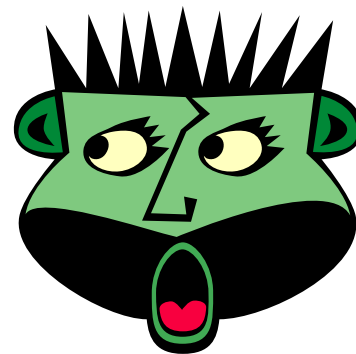


The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SETTING EARTH SCIENCE



Wednesday, January 27, 2010 — 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 *2010 Edition Reference Tables for Physical Setting/Earth Science*. The reference tables are supplied separately. Be certain you have a copy of the *2010 Edition* of these reference tables before you begin the examination.

Your answer sheet for Part A and Part B–1 is the last page of this examination booklet. Turn to the last page and fold it along the perforations. Then, slowly and carefully, tear off your answer sheet and fill in the heading.

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

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

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

Notice. . .

A four-function or scientific calculator and a copy of the *2010 Edition Reference Tables for Physical Setting/Earth Science* 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.

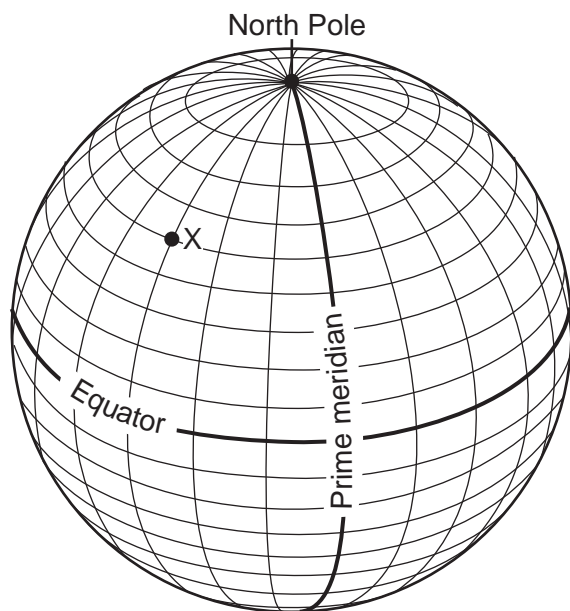
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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 2010 Edition Reference Tables for Physical Setting/Earth Science.

- 1 The diagram below shows latitude measurements every 10 degrees and longitude measurements every 15 degrees.



What is the latitude and longitude of point X?

- (1) 40° S 45° E (3) 60° S 30° W
(2) 50° N 45° W (4) 75° N 30° E
- 2 In which sequence are the items listed from least total mass to greatest total mass?
- (1) solar system, Milky Way, universe
(2) Milky Way, solar system, universe
(3) universe, Milky Way, solar system
(4) Milky Way, universe, solar system
- 3 The red shift of visible light waves that is observed by astronomers on Earth is used to determine the
- (1) sizes of nearby galaxies
(2) relative motions of distant galaxies
(3) densities of the planets
(4) rotation periods of the planets

- 4 At which New York State location would an observer measure the highest altitude of *Polaris*?
- (1) New York City (3) Niagara Falls
(2) Slide Mountain (4) Plattsburgh
- 5 How many days are required for the Moon to go from one full-Moon phase to the next full-Moon phase when viewed from Earth?
- (1) 24 (3) 29.5
(2) 27.3 (4) 365
- 6 If the average distance between Earth and the Sun were doubled, what changes would occur in the Sun's gravitational pull on Earth and Earth's period of revolution?
- (1) Gravitational pull would decrease and period of revolution would increase.
(2) Gravitational pull would decrease and period of revolution would decrease.
(3) Gravitational pull would increase and period of revolution would increase.
(4) Gravitational pull would increase and period of revolution would decrease.
- 7 The Foucault pendulum provides evidence of Earth's
- (1) revolution around the Sun in a geocentric solar system
(2) revolution around the Sun in a heliocentric solar system
(3) rotation on its axis in a geocentric solar system
(4) rotation on its axis in a heliocentric solar system
- 8 The first S-wave arrived at a seismograph station 11 minutes after an earthquake occurred. How long after the arrival of the first P-wave did this first S-wave arrive?
- (1) 3 min 15 s (3) 6 min 05 s
(2) 4 min 55 s (4) 9 min 00 s

9 An air mass classified as cT usually forms over which type of Earth surface?

- (1) cool water (3) warm water
(2) cool land (4) warm land

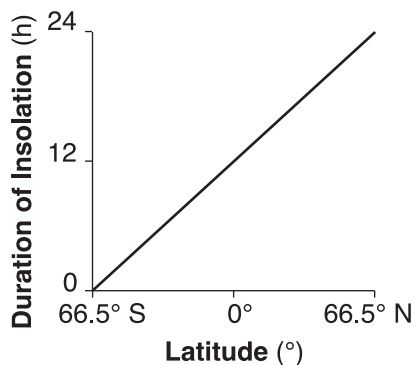
10 What is the dewpoint when the dry-bulb temperature is 24°C and the wet-bulb temperature is 21°C?

- (1) 16°C (3) 20°C
(2) 18°C (4) 21°C

11 During which process does water gain the most heat energy?

- (1) condensation (3) evaporation
(2) freezing (4) melting

12 The graph below shows the general relationship between latitude and the duration of insolation on a particular day of the year.



Which date is represented by the graph?

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

13 Eurypterid fossils are abundant in the Bertie dolostone, a sedimentary rock layer found in western New York State. The presence of both the eurypterids and the dolostone indicates that, during the formation of this rock layer, this region of New York State was

- (1) covered by evaporating shallow seas
(2) uplifted and eroded
(3) buried beneath lava flows
(4) intensely metamorphosed

14 The table below shows information about the radioactive decay of carbon-14.

Half-Life	Mass of Original Carbon-14 Remaining (g)	Number of Years
0	1	0
1	$\frac{1}{2}$	5700
2	$\frac{1}{4}$	11,400
3	$\frac{1}{8}$	17,100

What is the amount of carbon-14 remaining after 28,500 years?

- (1) $\frac{1}{16}$ g (3) $\frac{1}{32}$ g
(2) $\frac{15}{16}$ g (4) $\frac{31}{32}$ g

15 Which coastal location experiences a cooler summer climate due to ocean currents?

- (1) southeast coast of North America
(2) northeast coast of Australia
(3) southwest coast of South America
(4) northwest coast of Europe

16 According to the fossil record, which group of organisms has existed for the greatest length of time?

- (1) gastropods (3) mammals
(2) corals (4) vascular plants

17 The division of Earth's geologic history into units of time called eons, eras, periods, and epochs is based on

- (1) absolute dating techniques
(2) fossil evidence
(3) climatic changes
(4) seismic data

18 Which statement is best supported by the fossil record?

- (1) Fossils are found in nearly all rocks.
- (2) Fossils are found only in areas that were once under water.
- (3) Most early life-forms that left fossil remains are now extinct.
- (4) Most early life-forms that left fossil remains still exist today.

19 U-shaped valleys and parallel grooves in bedrock are characteristics of erosion by

- (1) mass movement
- (2) wave action
- (3) running water
- (4) glacial ice

20 Which mineral is the major component of drywall?

- (1) talc
- (2) calcite
- (3) muscovite mica
- (4) selenite gypsum

21 Which element is most abundant in Earth's crust?

- (1) nitrogen
- (2) hydrogen
- (3) oxygen
- (4) silicon

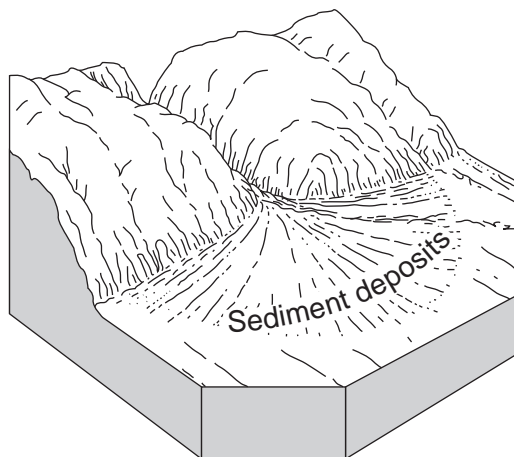
22 What elevation and bedrock structure are generally found in the Catskills?

- (1) low elevation and horizontal sedimentary bedrock structure
- (2) high elevation and horizontal sedimentary bedrock structure
- (3) low elevation and folded metamorphic bedrock structure
- (4) high elevation and folded metamorphic bedrock structure

23 The Mariana Trench was most likely created by the

- (1) convergence of the Pacific and Philippine Plates
- (2) divergence of the Eurasian and Philippine Plates
- (3) sliding of the Pacific Plate past the North American Plate
- (4) movement of the Pacific Plate over the Hawaii Hot Spot

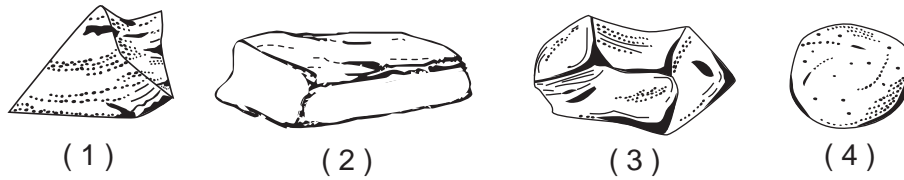
24 The landscape diagram below shows a fan-shaped pattern of sediment deposits.



