The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

EARTH SCIENCE

Wednesday, August 16, 2000 — 12:30 to 3:30 p.m., only

The last page of the booklet is the answer sheet. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

All of your answers are to be recorded on the separate answer sheet. For each question, decide which of the choices given is the best answer. Then on the answer sheet, in the row of numbers for that question, circle with pencil the number of the choice that you have selected. The sample below is an example of the first step in recording your answers.

SAMPLE: (1) 2 3 4

If you wish to change an answer, erase your first penciled circle and then circle with pencil the number of the answer you want. After you have completed the examination and you have decided that all of the circled answers represent your best judgment, signal a proctor and turn in all examination material except your answer sheet. Then and only then, place an X in ink in each penciled circle. Be sure to mark only one answer with an X in ink for each question. No credit will be given for any question with two or more X's marked. The sample below indicates how your final choice should be marked with an X in ink.

SAMPLE: (X) 2 3 4

The *Earth Science Reference Tables*, which you may need to answer some questions in this examination, are supplied separately. Be certain you have a copy of the 1994 edition of these reference tables before you begin the examination.

When you have completed the examination, you must sign the statement printed at the end of the 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 cannot be accepted if you fail to sign this declaration.

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

Part I

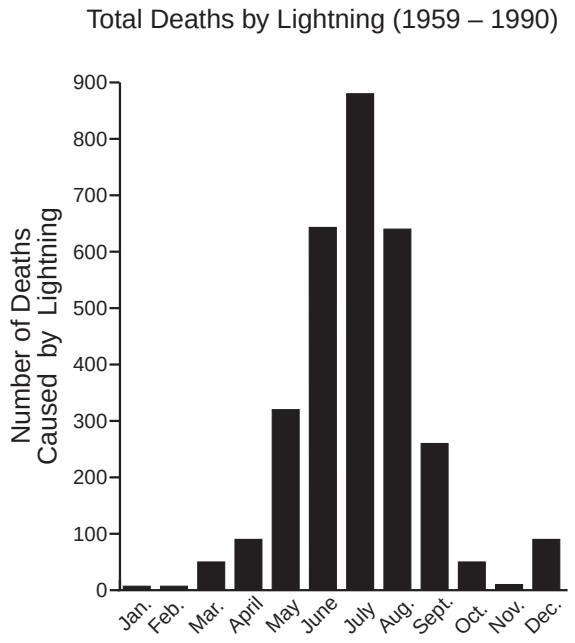
Answer all 55 questions in this part. [55]

Directions (1–55): For *each* statement or question, select the word or expression that, of those given, best completes the statement or answers the question. Record your answer on the separate answer sheet in accordance with the directions on the front page of this booklet. Some questions may require the use of the *Earth Science Reference Tables*.

1 Which description of change is most closely associated with ocean tides and moon phases?

1 cyclic and predictable
2 cyclic and unpredictable
3 noncyclic and predictable
4 noncyclic and unpredictable

2 The graph below shows the total number of deaths per month caused by lightning in the United States between 1959 and 1990.



Based on the information on the graph, which prediction about lightning deaths in the United States in the year 2000 would be most accurate?

1 Most deaths will occur along the eastern coastline.
2 The number of deaths will exceed 900.
3 The greatest number of deaths will occur during summer.
4 Most deaths will be the result of hurricanes.

3 A student is asked to classify several rocks. For best results, the classification should be based on

1 inferences
2 interpretations
3 hypotheses
4 observations

4 The temperature of water in a container was 60°C. Ten minutes later, the water temperature was 35°C. What was the rate of cooling of the water?

(1) 25 C°/min
(2) 2.5 C°/min
(3) 35 C°/min
(4) 3.5 C°/min

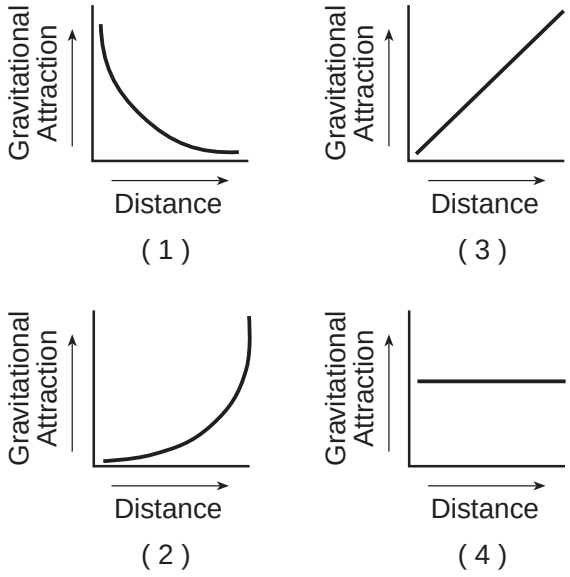
5 As a weather balloon released from the surface of Earth rises through the troposphere, the instruments it carries will usually indicate that

1 temperature, atmospheric pressure, and concentration of water vapor decrease
2 temperature decreases, but atmospheric pressure and concentration of water vapor increase
3 temperature increases, but atmospheric pressure and concentration of water vapor decrease
4 temperature, atmospheric pressure, and concentration of water vapor increase

6 The North Star (Polaris) can be used for navigation in Earth's Northern Hemisphere because

1 Polaris is located directly over the Tropic of Cancer
2 Polaris is the brightest and most easily located star
3 the altitude of Polaris is equal to the observer's latitude
4 the position of Polaris changes with the seasons

7 Which graph best represents the relationship between the gravitational attraction of two objects and their distance from each other?



8 Which statement correctly describes the motion on which an Earth time interval is based?

1 Earth's year is based on the Sun's revolution.
2 Earth's year is based on Earth's rotation.
3 Earth's day is based on the Sun's revolution.
4 Earth's day is based on Earth's rotation.

9 Which observation is a direct result of changes in distance between Earth and the Sun?

1 A Foucault pendulum shows predictable changes in its direction of swing.
2 The apparent diameter of the Sun shows predictable changes in size.
3 The length of daylight at the poles changes from 0 to 24 hours during the year.
4 Summer occurs in the Northern Hemisphere at the same time that winter occurs in the Southern Hemisphere.

10 What is the dewpoint when the dry-bulb temperature is 14°C and the wet-bulb temperature is 8°C?

(1) 1°C
(2) –9°C
(3) 6°C
(4) 22°C

11 What is the primary method of heat transfer through solid rock during contact metamorphism?

1 advection
2 convection
3 absorption
4 conduction

12 The same amount of heat energy is added to equal masses of lead, iron, basalt, and water at room temperature. Assuming no phase change takes place, which substance will have the *smallest* change in temperature?

1 lead
2 iron
3 basalt
4 water

13 To an observer on Earth, how many degrees does the Sun appear to move across the sky in 4 hours?

(1) 96°
(2) 60°
(3) 48°
(4) 4°

14 Which statement best explains why the angle of insolation received at any Earth location changes in a cyclic pattern throughout the year?

1 The Sun's orbit around Earth is an ellipse.
2 Earth's orbit around the Sun is an ellipse.
3 The Sun rotates on a tilted axis while revolving around Earth.
4 Earth rotates on a tilted axis while revolving around the Sun.

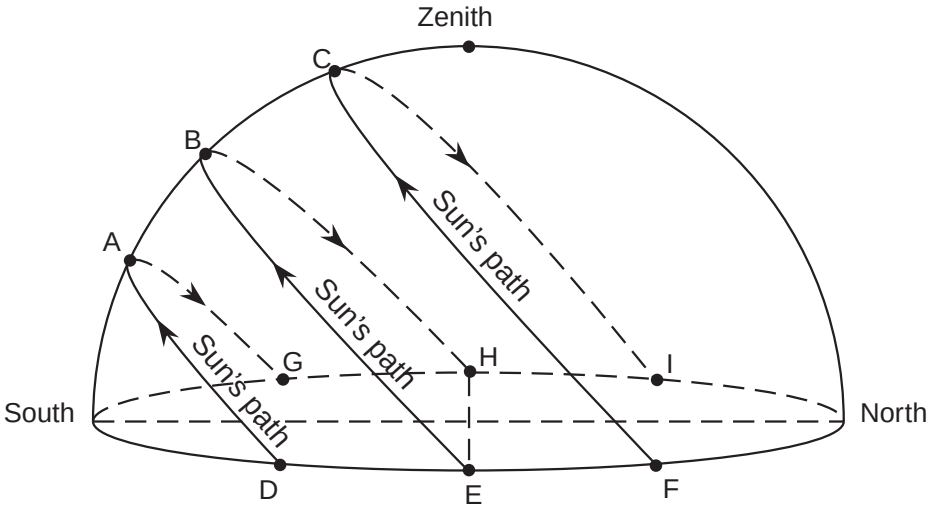
15 Earth's coldest climates are near the North Pole and the South Pole mainly because, compared to the rest of Earth's surface, these regions

