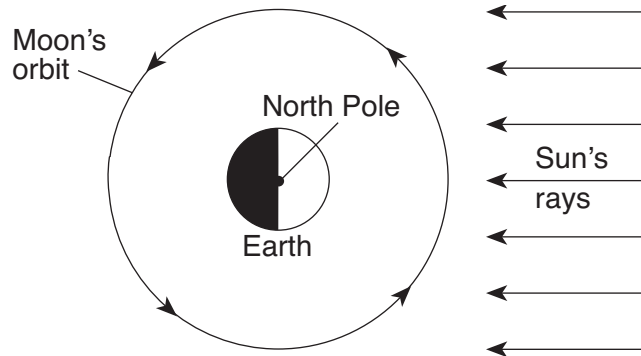
66 _____

66

67 August _____

67

68



68

69 _____

69

For Raters
Only

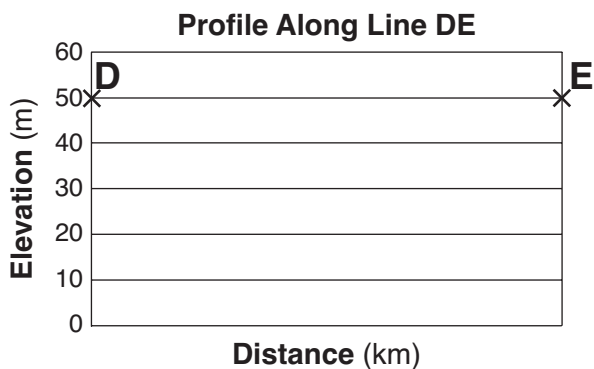
70 _____ m

70

71 Gradient = _____

71

72



72

73 _____

73

74 Magnitude: _____

74

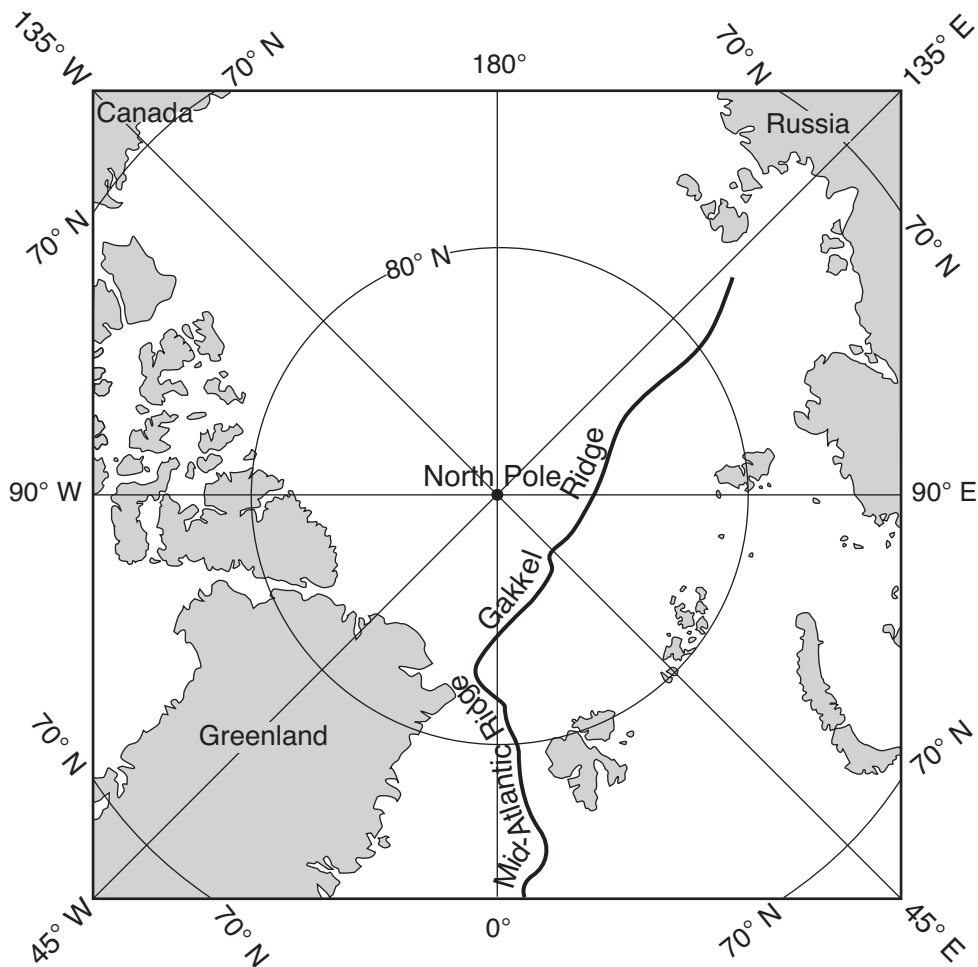
75 _____

75

76 _____ minutes _____ seconds

76

77



77

78

78

79

_____ Plate and _____ Plate

79

80

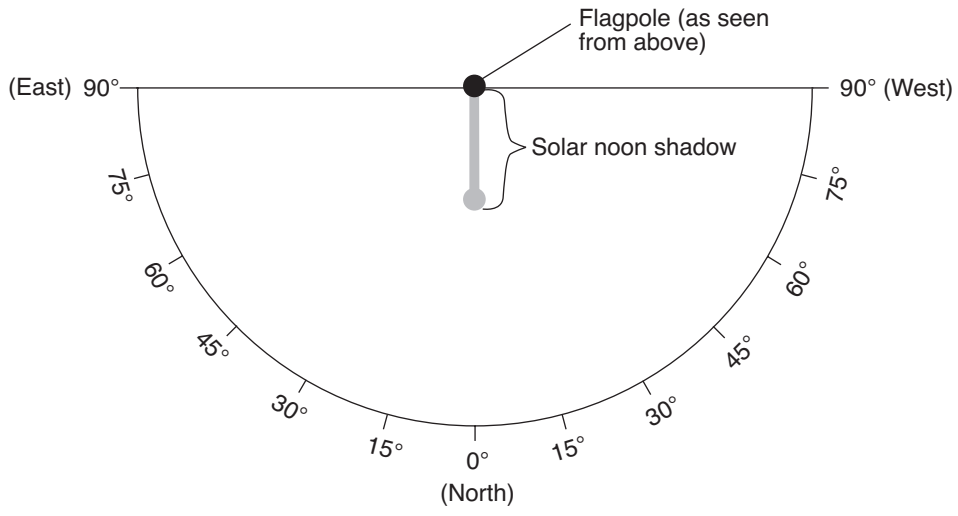
80

81

_____ and _____

81

82



For Raters Only

82

Total Score for Part C

FOR TEACHERS ONLY

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

PS-ES PHYSICAL SETTING/EARTH SCIENCE

Tuesday, June 19, 2007 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

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

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

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Physical Setting/Earth Science examination. Additional information about scoring is provided in the publication *Information Booklet for 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 Tuesday, June 19, 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 14 credits for this part. The student must answer all questions in this part.

51 [1] Allow 1 credit if *both* air masses are correct as shown below. Allow credit for either upper- or lowercase letters.

(1) cP

(2) mT

Note: Do *not* allow credit if the letters are reversed, such as, Tm.

52 [1] Allow 1 credit for Binghamton.

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

- Move indoors.
- Do not use electrical equipment or telephones.
- Do not stand under tall objects.

54 [1] Allow 1 credit for Cambrian Period.

55 [1] Allow 1 credit if *both* processes are correct. Acceptable responses include, but are not limited to:

- uplift
- erosion
- weathering
- subsidence
- deposition
- burial

56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- widespread geographic distribution
- short existence in geologic time

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Carbon-14's half-life is too short.
- Not enough carbon-14 is left to measure.
- The fossils are too old.

58 [1] Allow 1 credit for pebble.

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

- abrasion
- weathering
- erosion
- Particles were worn down as they were scraped along the bedrock.