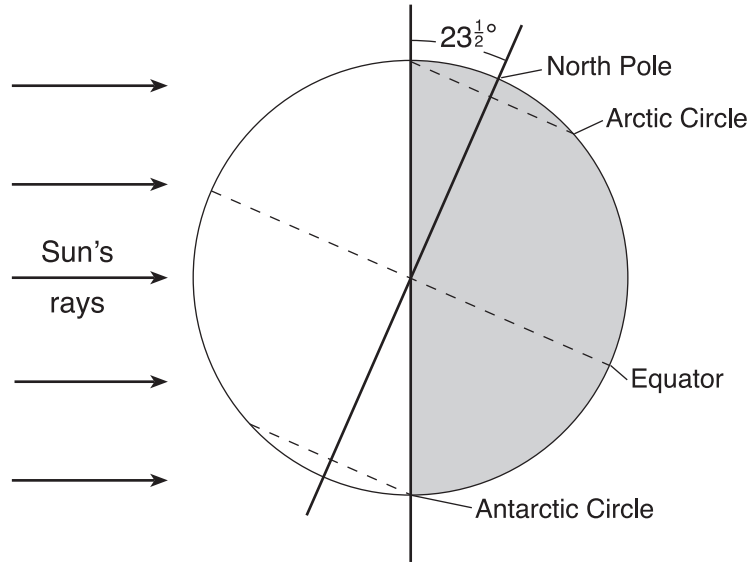
The fan-shaped pattern of these sediments is most likely the result of deposition by

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

25 Four quartz samples of equal size and shape were placed in a stream. Which of the four quartz samples below has most likely been transported farthest in the stream?



26 The diagram below shows Earth as viewed from space.



Which season is beginning in the Northern Hemisphere?

- (1) spring
- (2) summer
- (3) fall
- (4) winter

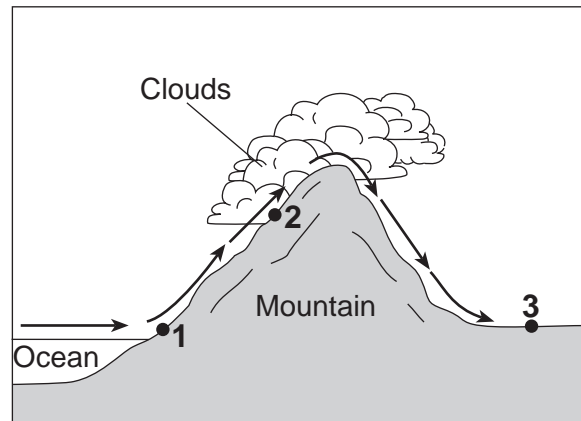
27 The table below shows the latitude and the average yearly temperature for four different cities.

City	Singapore	Calcutta	Washington, D.C.	Moscow
Latitude	1° N	23° N	39° N	56° N
Average Yearly Temperature	81°F	79°F	57°F	39°F

It can be inferred from this table that the cities at higher latitudes have

- (1) lower average yearly temperatures because these cities receive insolation at a higher angle during the year
- (2) lower average yearly temperatures because these cities receive insolation at a lower angle during the year
- (3) higher average yearly temperatures because these cities receive insolation at a higher angle during the year
- (4) higher average yearly temperatures because these cities receive insolation at a lower angle during the year

Base your answers to questions 28 and 29 on the diagram below, which shows air movement over a mountain range. The arrows indicate the direction of airflow. Points 1 through 3 represent locations on Earth's surface.



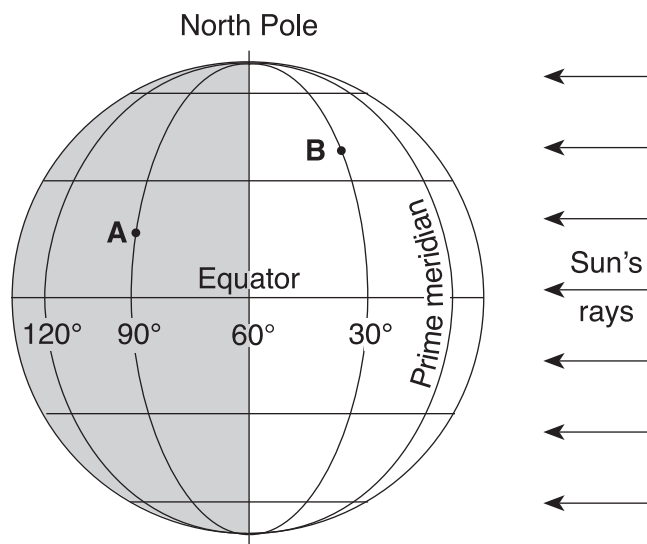
28 Compared to the climate at location 1, the climate at location 3 is

- | | |
|-----------------------|-----------------------|
| (1) cooler and drier | (3) warmer and drier |
| (2) cooler and wetter | (4) warmer and wetter |

29 Cloud formation at location 2 is the direct result of air that is rising,

- | | |
|----------------------------|------------------------------|
| (1) expanding, and cooling | (3) compressing, and cooling |
| (2) expanding, and warming | (4) compressing, and warming |

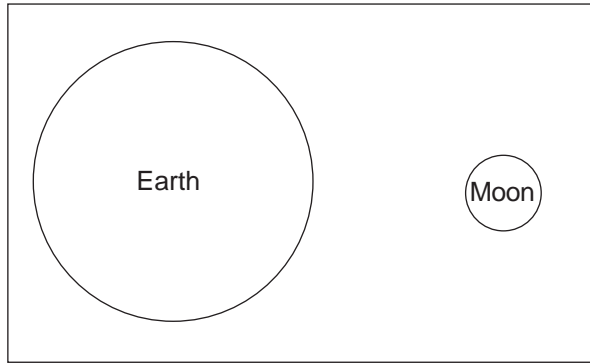
30 The diagram below shows the latitude and longitude lines on Earth. Points A and B are locations on Earth's surface.



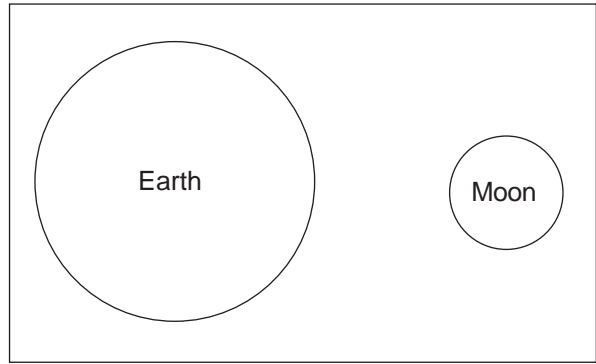
If it is 4 a.m. at location A, what time is it at location B?

- | | |
|-------------|------------|
| (1) 10 a.m. | (3) 6 a.m. |
| (2) 2 a.m. | (4) 8 a.m. |

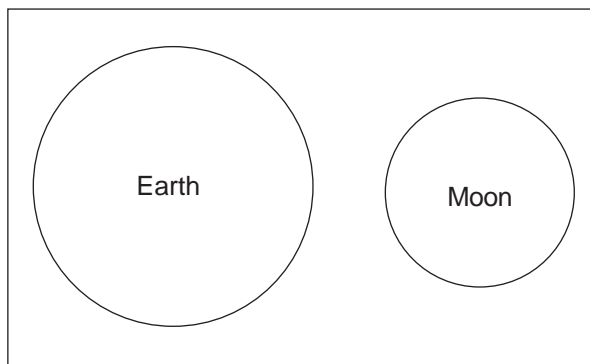
31 Which diagram best represents the size of the Moon, compared to Earth, when drawn to scale?



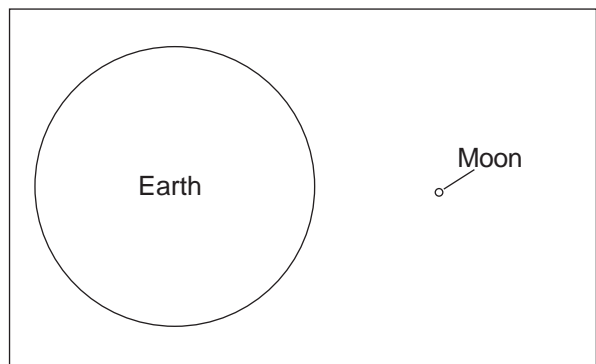
(1)



(3)

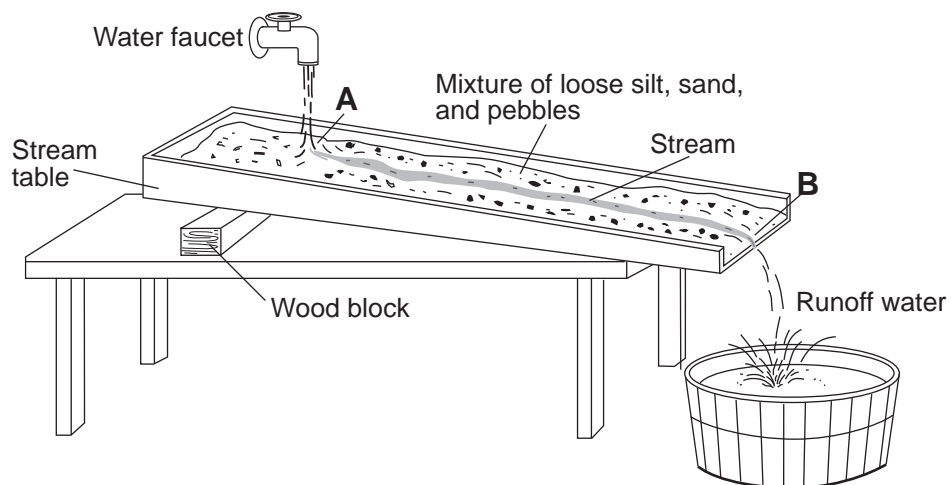


(2)



(4)

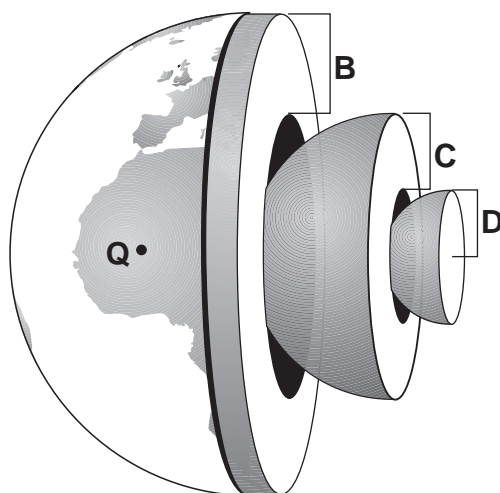
32 The model shown below illustrates stream erosion between locations A and B in the stream.