1 receive more total hours of daylight
2 receive less intense insolation
3 absorb a greater amount of insolation
4 are farther from the Sun

16 Which of the following Earth surfaces usually reflects the most incoming solar radiation?

1 snow cover
2 green grass
3 dark soil
4 lake water

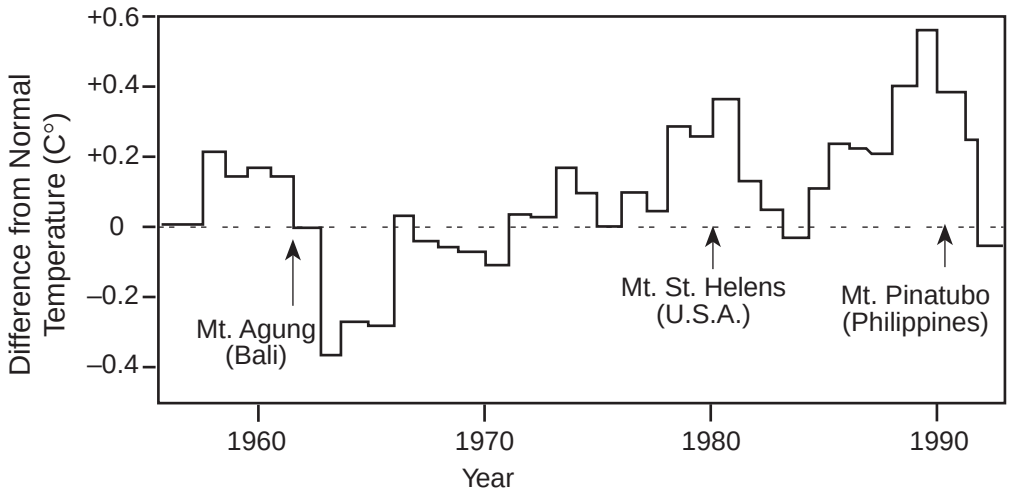
17 The diagram below represents a plastic hemisphere upon which lines have been drawn to show the apparent paths of the Sun at a location in New York State on the first day of each season. Letters *A* through *I* represent points on the paths.



Which point represents the sunrise location on the first day of winter?

(1) *G*
(2) *F*
(3) *E*
(4) *D*

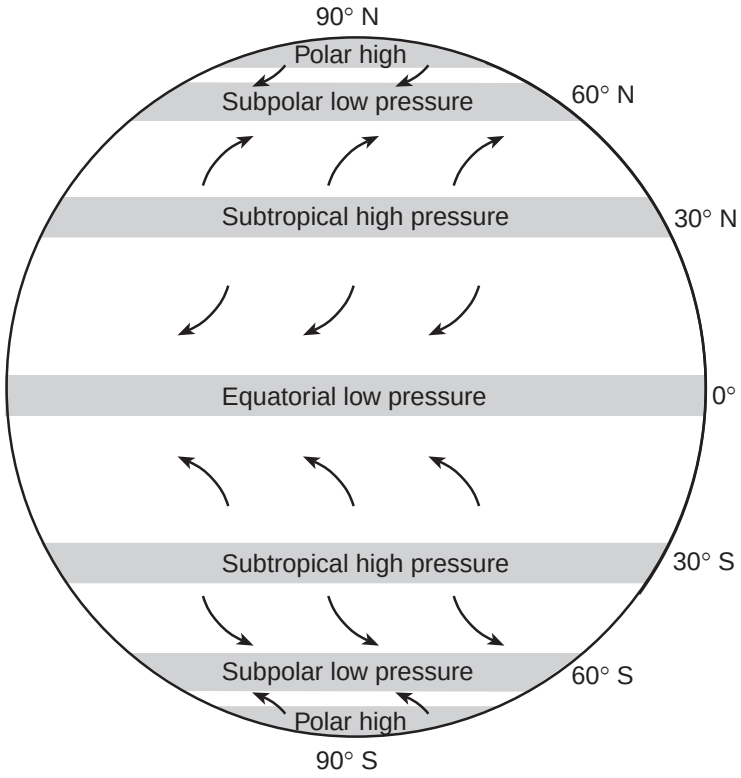
18 The graph below shows atmospheric temperature variations on Earth between 1956 and 1993. The dates of three major volcanic eruptions are indicated.



What is the most probable reason that Earth's atmospheric temperature decreased shortly after each major volcanic eruption?

1 Water droplets produced by the eruptions absorbed terrestrial reradiation.
2 Ozone produced by the eruptions absorbed ultraviolet radiation from the Sun.
3 Volcanic dust from the eruptions blocked insolation.
4 Carbon dioxide gas from the eruptions blocked terrestrial reradiation.

Base your answers to questions 19 and 20 on the diagram below, which shows Earth's planetary wind belts and pressure belts.



19 The best inference that can be made from this diagram is that winds blow from regions of

1 high latitude to regions of low latitude
2 high pressure to regions of low pressure
3 high elevation to regions of low elevation
4 high temperature to regions of low temperature

20 The surface winds shown in the diagram follow curving paths mainly due to Earth's

1 revolution
2 rotation
3 gravitational field
4 magnetic field

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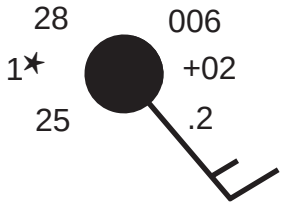
21 A container of water is placed in an open outdoor area so that the evaporation rate can be observed. The water will most likely evaporate fastest when the weather is

1 cool, humid, and windy
2 cool, dry, and calm
3 warm, humid, and calm
4 warm, dry, and windy

22 Close spacing of isobars on a weather map is a good indicator of

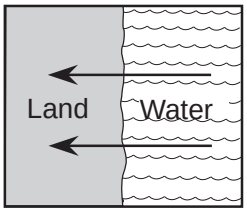
1 low visibility
2 low dewpoint temperatures
3 high air temperatures
4 high wind velocity

23 What is the air pressure indicated on the weather station model shown below?

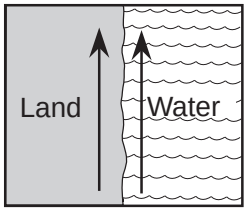


(1) 900.6 mb
(2) 960.0 mb
(3) 1000.6 mb
(4) 1006.0 mb

24 Adjacent water and land surfaces have the same temperature at sunrise on a clear, calm day. A surface wind develops after the water and land are heated by the Sun for a few hours. On which map do the arrows best represent the direction of this wind?



(1)



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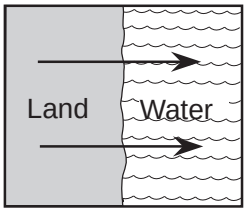

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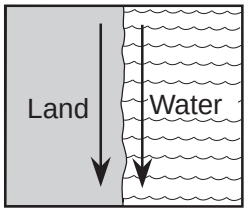


(4)

25 The prevailing southwesterlies wind belt causes most low-pressure weather systems to travel across the United States from the

1 southwest toward the northeast
2 northwest toward the southeast
3 northeast toward the southwest
4 southeast toward the northwest

26 The table below shows the relationship between total yearly precipitation (P) and potential evapotranspiration (E_p) for different types of climates.

Climate Classification

Climate Type	Total Yearly P/E_p Ratio
Humid	Greater than 1.2
Subhumid	0.8 to 1.2
Semiarid	0.4 to 0.8
Arid	Less than 0.4

The total yearly precipitation (P) for a city in Texas is 218 millimeters. The total yearly potential evapotranspiration (E_p) is 951 millimeters. Which type of climate does this city have?