60 [1] Allow 1 credit for shale.

61 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- A glacier forms a U-shaped valley.
- Glaciers form U-shaped valleys and streams form V-shaped valleys.

62 [1] Allow 1 credit. Acceptable responses include, but are limited to:

- It shows banding.
- The rock is foliated.
- The minerals are segregated into layers.
- distortion

63 [1] Allow 1 credit for any *two* of the three responses below.

- pyroxene (augite)
- mica (biotite)
- amphibole (hornblende)

Note: Do *not* allow credit for muscovite mica.

64 [1] Allow 1 credit for garnet and *one* acceptable use. Acceptable responses include, but are not limited to:

- jewelry
- abrasives

Part C

Allow a total of 21 credits for this part. The student must answer all questions in this part.

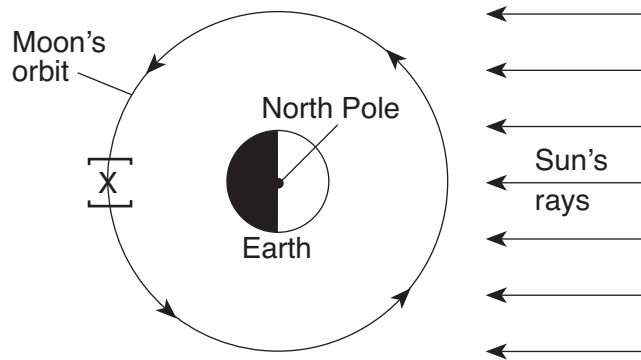
65 [1] Allow 1 credit for July 7 *or* July 8.

66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- the Moon’s revolution
- The Moon orbits Earth.

67 [1] Allow 1 credit for August 12 *or* 13 *or* 14.

68 [1] Allow 1 credit if the center of the student’s **X** is placed within the brackets shown.



69 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The Moon phases repeat in a definite pattern.
- The visible part of the Moon increases and decreases repeatedly.

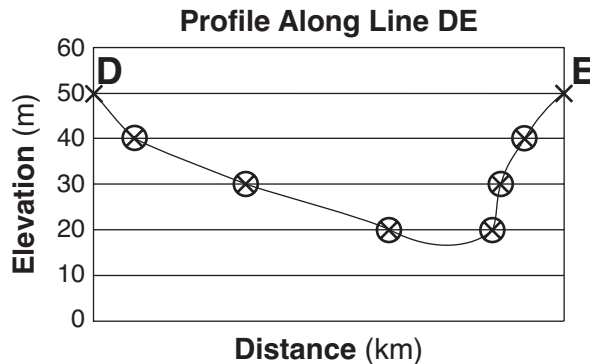
70 [1] Allow 1 credit for 10 m.

71 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit for any value from 18.9 to 21.1.
- Allow 1 credit for the correct units. Acceptable units include, but are not limited to:
 - m/km
 - meters/km
 - m/kilometer

72 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 2 credits if the centers of five or six **X**s are located within the circles shown on the profile and are correctly connected with a line that passes within the circles. The line must have the lowest elevation between 10 and 20 meters.
- Allow 1 credit if the centers of five or six **X**s are located within the circles shown on the profile but the line is *not* correctly drawn or is missing.



73 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Contour lines between *N* and *M* are closer together.
- There is a steeper slope between *N* and *M*.
- Where contour lines are far apart, there is a gentle slope and the stream velocity is less.