Placing a second block under location A will cause the stream's velocity to

- (1) decrease and the rate of erosion to decrease
- (2) decrease and the rate of erosion to increase
- (3) increase and the rate of erosion to decrease
- (4) increase and the rate of erosion to increase

Base your answers to questions 33 and 34 on the diagram of Earth shown below. Letters *B*, *C*, and *D* represent layers of Earth. Letter *Q* represents a location on Earth's surface.



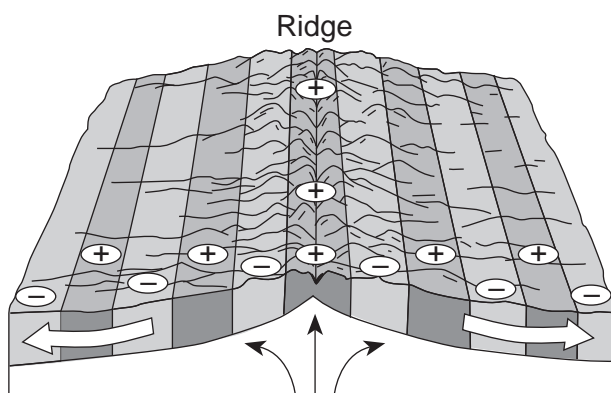
33 What is the probable density of the granitic bedrock at *Q*?

- | | |
|---------------------------|---------------------------|
| (1) 1.0 g/cm ³ | (3) 3.0 g/cm ³ |
| (2) 2.7 g/cm ³ | (4) 5.5 g/cm ³ |

34 Which letter best represents Earth's mantle?

- | | |
|--------------|--------------|
| (1) <i>Q</i> | (3) <i>C</i> |
| (2) <i>B</i> | (4) <i>D</i> |

35 The block diagram below represents the present ocean floor. The white arrows show the movement of the ocean floor and the black arrows show the movement of the asthenosphere.



Which characteristic of the ocean-floor bedrock is best described by the \oplus and \ominus symbols in the diagram?

- (1) \oplus = older age; \ominus = younger age
- (2) \oplus = younger age; \ominus = older age
- (3) \oplus = reversed magnetic polarity; \ominus = normal magnetic polarity
- (4) \oplus = normal magnetic polarity; \ominus = reversed magnetic polarity

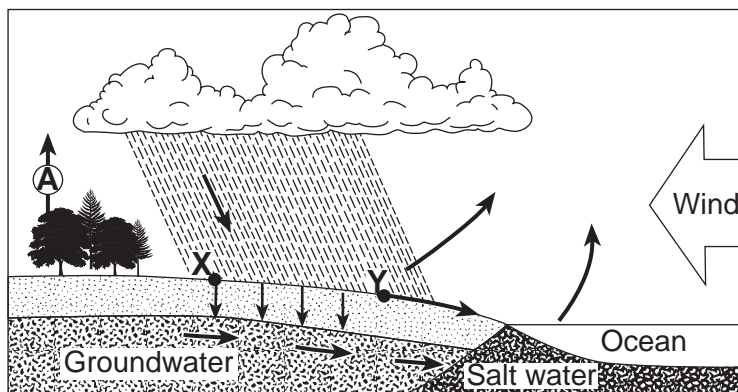
Part B-1

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 2010 Edition Reference Tables for Physical Setting/Earth Science.

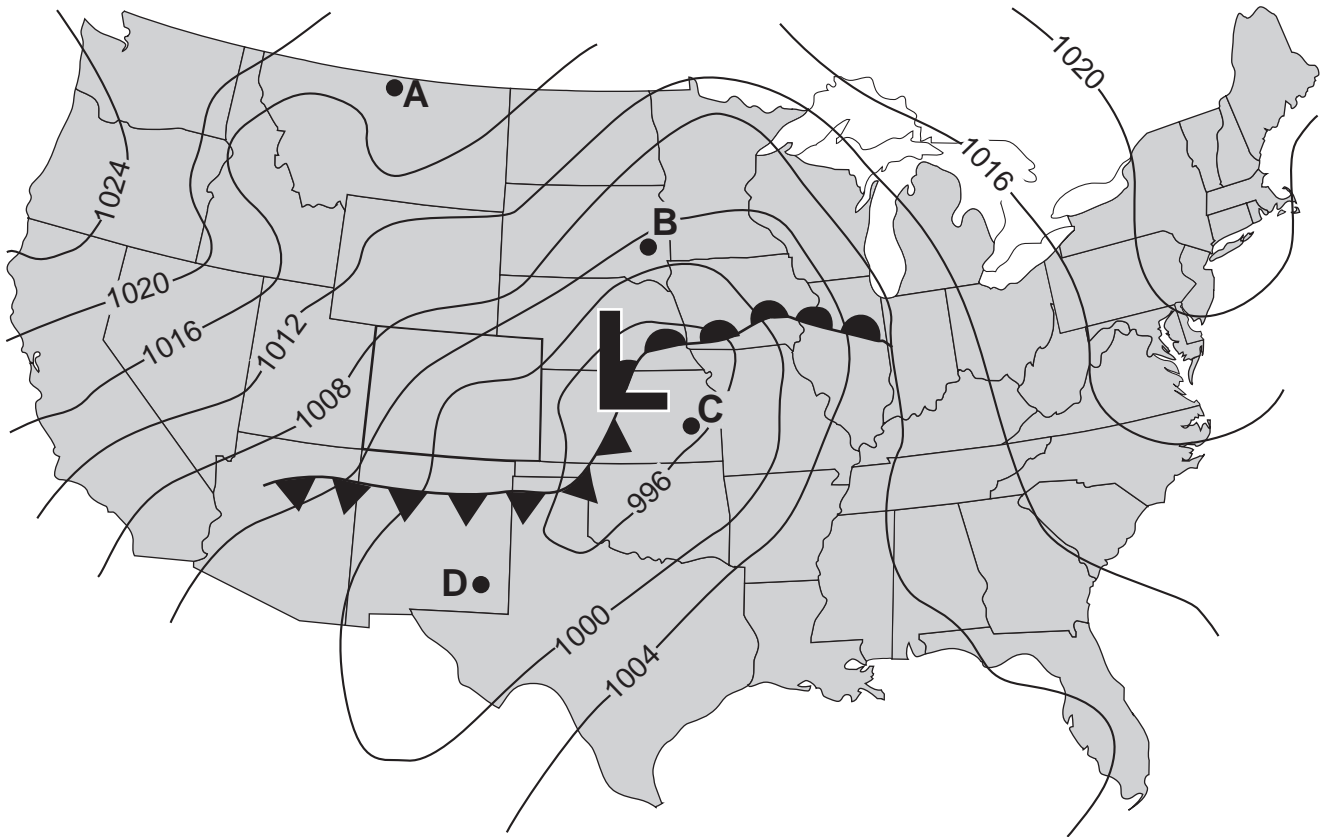
Base your answers to questions 36 through 39 on the diagram of the water cycle below. Letter A represents a process in the water cycle. Points X and Y represent locations on Earth's surface.

Water Cycle



- 36 The process represented by A is
- | | |
|-------------------|------------------|
| (1) precipitation | (3) condensation |
| (2) transpiration | (4) saturation |
- 37 Rainwater will enter the ground at X if the ground is
- | | |
|-------------------------------|---------------------------------|
| (1) saturated and permeable | (3) unsaturated and permeable |
| (2) saturated and impermeable | (4) unsaturated and impermeable |
- 38 The amount of runoff at Y will increase as the
- | |
|--|
| (1) slope of the land decreases |
| (2) porosity of the soil increases |
| (3) evaporation rate exceeds the infiltration rate |
| (4) precipitation rate exceeds the infiltration rate |
- 39 Which process in the water cycle is directly responsible for cloud formation?
- | | |
|------------------|-------------------|
| (1) condensation | (3) precipitation |
| (2) infiltration | (4) evaporation |
-

Base your answers to questions 40 through 43 on the weather map below, which shows a low-pressure system over the central United States. Isobars are labeled in millibars. Points A, B, C, and D represent locations on Earth's surface.