1 humid
2 subhumid
3 semiarid
4 arid

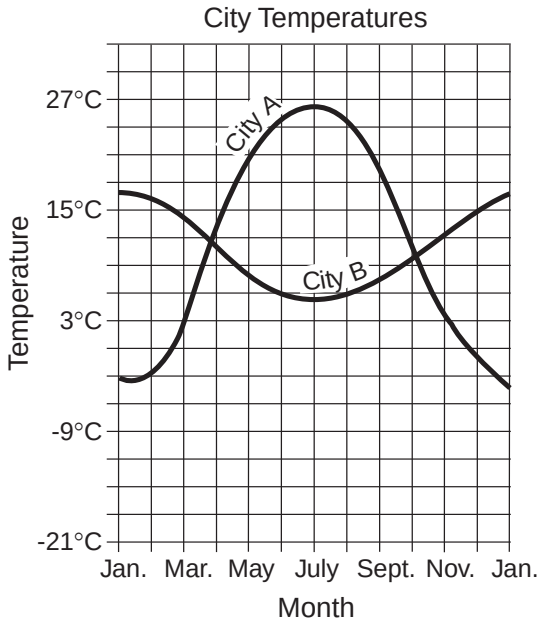
27 Through which of the following loose soil materials does water infiltrate fastest?

1 clay
2 silt
3 sand
4 pebbles

28 What is the name of the cool ocean current that flows along the west coast of South America?

1 Brazil Current
2 Peru Current
3 South Equatorial Current
4 North Pacific Current

Base your answers to questions 29 and 30 on the graph below, which shows the average monthly temperature of two cities, *A* and *B*.



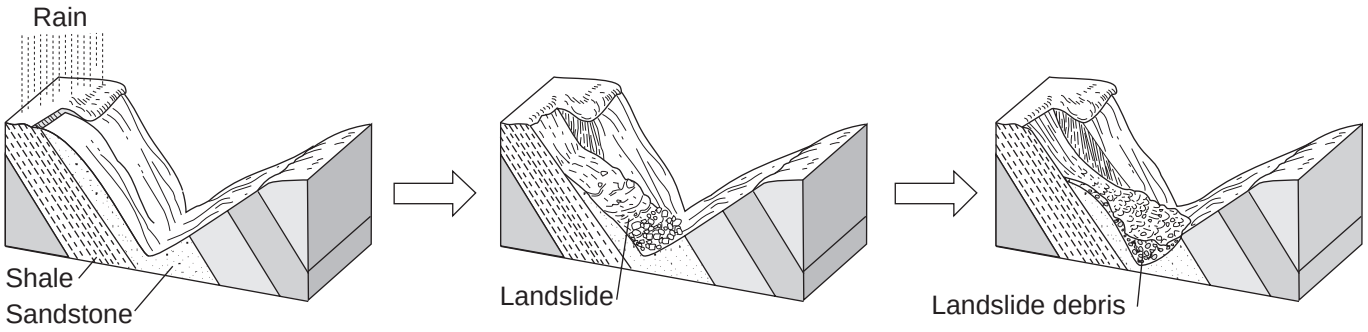
29 The temperature in city *B* is highest in January and lowest in July because city *B* is located

1 on the side of a mountain
2 on an island
3 in the Southern Hemisphere
4 at the North Pole

30 Both cities have an average yearly temperature of 11°C, but city *A* has a much greater temperature range than city *B* has because city *A* most likely

1 is closer to the Equator
2 is farther from a large body of water
3 has more rainfall
4 has stronger prevailing winds

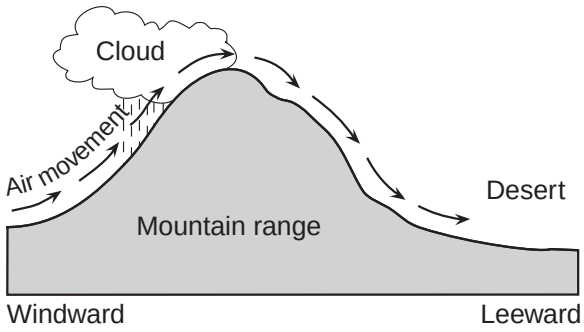
31 The diagram below shows the sequence of events leading to the deposition of landslide debris.



What was the primary force that caused this landslide?

1 gravity
2 moving ice
3 prevailing winds
4 stream discharge

32 A desert often forms on the leeward side of a mountain range, as shown in the cross section below.



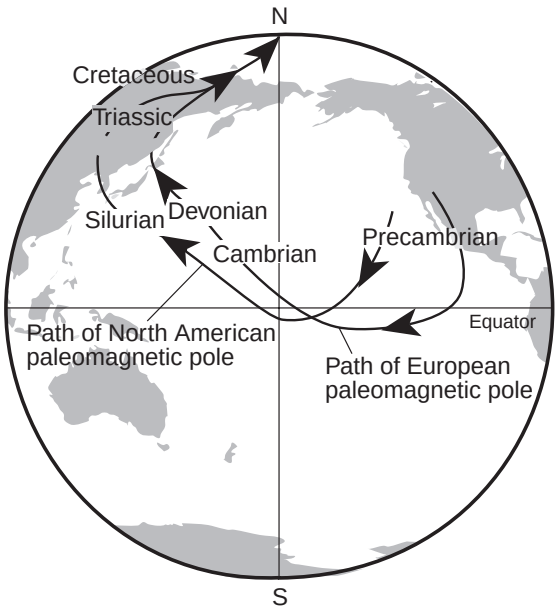
After most of the moisture is removed from the air on the windward side, deserts form on the leeward side because the sinking air

1 compresses and warms
2 compresses and cools
3 expands and warms
4 expands and cools

33 Which condition makes surface runoff of rainfall most likely?

1 The gradient of the surface is low.
2 Permeability rate exceeds the rate of rainfall.
3 Surface soil pore spaces are filled.
4 The porosity of the surface soil is high.

34 The arrows on the map below show the apparent changes in the position of Earth's magnetic North Pole throughout geologic time, as recorded in the igneous rocks of Europe and North America.



This evidence best supports the concept of

1 the heliocentric solar system
2 the Coriolis effect
3 planet orbit eccentricity
4 plate tectonics

35 Diagram I below shows a laboratory setup for observing the settling pattern in water of sediments composed of the same mineral. When the sediments in the container were poured into the tube of water, they settled to the bottom in the pattern shown in diagram II below. [Diagram II is enlarged to show the sedimentary particles.]

Diagram I

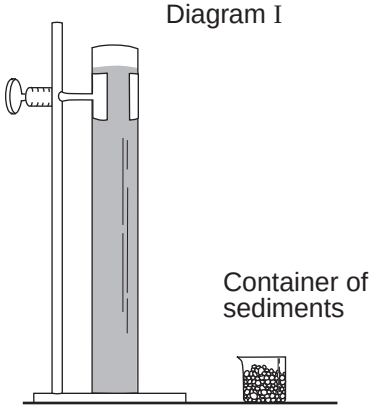
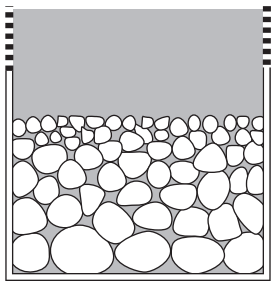


Diagram II



Which characteristic of the sedimentary particles most likely caused the pattern of deposition shown in diagram II?

1 particle shape
2 particle size
3 particle composition
4 particle density

36 The table below indicates the presence of various minerals in different rock samples.

Rock Sample	Mineral Composition								
	Quartz	Potassium feldspar	Plagioclase feldspar	Biotite	Hornblende	Pyroxene	Olivine	Calcite	Others
Granite	✔	✔	✔	✔	✔				
Rhyolite	✔	✔	✔	✔	✔				
Pumice	✔	✔	✔	✔	✔				
Conglomerate	✔	✔	✔	✔	✔	✔	✔	✔	✔
Slate				✔					✔
Marble								✔	
Limestone								✔	
Basalt			✔		✔	✔	✔		
Gabbro			✔	✔	✔	✔			

Key
✔ = Mineral is present

Which statement is an accurate conclusion based on the information provided in the table?

1 Most rocks are monomineralic.
2 All rocks are polymineralic.
3 Many rocks have a number of minerals in common.
4 Only igneous rocks contain quartz.

Base your answers to questions 37 and 38 on the table below, which shows the characteristics of four different mineral samples.