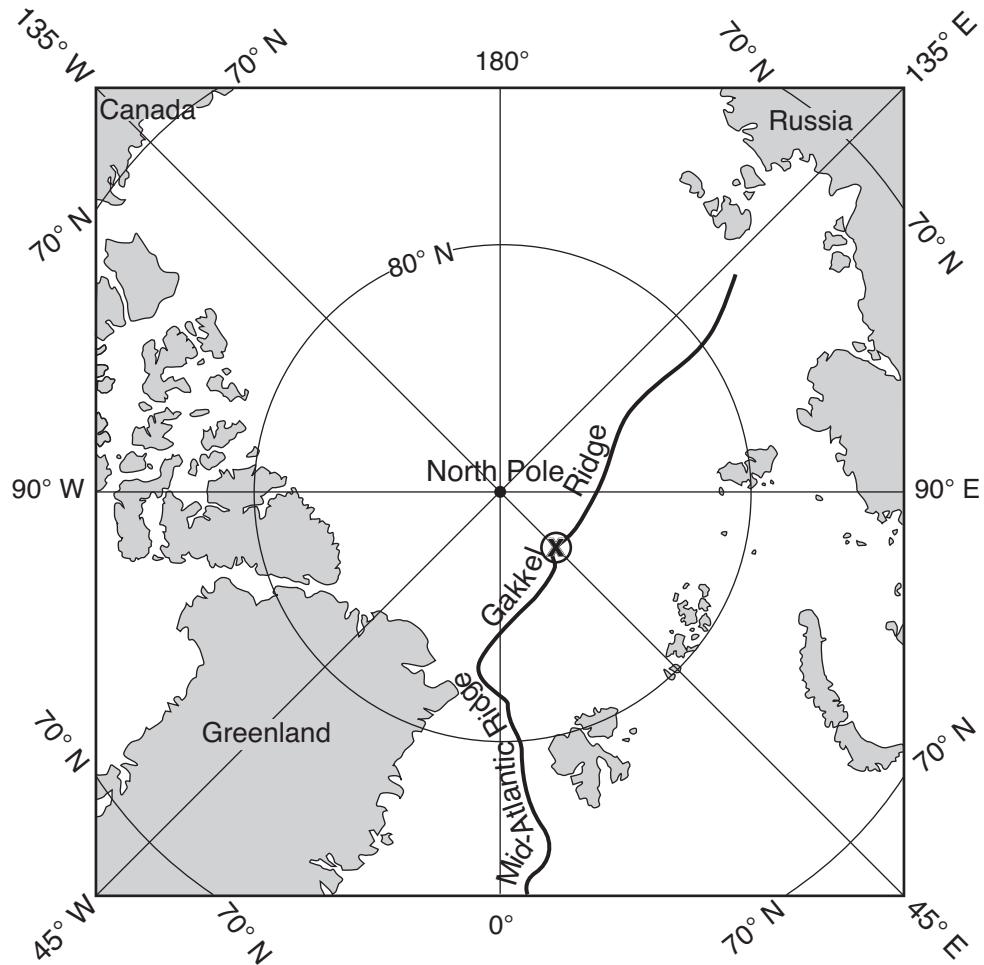
74 [1] Allow 1 credit for a response from 6.0 to 6.2.

75 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- the lag time between the *P*-wave arrival and the *S*-wave arrival
- the difference in arrival time for the *P*-wave and *S*-wave
- the *P*-wave and *S*-wave arrival times
- 61 seconds

76 [1] Allow 1 credit for any answer from 2 minutes 0 seconds to 2 minutes 20 seconds.

77 [1] Allow 1 credit if the center of the **X** falls within the circle shown.



78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The plates are moving apart or spreading.
- The tectonic plates are moving away from each other.
- The ridge is a diverging plate boundary.
- rifting

79 [1] Allow 1 credit for *both* North American Plate and Eurasian Plate.