40 The circulation of surface winds associated with this low-pressure system is

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

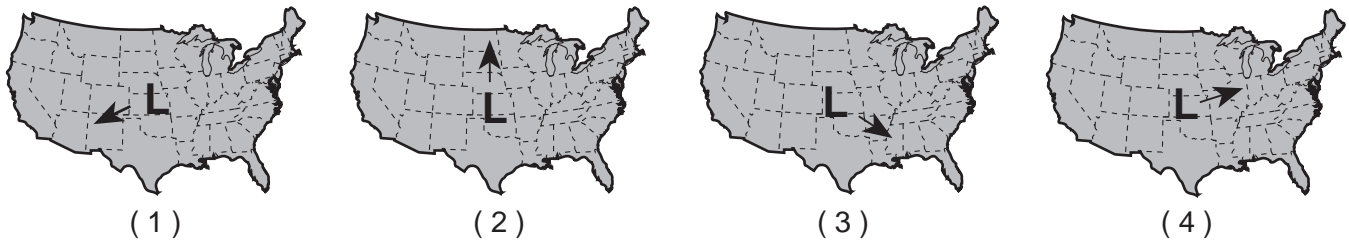
41 The air pressure at the center of this low is

- (1) 991 mb
- (2) 994 mb
- (3) 997 mb
- (4) 1001 mb

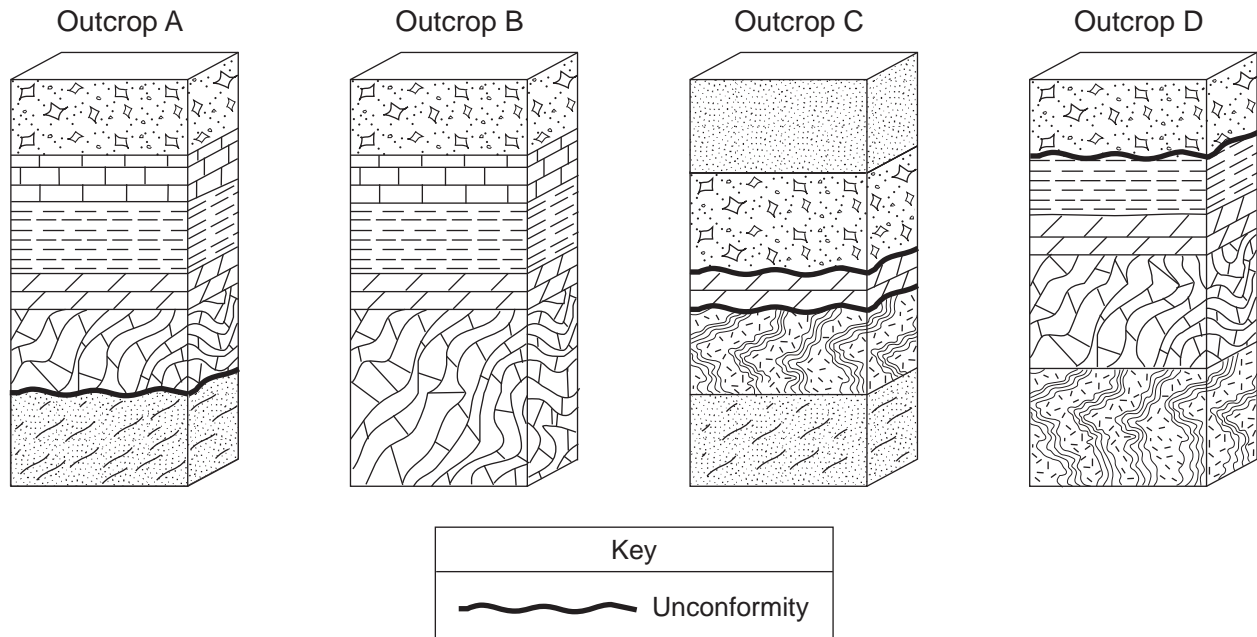
42 Which location is most likely experiencing the fastest wind speed?

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

43 Which map shows the most likely path this low-pressure center will follow during the next 12 hours?



Base your answers to questions 44 through 46 on the block diagrams of four rock outcrops, A, B, C, and D, located within 15 kilometers of each other. The rock layers have not been overturned.



44 When the rock layers at outcrops A, B, C, and D are correlated, which rock layer would be determined to be the oldest?

- (1) quartzite (3) gneiss
(2) marble (4) sandstone

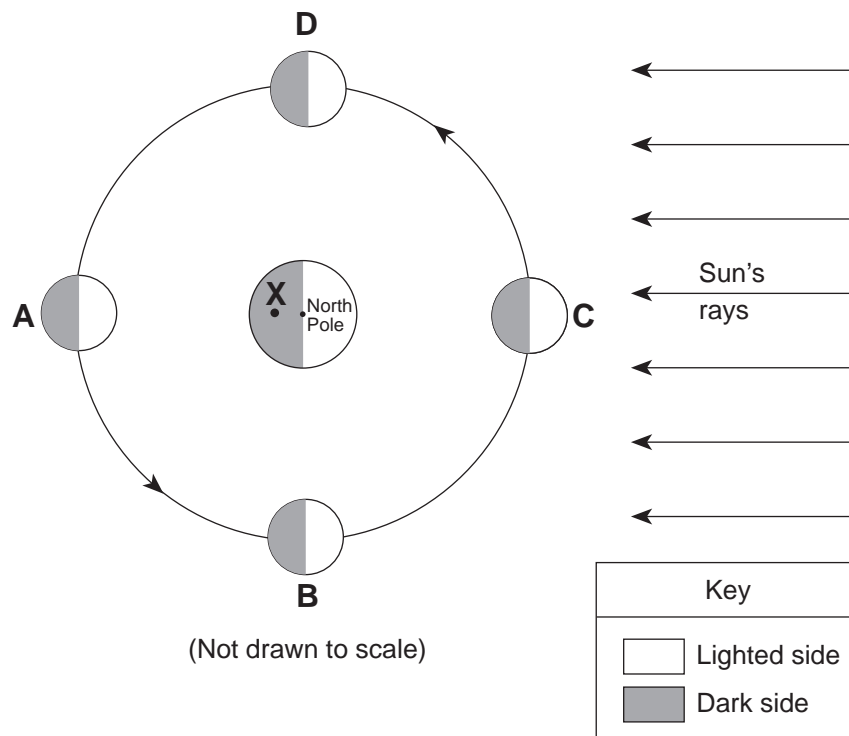
45 Which stream velocity carried only clay particles to the depositional environment where the shale formed?

- (1) 0.02 cm/s (3) 10 cm/s
(2) 0.05 cm/s (4) 20 cm/s

46 By which process was the quartzite formed?

- (1) deposition of clastic sediment (3) metamorphism of sandstone
(2) precipitation from seawater (4) cementation of shells

Base your answers to questions 47 through 50 on the diagram below, which shows Earth and the Moon in relation to the Sun. Positions A, B, C, and D show the Moon at specific locations in its orbit. Point X is a location on Earth's surface.



47 What is the time of day at point X?

- | | |
|------------|--------------|
| (1) 6 a.m. | (3) 6 p.m. |
| (2) noon | (4) midnight |

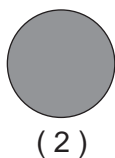
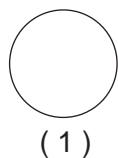
48 On what date does the line separating day and night pass through Earth's North Pole, as shown in this diagram?

- | | |
|-----------------|--------------|
| (1) December 21 | (3) March 21 |
| (2) January 21 | (4) June 21 |

49 A solar eclipse might occur when the Moon is at location

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

50 Which phase of the Moon would be observed on Earth when the Moon is at location A?



Part B–2

Answer all questions in this part.

Directions (51–65): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *2010 Edition Reference Tables for Physical Setting/Earth Science*.

Base your answers to questions 51 through 54 on the passage below.

Earth's Early Atmosphere

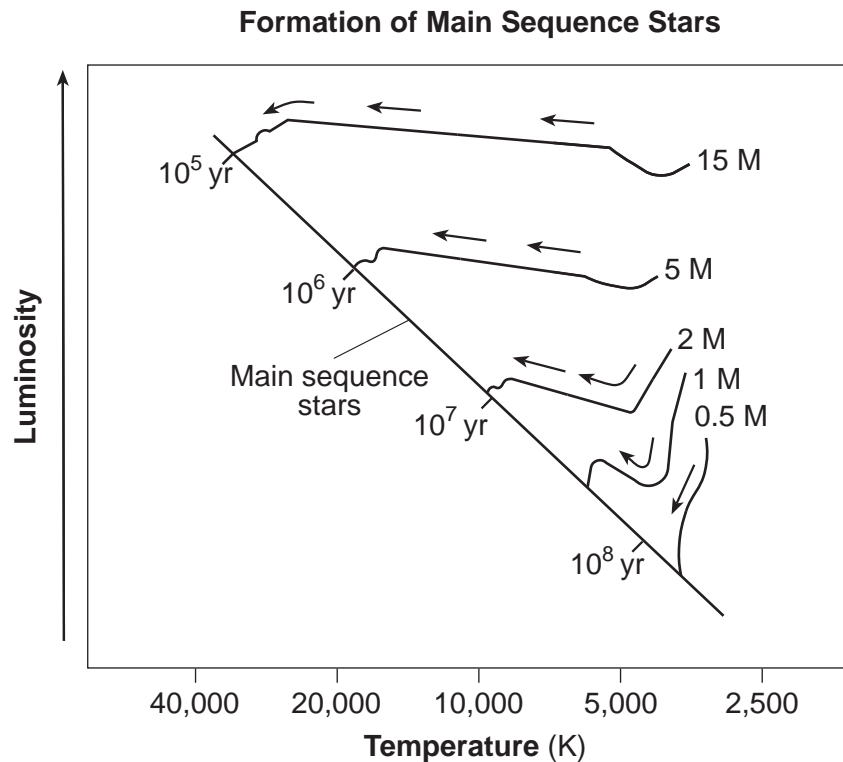
Early in Earth's history, the molten outer layers of Earth released gases to form an early atmosphere. Cooling and solidification of that molten surface formed the early lithosphere approximately 4.4 billion years ago. Around 3.3 billion years ago, photosynthetic organisms appeared on Earth and removed large amounts of carbon dioxide from the atmosphere, which allowed Earth to cool even faster. In addition, they introduced oxygen into Earth's atmosphere, as a by-product of photosynthesis. Much of the first oxygen that was produced reacted with natural Earth elements, such as iron, in the lithosphere and produced new varieties of rocks and minerals. Eventually, photosynthetic organisms produced enough oxygen so that it began to accumulate in Earth's atmosphere. About 450 million years ago, there was enough oxygen in the atmosphere to allow for the development of an ozone layer 30 to 50 kilometers above Earth's surface. This layer was thick enough to protect organisms developing on land from the ultraviolet radiation from the Sun.