Mineral Characteristics

Mineral Sample	Color	Luster	Streak	Breakage Pattern
Galena	gray	metallic	gray	breaks into cubes
Halite	colorless	nonmetallic	colorless	breaks into cubes
Quartz	colorless	nonmetallic	colorless	irregular breakage
Gold	yellow	metallic	yellow	irregular breakage

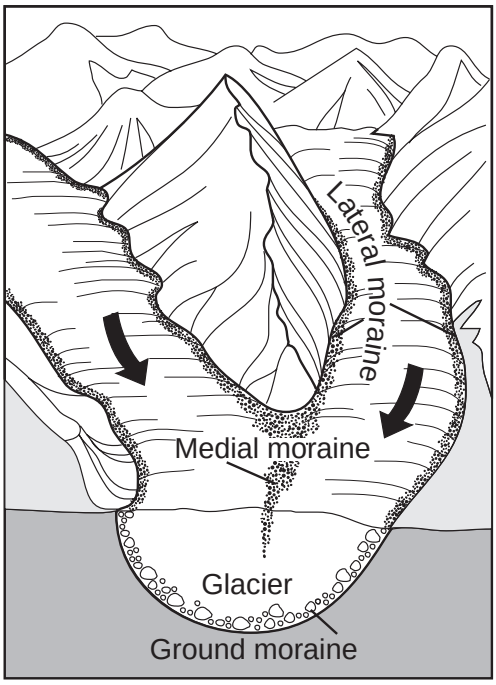
37 Which two mineral samples would be most difficult to distinguish from each other based on their color, luster, and streak?

1 halite and quartz
2 halite and gold
3 galena and quartz
4 galena and gold

38 Which two mineral samples most likely have a similar internal arrangement of atoms?

1 galena and quartz
2 galena and halite
3 gold and halite
4 gold and galena

39 The diagram below shows rock material being transported by a mountain glacier.



The moraine deposits left when this glacier melts will generally be

1 sorted by size and layered
2 sorted by size and unlayered
3 unsorted by size and layered
4 unsorted by size and unlayered

40 Large deposits of rock gypsum and rock salt usually form in areas of

1 active volcanoes
2 continental ice sheets
3 fault zones in the crust
4 shallow evaporating seas

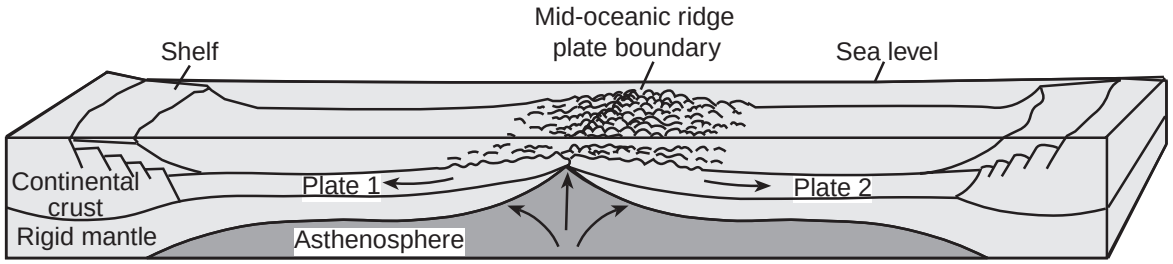
41 Which characteristic provides the best evidence that obsidian rock formed in an extrusive environment?

1 layers of rounded fragments
2 distorted bands of large mineral crystals
3 noncrystalline glassy texture
4 mineral cement between grains

42 Compared to continental crust, oceanic crust is

1 less dense, more mafic, and thinner
2 less dense, more felsic, and thicker
3 more dense, more mafic, and thinner
4 more dense, more felsic, and thicker

Base your answers to questions 43 and 44 on the cross section of two crustal plates and the boundary between them shown below. The arrows indicate the direction of rock movement.



43 The mid-oceanic ridge portion of this cross section best represents

1 convergence of the Nazca Plate and the South American Plate
2 divergence of the African Plate and the South American Plate
3 subduction of the Philippine Plate by the China Plate
4 transform faulting between the Pacific Plate and the North American Plate

44 Which geologic events occur most often at this mid-oceanic ridge plate boundary?

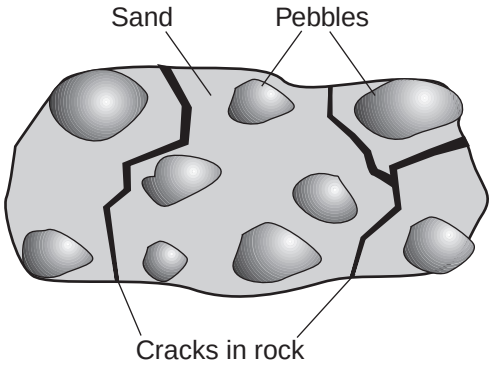
1 magnetic pole reversals and cooling of ocean water
2 meteorite impacts and tilting of shorelines
3 hydrospheric pollution and adiabatic heating
4 earthquakes and volcanic eruptions

45 The photograph below shows an arch of rock located in the western United States.

How did the arch most likely form?

1 The bedrock in the arch was more resistant to weathering and erosion than the surrounding bedrock that was removed.
2 An earthquake forced bedrock upward into the shape of an arch.
3 Sand and gravel were deposited and compacted in the shape of an arch.
4 An underground glacier tunneled through the bedrock.

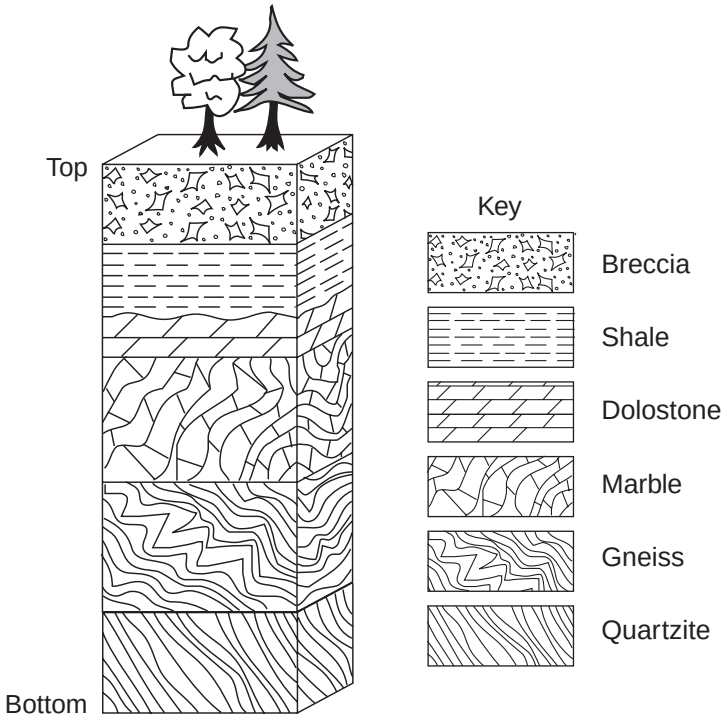
46 The diagram below represents a sedimentary rock composed of pebbles and sand.



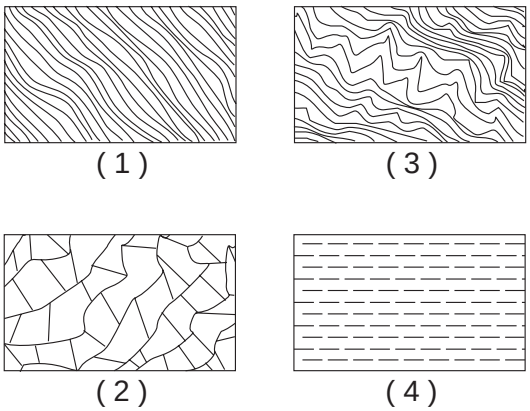
Which statement most accurately compares the ages of the cracks and pebbles to the age of the sedimentary rock in which they are found?

1 The cracks and pebbles are both younger than the sedimentary rock.
2 The cracks and pebbles are both older than the sedimentary rock.
3 The cracks are younger and the pebbles are older than the sedimentary rock.
4 The cracks are older and the pebbles are younger than the sedimentary rock.

Base your answers to questions 47 through 49 on the diagram below, which represents a cross section of rock layers that have not been overturned.



47 Within which rock type would a fossil most likely be found?



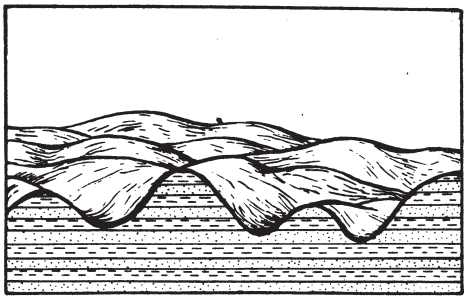
48 The breccia layer is composed mostly of

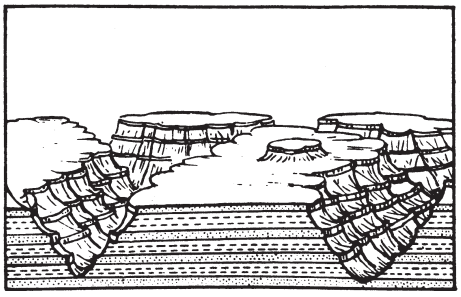
1 cemented, rounded rock fragments
2 cemented, angular rock fragments
3 intergrown, fine-textured crystals
4 microscopic shells

49 If the breccia layer formed during the Carboniferous Period, the shale layer below it could have formed during which geologic time period?