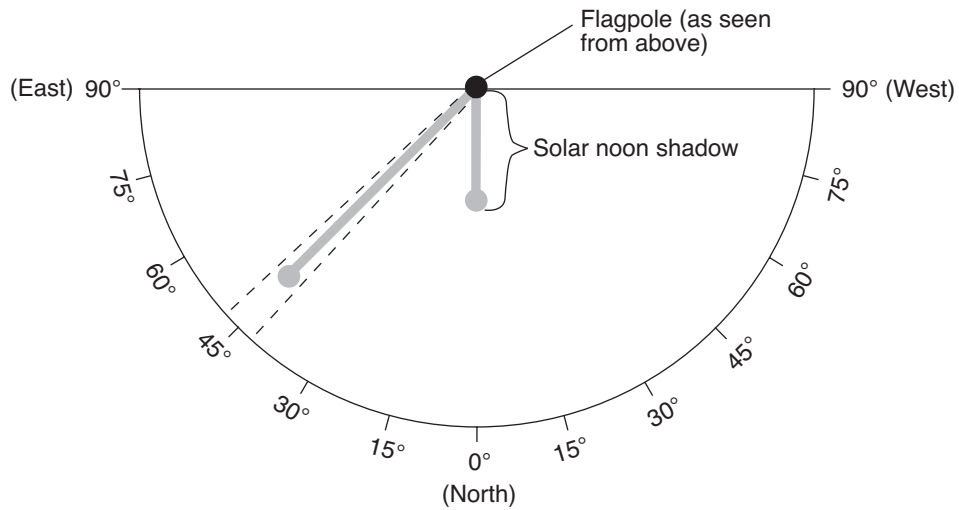
80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- magma/lava
- volcanoes
- smoker vents

81 [1] Allow 1 credit for *both* pyroxene (augite) and olivine.

82 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit if the shadow three hours later is drawn within the dashed lines shown below.
- Allow 1 credit if the length of the shadow after three hours is longer than the solar noon shadow. Allow this credit even if the direction of the shadow is incorrectly drawn.



Regents Examination in Physical Setting/Earth Science

June 2007

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

The *Chart for Determining the Final Examination Score for the June 2007 Regents Examination in Physical Setting/Earth Science* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Tuesday, June 19, 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.

Map to Core Curriculum

June 2007 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1			71,72,73,74,75
Math Key Idea 2	27,30,35		67,69
Math Key Idea 3	30	41	74
Science Inquiry Key Idea 1		36,37,40,45,47, 56,59,61	65,66,68,69,82
Science Inquiry Key Idea 2			68
Science Inquiry Key Idea 3	8,14,16,22,23,24, 33	42,43,54,57,60, 63,64	73,76,79,81
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1		52	
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1		46,48,49,51,55	
Key Idea 2	3,9,13,17,21,25, 26,28,29,31,32, 33,34	36,37,38,43,44, 45,46,47,48,49, 50,51,52,54,55, 58,60,62	65,68,70,71,72, 73,74,75,77,78, 79,80,82
Key Idea 3	35	39,58	70,74
Key Idea 4			
Key Idea 5	26	38,41,52,56,57	66,67,69,71,73, 82
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2		53	
Standard 4			
Key Idea 1	1,2,4,7,9,16,20, 22,25,26,34,35	36,37,38,39,40, 41,42,45,54,55, 56,57	65,66,67,68,69, 77,82
Key Idea 2	3,4,5,6,8,10,11, 13,15,17,19,21, 23,27,28,29,31, 32	37,43,44,46,47, 48,49,50,51,52, 53,58,59,60,61	70,71,72,73,74, 75,76,78,79,80
Key Idea 3	12,14,18,24,30, 33	62,63,64	81
Reference Tables			
ESRT 2001 Edition (Revised)	6,8,12,13,14,16, 18,19,20,22,23, 24,29,30,31,32, 33,35	42,43,46,47,51, 52,54,57,58,62, 63,64	67,71,75,76,78, 79,81

Regents Examination in Earth Science – June 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 85.