- 51 State *one* reason why the first rocks on Earth were most likely igneous in origin. [1]
- 52 Identify *one* mineral with a red-brown streak that formed when oxygen in Earth's early atmosphere combined with iron. [1]
- 53 Identify the temperature zone of the atmosphere in which the ozone layer developed. [1]
- 54 Complete the pie graph *in your answer booklet* to show the percent by volume of nitrogen and oxygen gases currently found in Earth's troposphere. Label each section of the graph with the name of the gas. The percentage of other gases is shown. [1]
-

Base your answers to questions 55 and 56 on the field map in your answer booklet. The field map shows temperatures, in degrees Fahrenheit, taken at several locations on a blacktop parking lot in New York State. The temperatures were recorded at 11:00 a.m. in early June.

- 55 On the field map *in your answer booklet*, draw the 70°F and 80°F isotherms. The isotherms should be extended to the edges of the map. [1]
- 56 Explain why the surface of this parking lot usually becomes warmer from 11:00 a.m. to 12 noon each day. [1]
-

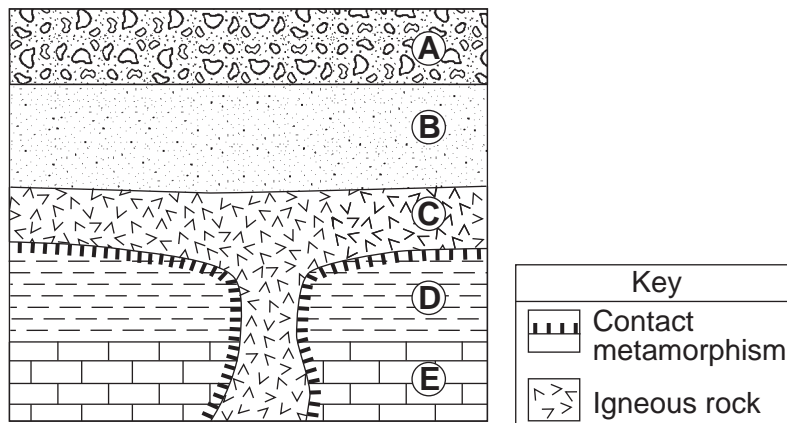
Base your answers to questions 57 through 59 on the graph below, which shows the early formation of main sequence stars of different masses (M). The arrows represent temperature and luminosity changes as each star becomes part of the main sequence. The time needed for each star to develop into a main sequence star is shown on the main sequence line.



Key
1 M = 1 Sun's mass

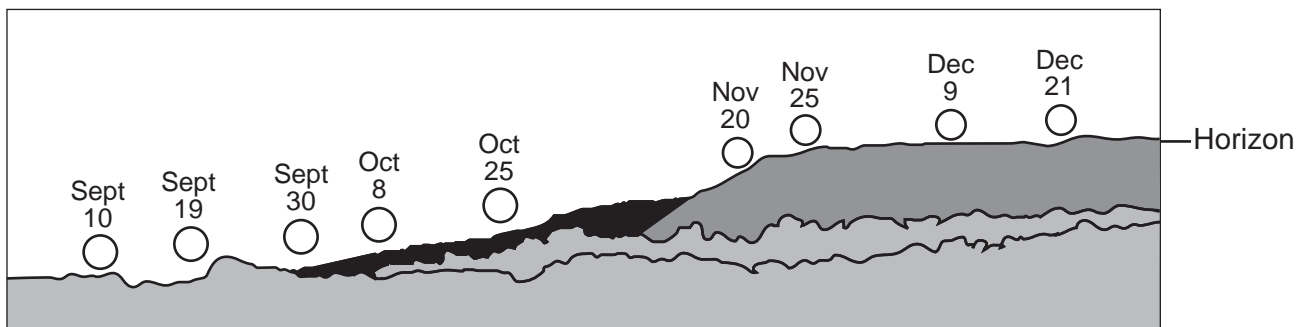
- 57 Describe the relationship between the original mass of a star and the length of time necessary for it to become a main sequence star. [1]
- 58 Describe the change in luminosity of a star that has an original mass of 0.5 M as it progresses to a main sequence star. [1]
- 59 Identify the force that causes the accumulation of matter that forms the stars. [1]

Base your answers to questions 60 through 62 on the cross section below, which shows rock units A through E that have not been overturned.



- 60 Identify *one* metamorphic rock that may be found along the boundary between rock units C and E. [1]
- 61 Describe *one* piece of evidence shown in the cross section that can be used to infer that rock unit A is younger than rock unit B. [1]
- 62 State the diameter of a particle normally found in rock unit B. [1]

63 The diagram below shows the position of sunrise along the horizon for a period of time from September 10 until December 21, as seen by an observer near Binghamton, New York.

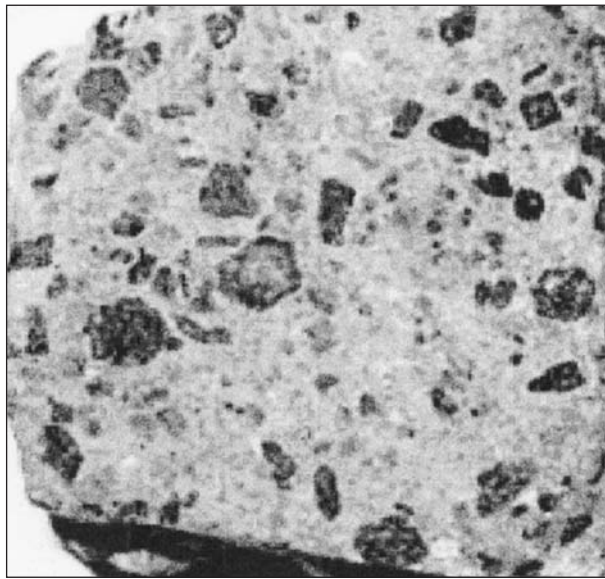


- State *one* reason why the position of sunrise changes during this time period. [1]

Base your answers to questions 64 and 65 on the passage and photograph below. The passage describes the properties of porphyritic rocks. The photograph shows a sample of andesite rock that has a porphyritic texture.

Porphyritic Rocks

Igneous rocks that have two distinctly different crystal sizes have a porphyritic texture. They contain large, coarse-grained crystals called phenocrysts, which are visible to the naked eye. These crystals are surrounded by fine-grained crystals called groundmass.



- 64 Identify the evidence shown by the photograph that indicates that two different cooling events occurred during the formation of this rock. [1]
- 65 The andesite sample in the photograph has a small percentage of quartz. List *three* other minerals that are found in this sample. [1]
-

Part C

Answer all questions in this part.

Directions (66–84): Record your answers in the spaces provided in your answer booklet. Some questions may require the use of the *2010 Edition Reference Tables for Physical Setting/Earth Science*.

Base your answers to questions 66 and 67 on the data table below, which lists six stars, numbered 1 through 6, found in the constellation Taurus. The table shows the celestial coordinates for these six stars.

Location of Six Stars in Taurus

Star Number	Celestial Longitude (hours)	Celestial Latitude (degrees)	Name
1	5.6	21	<i>Zeta Tauri</i>
2	4.6	16	<i>Aldebaran</i>
3	4.3	15	<i>Gamma Tauri</i>
4	4.5	19	<i>Epsilon Tauri</i>
5	4.7	23	<i>Tau Tauri</i>
6	5.4	29	<i>Elnath</i>

- 66 On the grid *in your answer booklet*, use an **X** to plot the position of each of the six stars. Record the number of the plotted star beside each **X** and connect the **Xs** in the following order: 1, 2, 3, 4, 5, 6. The first star, *Zeta Tauri*, has been plotted for you. [1]

- 67 *In your answer booklet*, complete the data table that provides additional information about two of the stars in Taurus. [1]

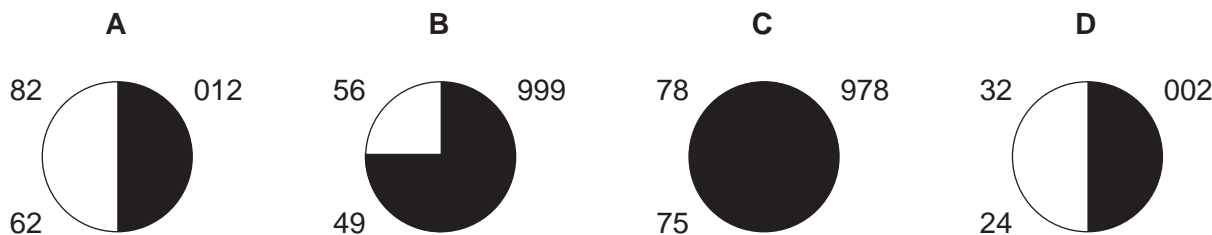
- 68 The table below shows information about Earth's geologic history. Letter X represents information that has been omitted.

Period	Million Years Ago	Index Fossil Found in Bedrock	Important Geologic Event
Triassic	251 to 200	<i>Coelophysis</i>	X



- Identify *one* important geologic event that occurred in New York State that could be placed in the box at X. [1]

Base your answers to questions 69 through 72 on the four weather station models, A, B, C, and D, below.