1 Cretaceous
2 Triassic
3 Permian
4 Carboniferous

50 The diagrams below represent two different plateaus.

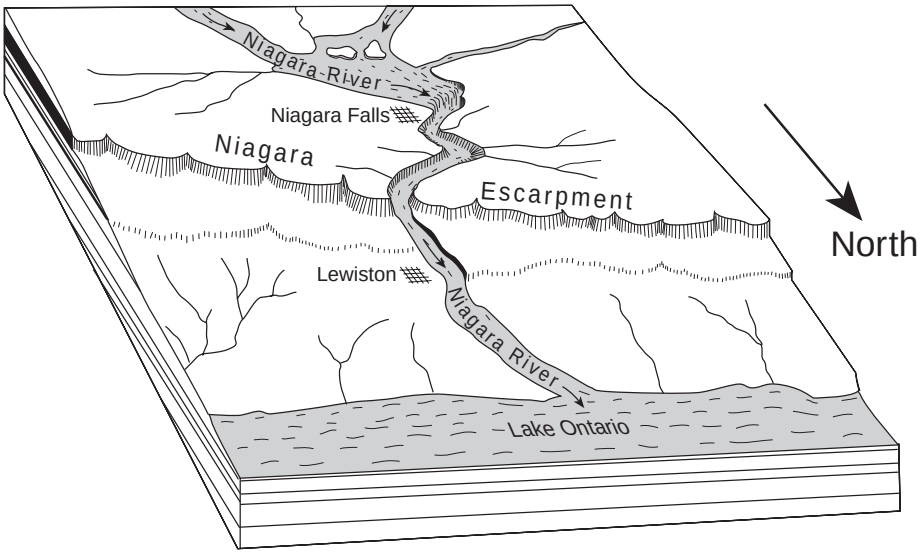




Which factor was probably most important in causing one plateau to develop smooth, rounded surface features and the other plateau to develop sharp, angular surface features?

1 type of bedrock
2 amount of folding
3 time
4 climate

51 The block diagram below shows a view of the Niagara Falls region of New York State.



In which New York State landscape region is Lewiston located?

1 St. Lawrence Lowlands
2 Erie-Ontario Lowlands
3 Atlantic Coastal Plain
4 Allegheny Plateau

52 In which New York State landscape region was most of the surface bedrock formed by the recrystallization of rock under conditions of high temperature and high pressure?

1 Newark Lowlands
2 Erie-Ontario Lowlands
3 Adirondack Mountains
4 Allegheny Plateau

53 Which characteristics best distinguish one landscape region from another?

1 human population density and types of environmental pollutants
2 composition of bedrock and variety of fossils
3 bedrock structure and elevation of land surfaces
4 stream gradients and soil types

54 Which bedrock feature is most useful in correlating sedimentary bedrock in one area with sedimentary bedrock in another area?

1 index fossils
2 cementing agent
3 texture
4 color

Note that question 55 has only three choices.

55 As the velocity of a stream decreases, the amount of sediment in the water of the stream

1 decreases
2 increases
3 remains the same

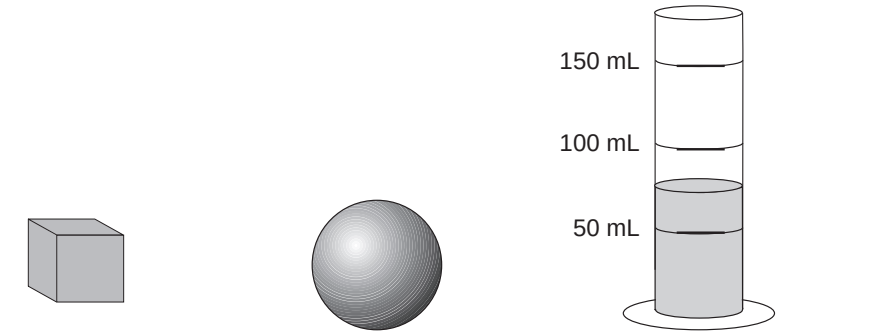
Part II

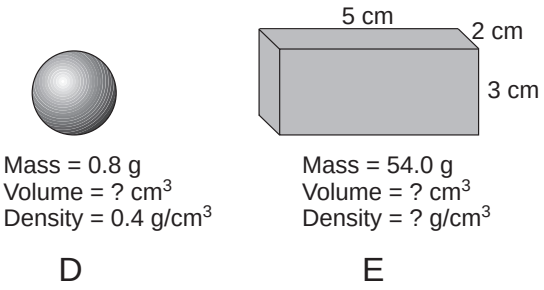
This part consists of ten groups, each containing five questions. Choose seven of these ten groups. Be sure that you answer all five questions in each group chosen. Record the answers to these questions on the separate answer sheet in accordance with the directions on the front page of this booklet. [35]

Group 1

If you choose this group, be sure to answer questions 56–60.

Base your answers to questions 56 through 60 on the *Earth Science Reference Tables*, the diagrams below, and your knowledge of Earth science. The diagrams represent five substances, *A* through *E*, at the same temperature. Some mass, volume, and density values are indicated for each substance. Substance *C* is a liquid in a graduated cylinder. [Note that 1 cubic centimeter = 1 milliliter. Objects are not drawn to scale.]





56 What is the volume of liquid *C*?

(1) 25.0 mL
(2) 50.0 mL
(3) 75.0 mL
(4) 125.0 mL

57 The density of object *A* is the same as the inferred average density of most of the rock in Earth's

1 inner core
2 outer core
3 mantle
4 oceanic crust

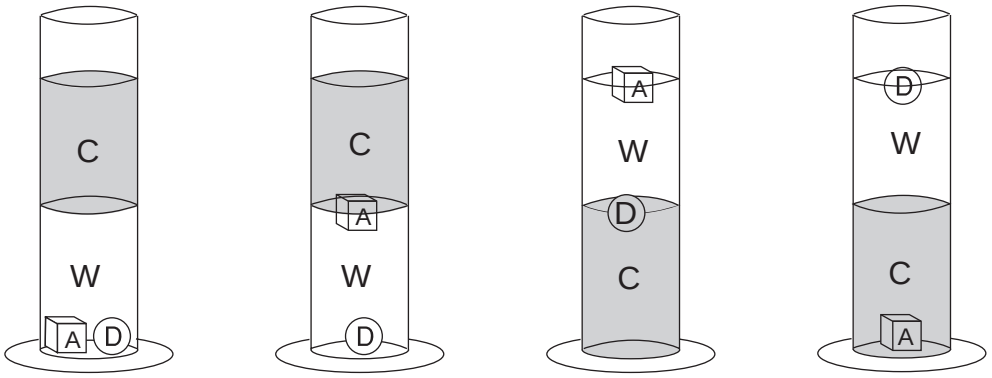
58 What is the volume of object *D*?