		Total Performance Test Score																							
		23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Total Written Test Score	85	100	99	98	97	97	97	97	96	96	95	95	94	94	93	92	92	91	90	89	89	88	87	86	85
	84	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
	83	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
	82	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
	81	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
	80	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
	79	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	83	82
	78	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	83	82
	77	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
	76	95	94	93	92	92	92	91	91	91	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	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	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	87	87	86	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	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	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	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	82	82	81	81	80	80	79	78	78	77	76	75	74	73	72
	63	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71
62	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71	
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	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	65	64	
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	73	72	72	71	70	70	69	68	67	67	66	65	64	
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	74	73	73	73	72	72	71	71	71	70	70	69	68	68	67	66	66	65	64	63	62	61	60	
48	75	73	72	72	72	71	71	71	70	70	69	69	68	68	67	66	66	65	64	63	62	61	60	60	
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
June 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	68	67	65	65	65	65	64	64	63	63	62	62	61	61	60	59	59	58	57	56	55	55	54	53	
	40	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	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	
	37	63	62	61	61	61	60	60	60	59	59	58	58	57	56	56	55	54	54	53	52	51	50	49	48	
	36	63	62	60	60	60	59	59	59	58	58	57	57	56	56	55	54	54	53	52	51	50	49	49	48	
	35	61	60	59	58	58	58	57	57	57	56	56	55	55	54	53	53	52	51	50	50	49	48	47	46	
	34	60	59	58	58	57	57	57	56	56	55	55	54	54	53	52	52	51	50	50	49	48	47	46	45	
	33	59	58	57	57	56	56	56	55	55	54	54	53	53	52	52	51	50	49	49	48	47	46	45	44	
	32	58	56	55	55	55	54	54	54	53	53	52	52	51	51	50	49	49	48	47	46	45	44	43	43	
	31	57	56	54	54	54	54	53	53	52	52	51	51	50	50	49	48	48	47	46	45	44	44	43	42	
	30	56	55	54	53	53	53	52	52	52	51	51	50	49	49	48	48	47	46	45	44	44	43	42	41	
	29	54	53	52	52	51	51	51	50	50	49	49	48	48	47	46	46	45	44	44	43	42	41	40	39	
	28	53	52	51	51	50	50	50	49	49	48	48	47	47	46	46	45	44	44	43	42	41	40	39	38	
	27	52	51	49	49	49	48	48	48	47	47	46	46	45	45	44	43	43	42	41	40	39	38	38	37	
	26	51	50	48	48	48	48	47	47	46	46	45	45	44	44	43	42	42	41	40	39	38	38	37	36	
	25	50	49	48	47	47	47	46	46	46	45	45	44	43	43	42	42	41	40	39	38	38	37	36	35	
	24	48	47	46	46	45	45	45	44	44	44	43	43	42	42	41	41	40	39	38	38	37	36	35	34	33
	23	47	46	45	45	45	44	44	43	43	43	42	42	41	40	40	39	38	38	37	36	35	34	33	32	
	22	46	45	43	43	43	42	42	42	41	41	40	40	39	39	38	37	37	36	35	34	33	32	32	31	
	21	45	44	43	42	42	42	41	41	40	40	40	39	38	38	37	36	36	35	34	33	33	32	31	30	
	20	43	42	41	41	40	40	40	39	39	38	38	37	37	36	35	35	34	33	33	32	31	30	29	28	
	19	42	41	40	40	39	39	39	38	38	37	37	36	36	35	35	34	33	32	32	31	30	29	28	27	
18	41	39	38	38	38	37	37	37	36	36	35	35	34	34	33	32	32	31	30	29	28	27	26	26		
17	40	39	37	37	37	37	36	36	35	35	34	34	33	33	32	31	31	30	29	28	27	27	26	25		
16	38	37	36	35	35	35	34	34	34	33	33	32	32	31	30	30	29	28	27	27	26	25	24	23		
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	33	33	33	32	32	32	31	31	30	30	29	28	28	27	26	26	25	24	23	22	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	31	30	29	29	28	28	28	27	27	26	26	25	25	24	24	23	22	21	21	20	19	18	17	16		
10	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	16	16	15	15	14	14	13	13	12	11	10	9	8	7	6	6		
3	19	18	17	17	16	16	16	15	15	14	14	13	13	12	12	11	10	10	9	8	7	6	5	4		
2	18	17	16	16	16	15	15	15	14	14	13	13	12	11	11	10	9	9	8	7	6	5	4	3		
1	17	16	14	14	14	14	13	13	12	12	11	11	10	10	9	8	8	7	6	5	4	4	3	2		
0	15	14	13	12	12	12	12	11	11	10	10	9	9	8	7	7	6	5	4	4	3	2	1	0		