69 In your answer booklet, list the letters of the four station models, in order, from the station with the highest air-pressure reading to the station with the lowest air-pressure reading. [1]

? 70 Convert the air temperature at station A into degrees Celsius. [1]

? 71 What evidence indicates that station C has the highest relative humidity? [1]

72 On station model D in your answer booklet, draw the proper symbol to indicate a 25-knot wind coming from the west. [1]

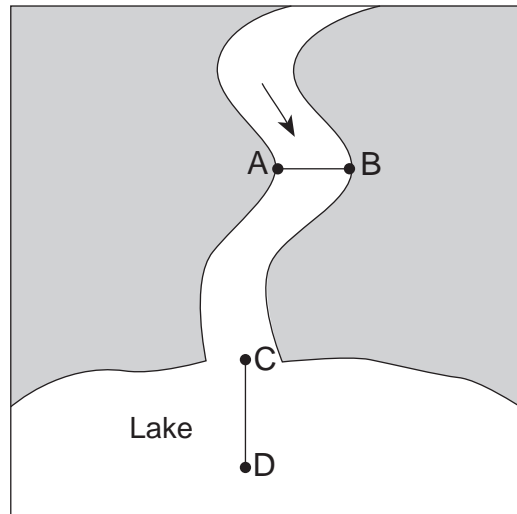
Base your answers to questions 73 through 75 on the map in your answer booklet, which shows the inferred position of Earth's landmasses at a particular time in Earth's history. The Taconic Mountains are shown near a subduction zone where they formed after the coast of Laurentia collided with a volcanic island arc, closing the western part of the Iapetus Ocean.

73 On the map in your answer booklet, place an **X** to show the approximate location of the remaining part of the Iapetus Ocean. [1]

74 On the map in your answer booklet, draw an arrow on the Laurentia landmass to show its direction of movement relative to the subduction zone. [1]

? 75 Identify the geologic time period represented by the map. [1]

Base your answers to questions 76 through 78 on the map and the stream data table below. The map represents a stream flowing into a lake. An arrow shows the direction of streamflow. Points *A* and *B* are locations at the edge of the stream. Line *AB* is a reference line across the stream surface. Line *CD* is a reference line along the lake bottom from the mouth of the stream into the lake. The data table gives the depth of the water and distance from point *A*, in feet, along line *AB*.



	Point A	Stream Data Table								Point B
Distance from Point A (ft)	0	10	20	30	40	50	60	70	80	90
Depth of Water (ft)	0	2	4	7	11	13	16	17	10	0

76 On the grid in *your answer booklet*, construct a profile of the depth of water below line *AB*, following the directions below.

- Mark an appropriate numerical scale showing equal intervals on the axis labeled “Depth of Water.” The zero (0) on the depth of water axis represents the stream surface. [1]
- Using the data table, plot with an **X** the depth of water at each distance from point *A* to point *B*. Connect the **X**s with a smooth, curved line. Points *A* and *B* have already been plotted. [1]



77 Using the map and the data table, explain why the depth of water 20 feet from point *A* is different from the depth of water 20 feet from point *B*. [1]

78 The sediments being carried by the stream include clay, pebbles, sand, and silt. List these sediments in the most likely order of deposition from point *C* to point *D*. [1]

Base your answers to questions 79 through 81 on the passage below.

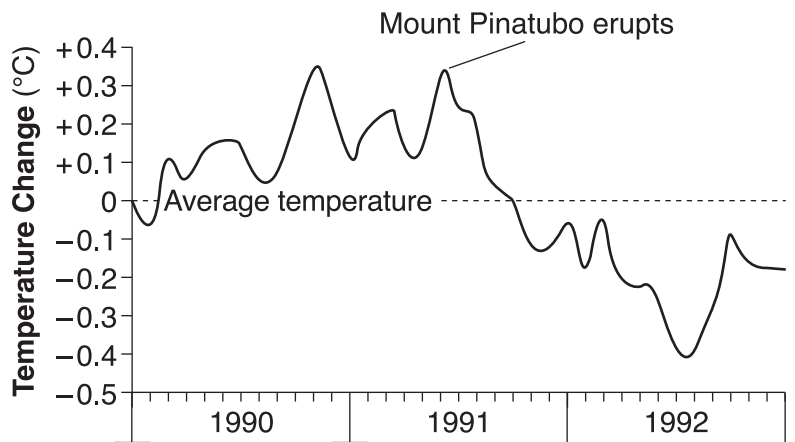
Graywacke

Graywacke is a type of sandstone composed of a great variety of minerals. Unlike a “clean” sandstone where both the sand-sized grains and cement are composed mostly of quartz, graywacke is a “dirty” sandstone which can be composed of potassium feldspar, plagioclase feldspar, calcite, hornblende, and augite, as well as quartz.

Graywacke can be used for paving highways. The hard, massive bedrock is first drilled and then blasted into large chunks. Stone crushers grind these chunks into pebble-sized pieces. Truckloads of the graywacke pebbles are then hauled to plants where asphalt for paving is made.

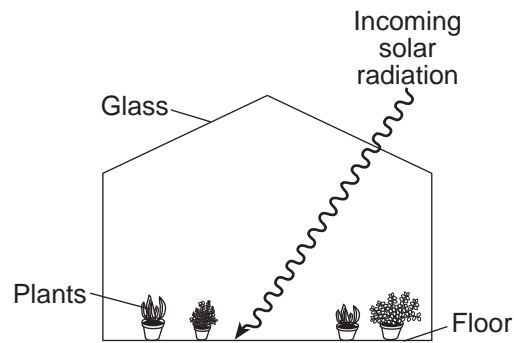
- 79 State *one* difference in the mineral composition of a “clean” sandstone and a “dirty” sandstone. [1]
- 80 Identify *one* rock-forming process that must have occurred after the sediments were deposited to form graywacke. [1]
- 81 State *one negative* environmental impact a graywacke quarry could have on the area where it is located. [1]
-

- 82 The graph below shows the average changes in monthly global air temperatures from 1990 to 1992. The time of a major volcanic eruption of Mount Pinatubo in the Philippines is shown.



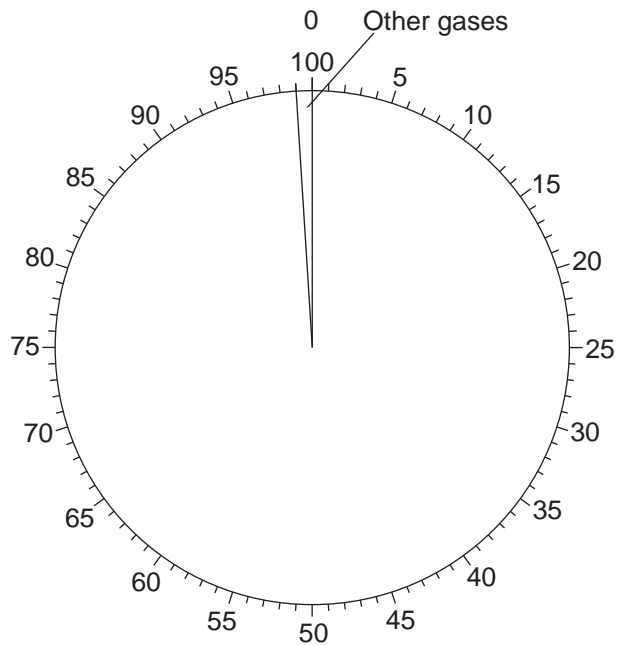
- Explain how this volcanic eruption could have caused the general decrease in temperature shown by the graph. [1]

Base your answers to questions 83 and 84 on the diagram below, which shows incoming solar radiation passing through the glass of a greenhouse and then striking the floor.



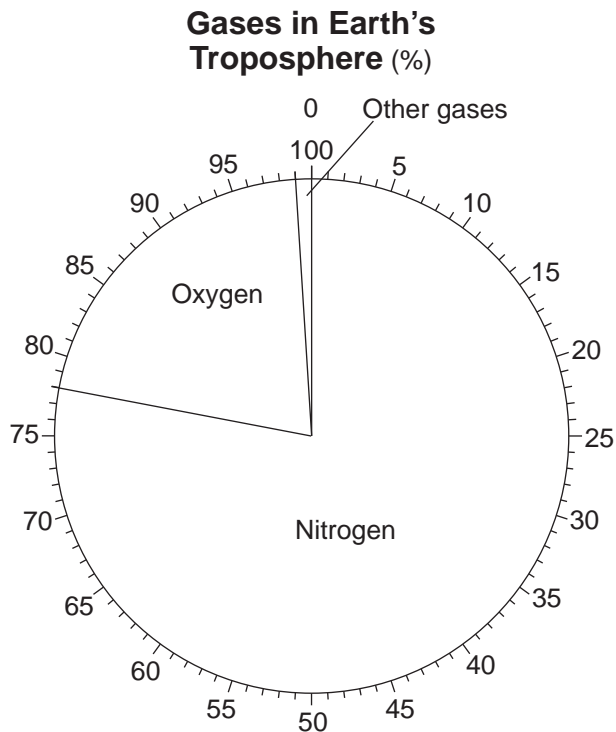
- 83 Some of the incoming solar radiation is absorbed by the floor. Identify the type of electromagnetic energy reradiated by the floor. [1]
- 84 Describe *one* way the glass in the greenhouse acts like the greenhouse gases in Earth's atmosphere. [1]
-

Gases in Earth's Troposphere (%)



- 54 [1] Allow 1 credit if the student-graphed sections are correctly drawn and labeled. The sections may be graphed in any order.