(1) 1.0 cm^3
(2) 2.0 cm^3
(3) 7.0 cm^3
(4) 16.0 cm^3

59 Which two substances could be made of the same material?

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

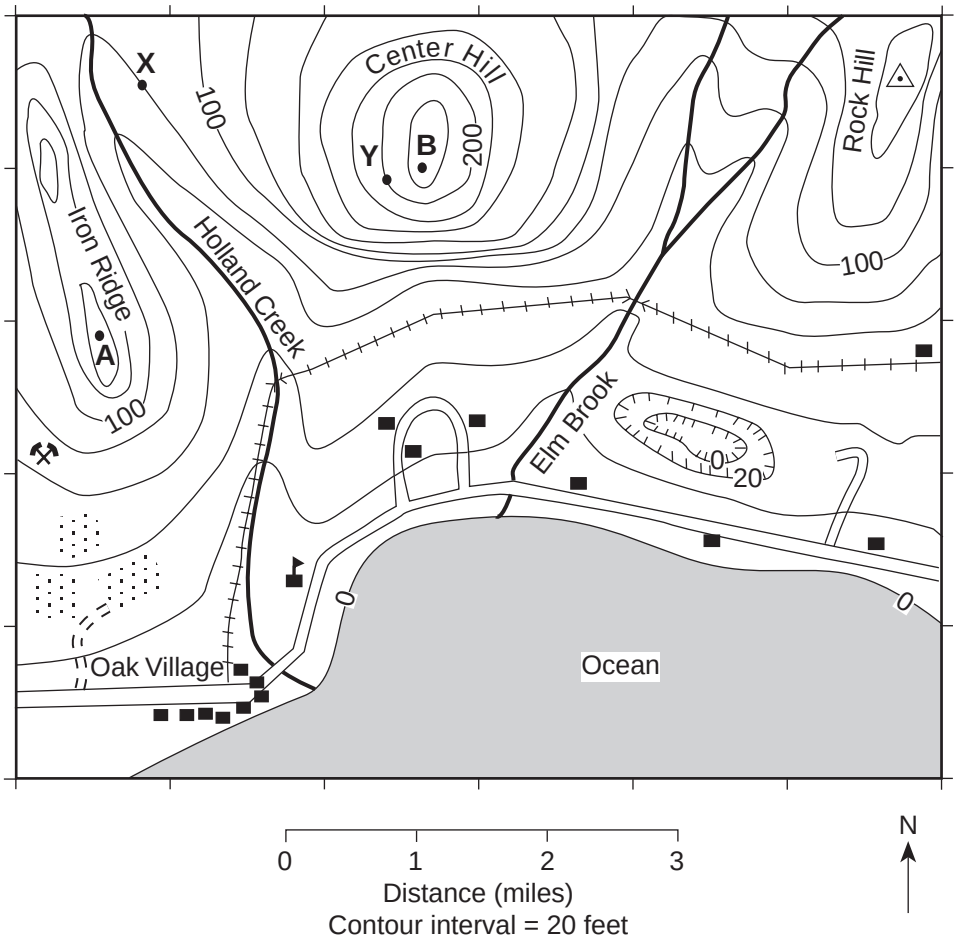
60 Water (*W*) was added to the graduated cylinder containing liquid *C*. Objects *A* and *D* were then dropped into the cylinder. Which diagram most accurately shows the resulting arrangement of these substances?



Group 2

If you choose this group, be sure to answer questions 61–65.

Base your answers to questions 61 through 65 on the *Earth Science Reference Tables*, the topographic map below, and your knowledge of Earth science. Points *A*, *B*, *X*, and *Y* are locations on the map. Elevations are shown in feet.



Symbols Key

Triangulation point	House
School	Depression contours
Mine	Railroad
	Roads

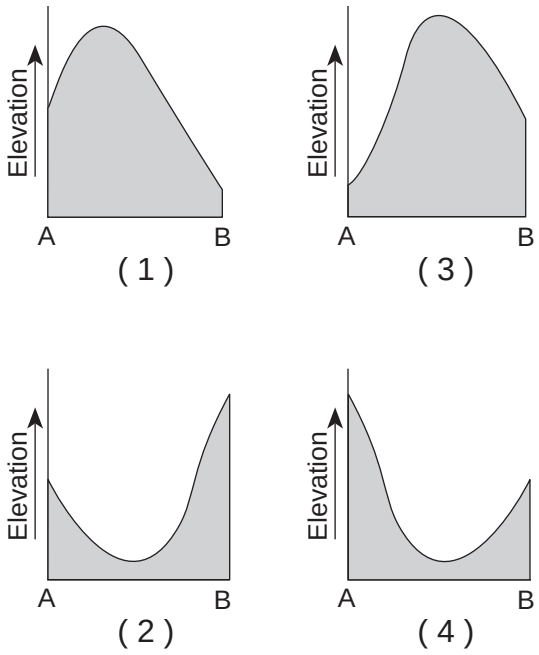
61 In which general direction is Elm Brook flowing?

1 southwest
2 southeast
3 northwest
4 northeast

62 What is the approximate elevation of the triangulation point on the top of Rock Hill?

(1) 124 ft
(2) 139 ft
(3) 144 ft
(4) 169 ft

63 Which diagram best represents the topographic profile along a straight line from point *A* to point *B*?



64 Which side of Center Hill has the steepest slope?

1 north
2 south
3 east
4 west

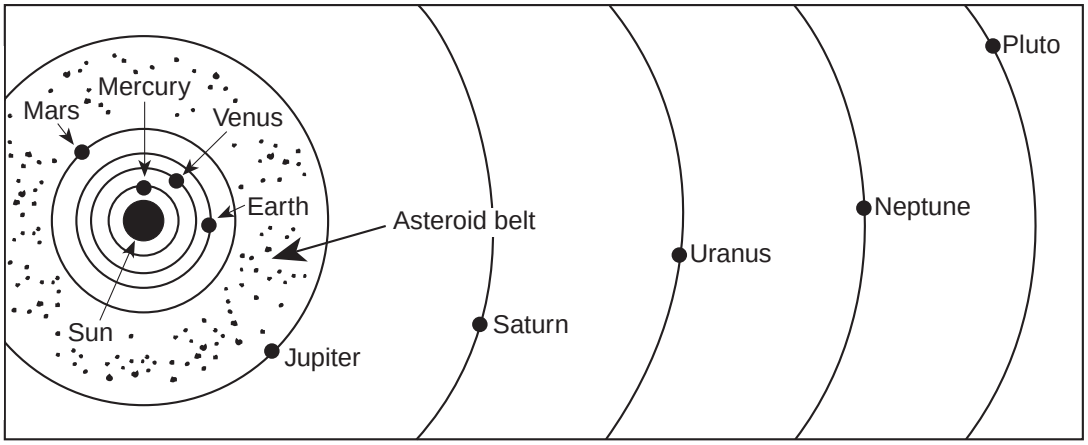
65 What is the average gradient along a straight line between point *X* and point *Y*?

(1) 30 ft/mi
(2) 40 ft/mi
(3) 60 ft/mi
(4) 70 ft/mi

Group 3

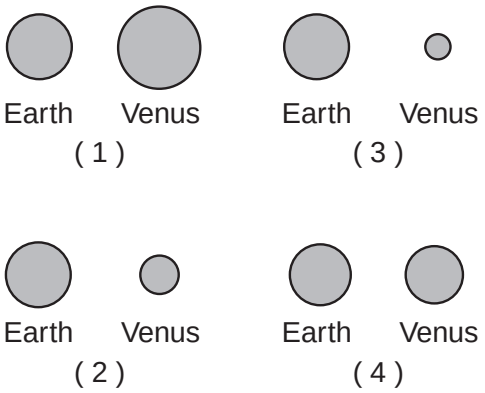
If you choose this group, be sure to answer questions 66–70.

Base your answers to questions 66 through 70 on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram shows a portion of the solar system.



(Not drawn to scale)

66 Which scale diagram best compares the size of Earth with the size of Venus?



67 Which of the following planets has the *lowest* average density?

1 Mercury
2 Venus
3 Earth
4 Mars

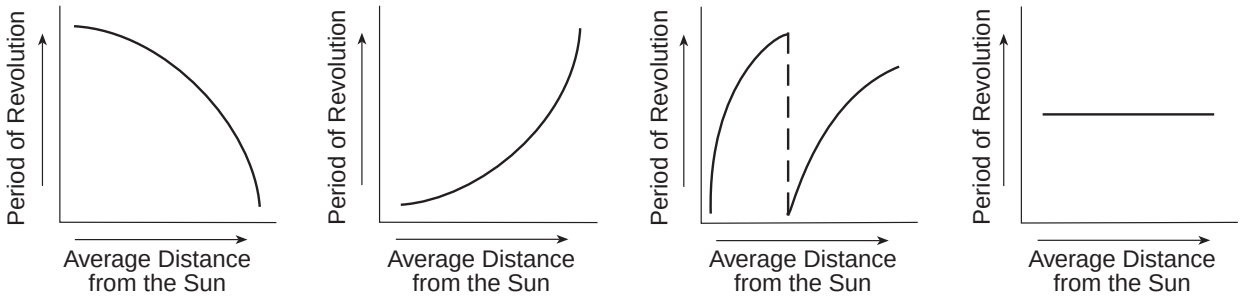
68 The actual orbits of the planets are

1 elliptical, with Earth at one of the foci
2 elliptical, with the Sun at one of the foci
3 circular, with Earth at the center
4 circular, with the Sun at the center

69 Mercury and Venus are the only planets that show phases when viewed from Earth because both Mercury and Venus

1 revolve around the Sun inside Earth's orbit
2 rotate more slowly than Earth does
3 are eclipsed by Earth's shadow
4 pass behind the Sun in their orbit

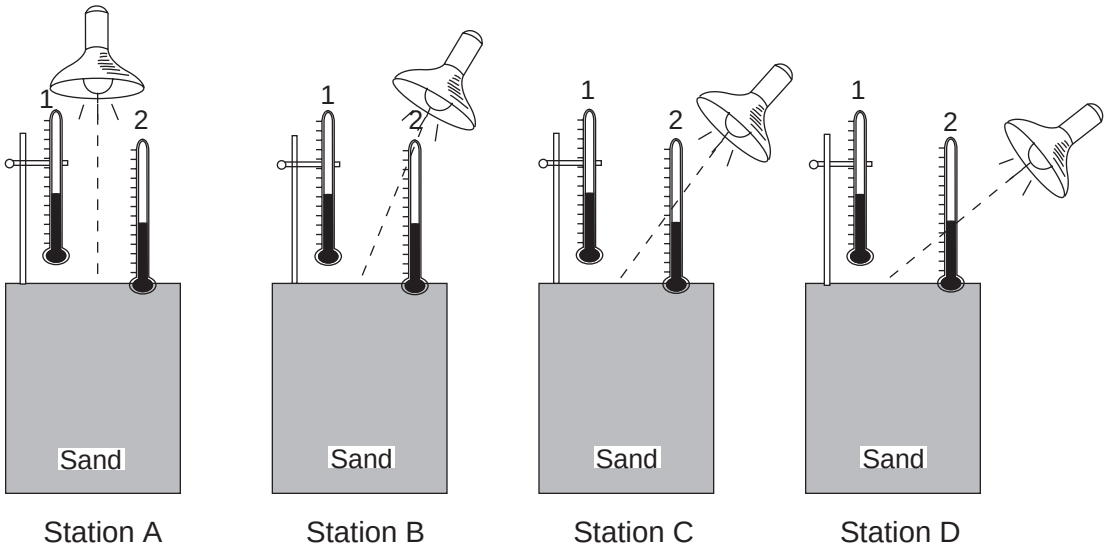
70 Which graph best represents the relationship between a planet's average distance from the Sun and the time the planet takes to revolve around the Sun?



Group 4

If you choose this group, be sure to answer questions 71–75.

Base your answers to questions 71 through 75 on the diagram below and on your knowledge of Earth science. The diagram represents four stations, *A*, *B*, *C*, and *D*, in a laboratory investigation in which equal volumes of sand at the same starting temperature were heated by identical light sources. The light sources were the same distance from each station, but at different angles to the surfaces. Two thermometers were used at each station, one just above the surface and the other just below the surface. The lights were turned on for 30 minutes and then removed for the next 30 minutes. Temperatures were recorded each minute for the 60 minutes.



(Not drawn to scale)

71 Most of the energy from the light sources was transferred to the sand by the process of

1 conduction
2 convection
3 radiation
4 transpiration

72 Which type of sand surface would most likely absorb the most radiation?

1 dark-colored smooth surface
2 dark-colored rough surface
3 light-colored smooth surface
4 light-colored rough surface

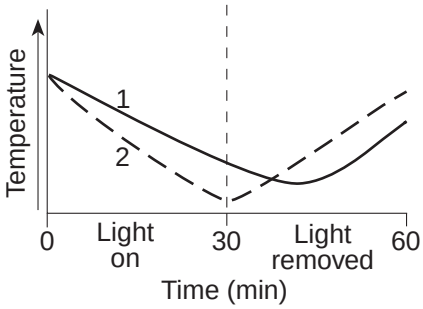
73 Which station received the *least* intense light energy?

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

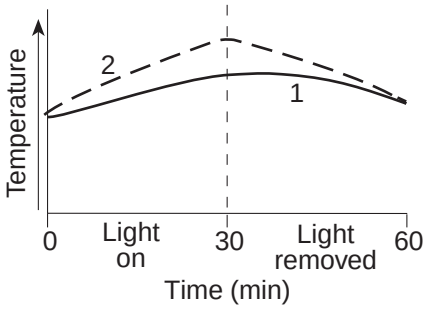
74 After the light sources were removed, the electromagnetic energy radiated by the cooling sand was mostly

1 infrared rays
2 ultraviolet rays
3 gamma rays
4 visible light rays

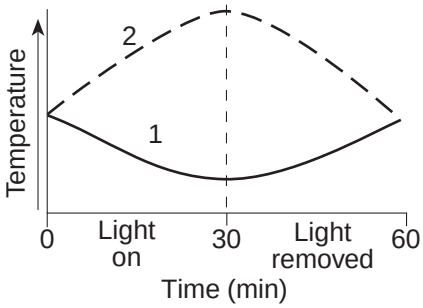
75 Which graph best represents the temperatures that would be shown by thermometers 1 and 2 at station *A*?



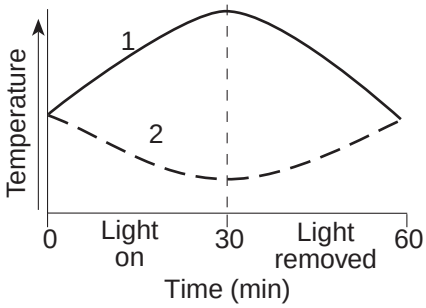
(1)



(3)



(2)

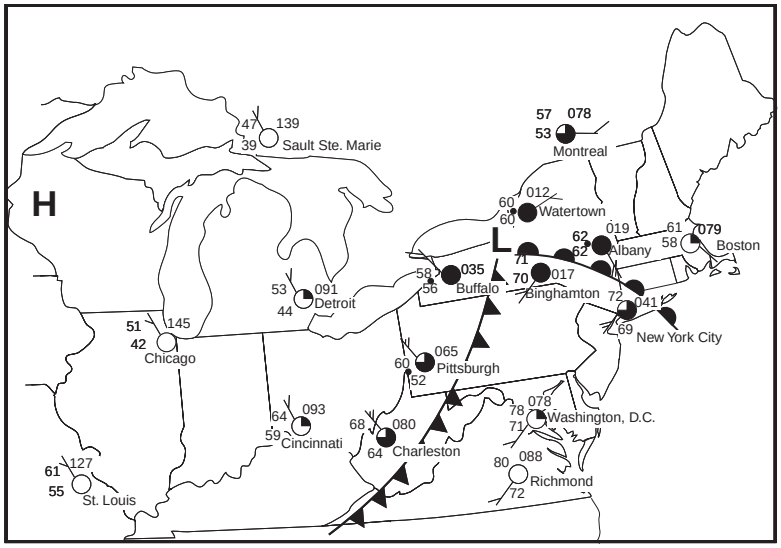


(4)

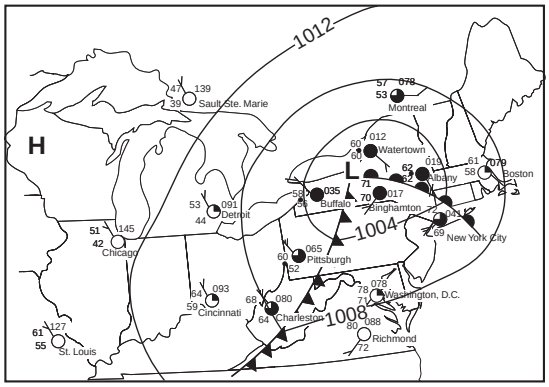
Group 5

If you choose this group, be sure to answer questions 76–80.

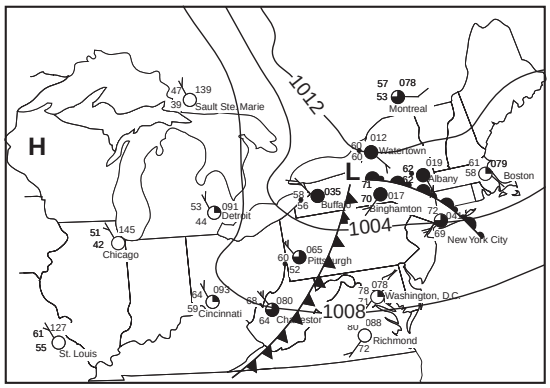
Base your answers to questions 76 through 80 on the *Earth Science Reference Tables*, the weather map below showing part of the United States, and your knowledge of Earth science.



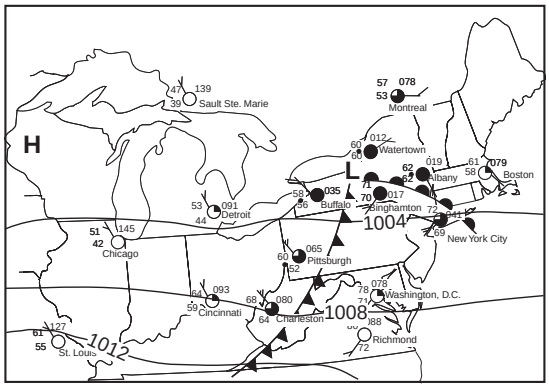
76 Which map best represents the correct location of the 1004-mb, 1008-mb, and 1012-mb isobars?