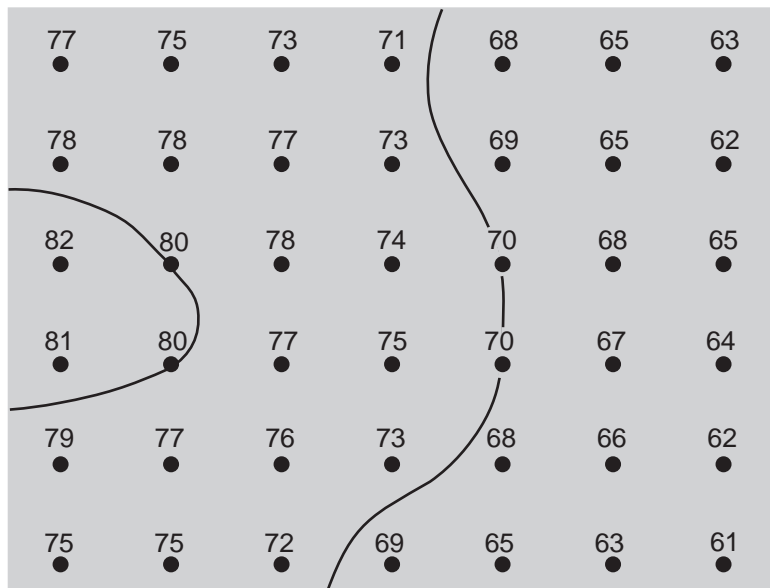
Example of a 1-credit response:

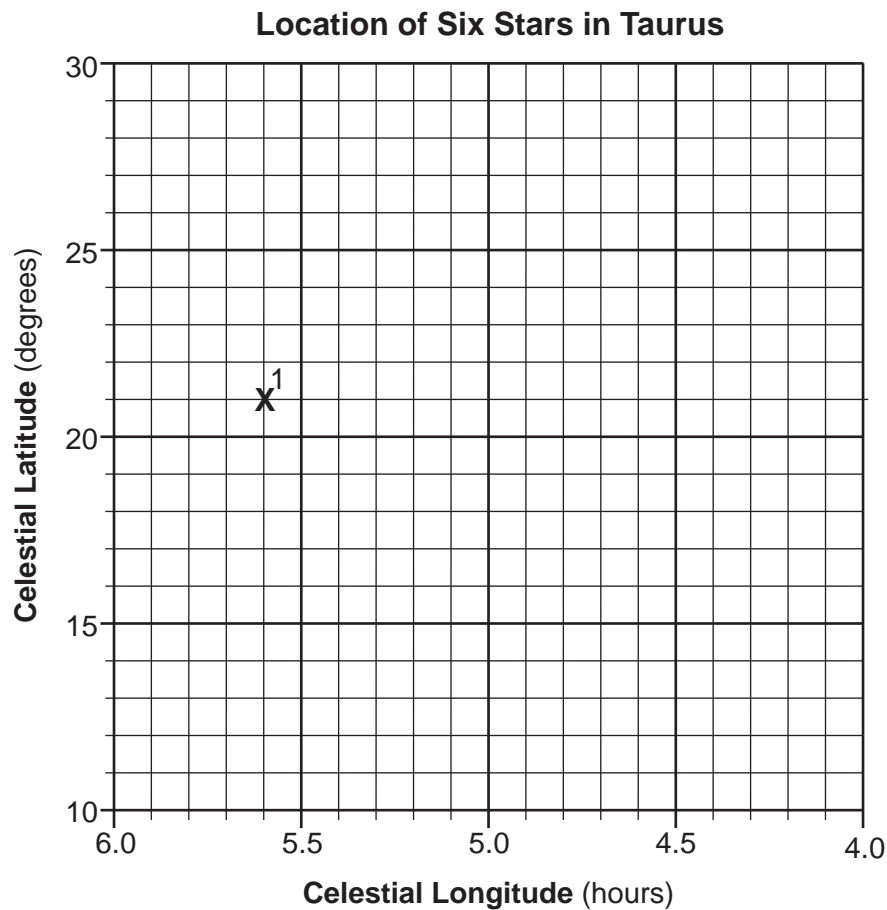


77 ●	75 ●	73 ●	71 ●	68 ●	65 ●	63 ●
78 ●	78 ●	77 ●	73 ●	69 ●	65 ●	62 ●
82 ●	80 ●	78 ●	74 ●	70 ●	68 ●	65 ●
81 ●	80 ●	77 ●	75 ●	70 ●	67 ●	64 ●
79 ●	77 ●	76 ●	73 ●	68 ●	66 ●	62 ●
75 ●	75 ●	72 ●	69 ●	65 ●	63 ●	61 ●

- 55** [1] Allow 1 credit if *both* isotherms are correctly drawn to the edges of the map. If additional isotherms are drawn, all isotherms must be correct to receive credit.

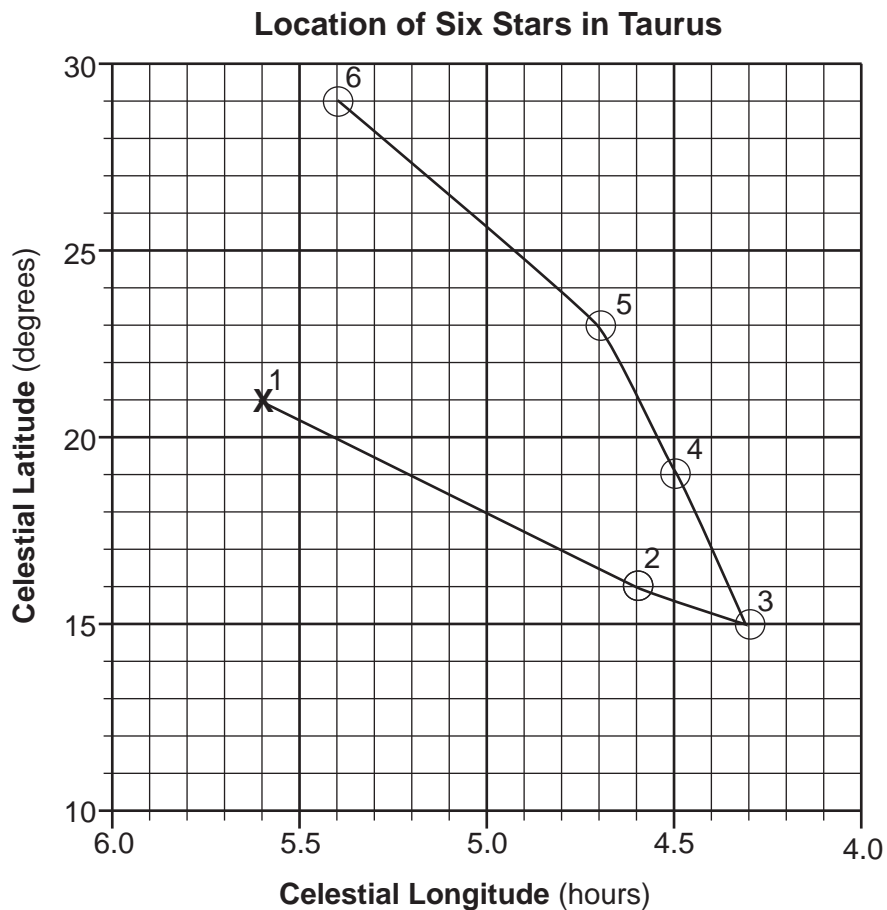
Example of a 1-credit response:





- 66 [1] Allow 1 credit if all **X**s are correctly plotted, numbered, and connected with a line that passes through the circles as shown below.

Example of a 1-credit response:



Stars	Temperature (K)	Luminosity (relative to the Sun)	Classification
<i>Aldebaran</i>		300	giant
<i>Elnath</i>	13,700	700	

67 [1] Allow 1 credit if *both* the temperature and classification are correct.

Stars	Temperature (K)	Luminosity (relative to the Sun)	Classification
<i>Aldebaran</i>	3500 to 4100		
<i>Elnath</i>			main sequence

69 Highest air-pressure station: _____



Lowest air-pressure station: _____

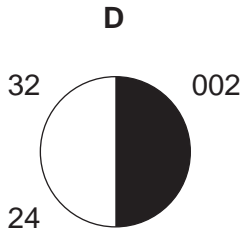
69 [1] Allow 1 credit for the letters in the order shown below.

Highest air-pressure station: *A*

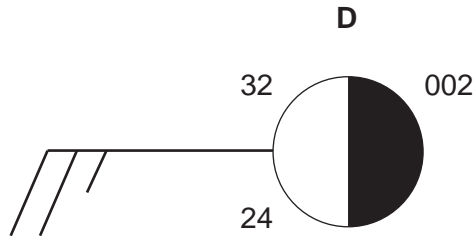
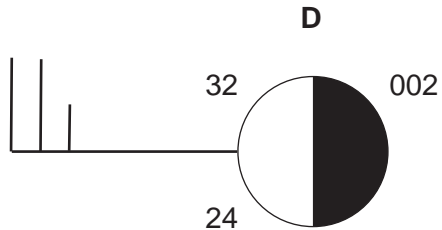
 D

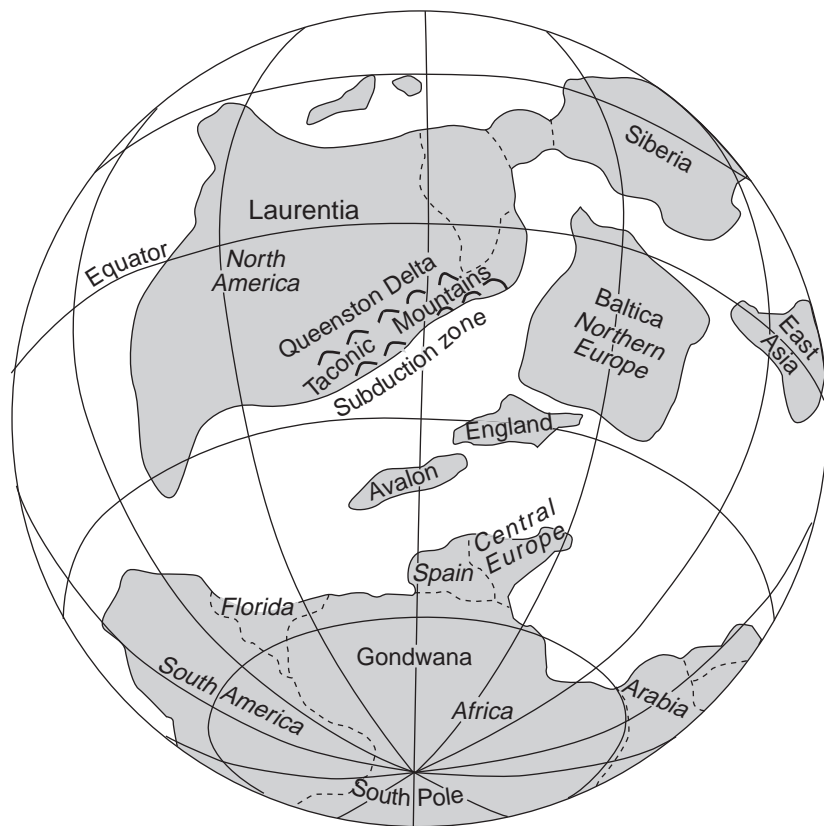
 B

Lowest air-pressure station: *C*



72 [1] Allow 1 credit if *both* wind direction and wind speed are correct as shown below.

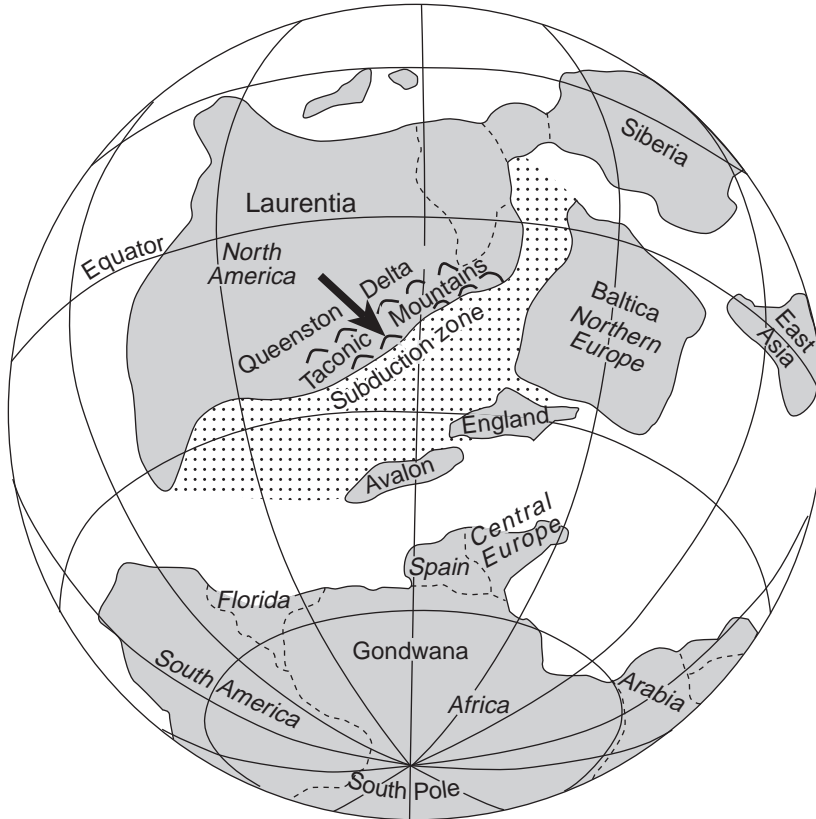




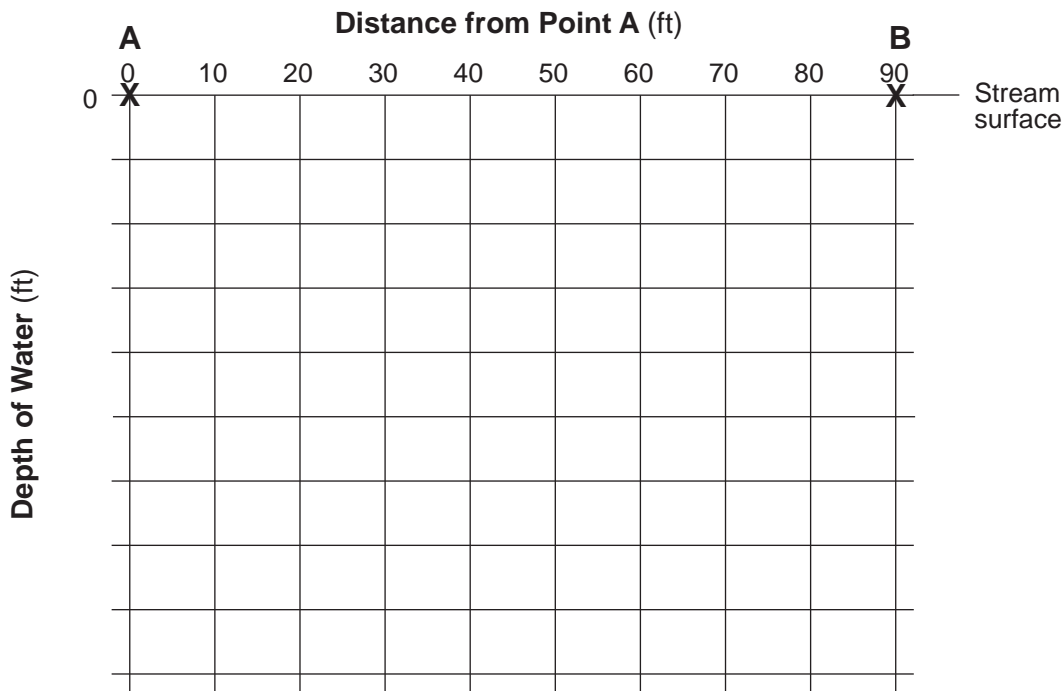
73 [1] Allow 1 credit if the center of the student's **X** is within the stippled area.

74 [1] Allow 1 credit for an arrow that shows Laurentia moving to the southeast, south, *or* east.

2-credit response for questions 73 and 74:



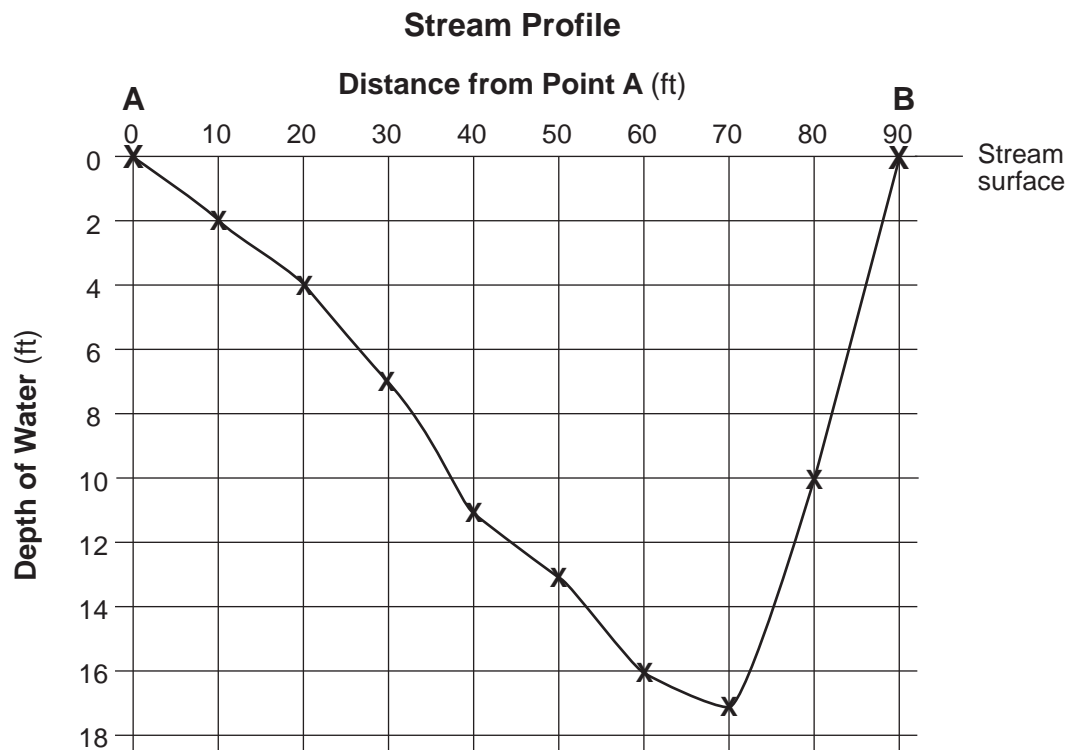
Stream Profile



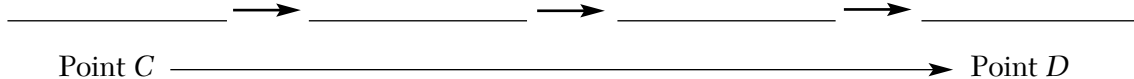
76 [2] Allow a maximum of 2 credits, allocated as follows:

- Allow 1 credit for a scale that has numbers at equal intervals indicating an increasing depth from the stream surface and incorporates all data.
- Allow 1 credit if the centers of seven or eight student drawn **X**s are located within ± 0.5 feet, according to the student's scale, and are correctly connected with a line.

Example of a 2-credit response:



78



78 [1] Allow 1 credit for listing all sediments in the order shown below.