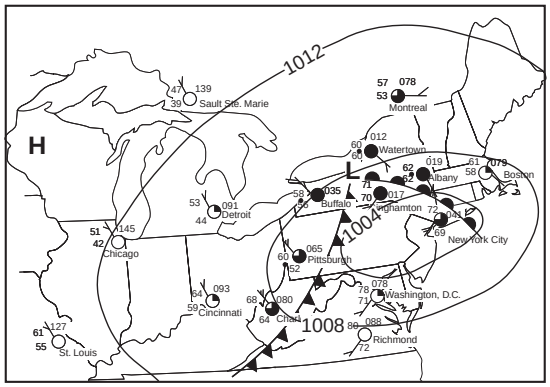
(1)



(3)

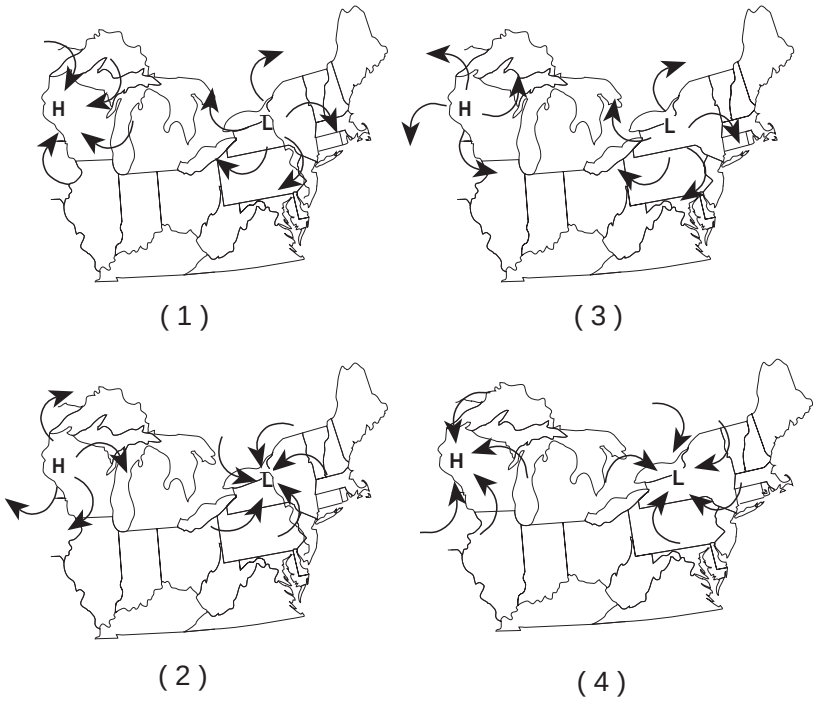


(2)



(4)

77 The arrows on which map best represent the direction of surface winds associated with the high-pressure and low-pressure systems?



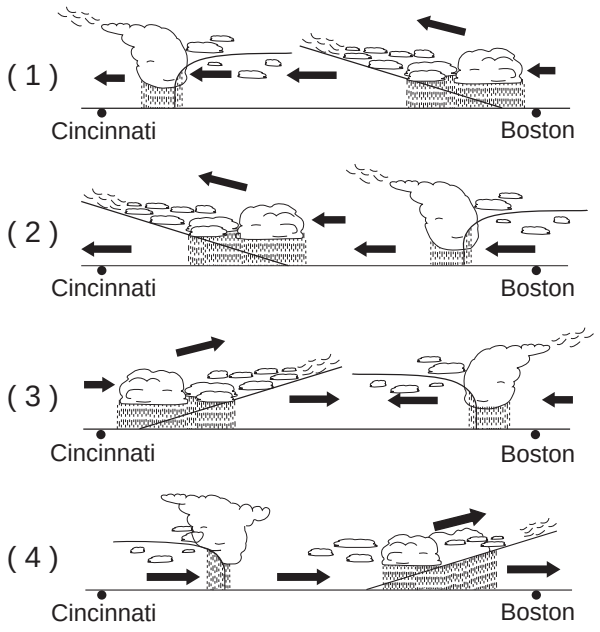
78 Which city is located in an mT air mass?

1 Richmond, Virginia
2 St. Louis, Missouri
3 Detroit, Michigan
4 Buffalo, New York

79 Which city has the highest relative humidity?

1 Chicago, Illinois
2 Buffalo, New York
3 Albany, New York
4 Boston, Massachusetts

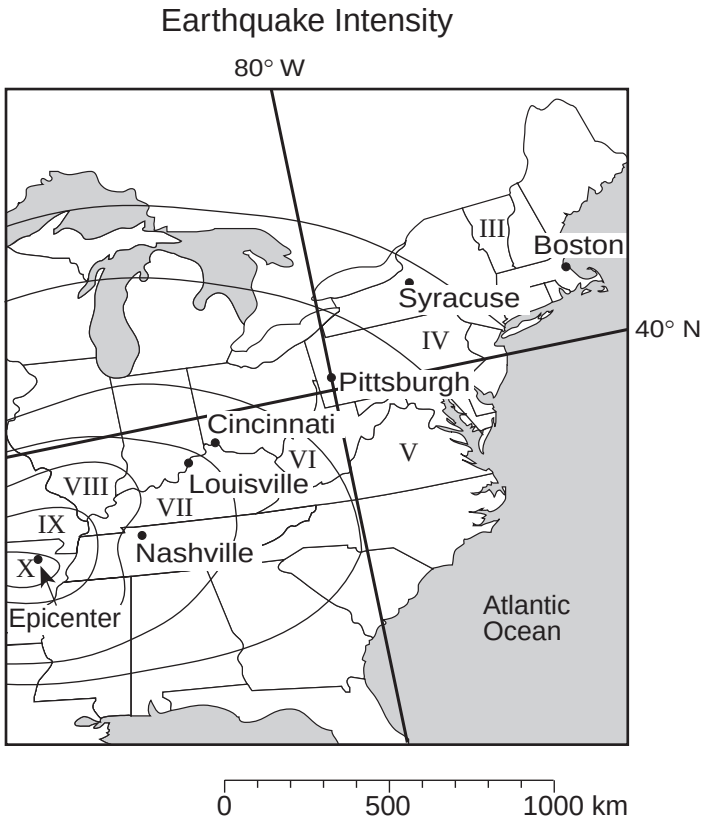
80 The arrows in the cross sections below represent the general direction of air movement. Which cross section along a straight line between Cincinnati and Boston best represents the weather fronts, clouds, precipitation, and general direction of air movement shown in the map?



Group 6

If you choose this group, be sure to answer questions 81–85.

Base your answers to questions 81 through 85 on the *Earth Science Reference Tables*, the map and table of the Modified Mercalli Scale below, and your knowledge of Earth science. The map shows the intensities of the earthquake that occurred slightly southwest of New Madrid, Missouri, on December 16, 1811. The numbered areas on the map were determined from the Modified Mercalli Scale according to the observed effects of the earthquake.



Modified Mercalli Scale

Intensity	Observed Effects
I	Felt by only a few people under very special circumstances
II	Felt by only a few people at rest, especially on the upper floors of buildings
III	Felt noticeably indoors, especially on upper floors of buildings
IV	Felt indoors by many people, outdoors by a few; some awaken
V	Felt by nearly everyone; many awaken; dishes and windows break; plaster cracks
VI	Felt by everyone; many frightened and run outdoors; heavy furniture moves
VII	Everyone runs outdoors; slight to moderate damage in ordinary structures
VIII	Considerable damage in ordinary structures; chimneys and monuments fall
IX	Considerable damage in all structures; ground cracks; underground pipes break
X	Most structures destroyed; rails bend; landslides occur; water splashes over banks
XI	Few structures left standing; bridges destroyed; broad fissures in the ground; underground pipes break
XII	Damage total; waves seen on ground surfaces; objects thrown in air

81 What is the approximate location of the earthquake's epicenter?

(1) 36° N, 90° W
(2) 90° N, 36° W
(3) 36° N, 90° E
(4) 90° N, 36° E

82 What was the approximate travel time for the earthquake's *P*-wave from the epicenter to Syracuse, New York?

(1) 1 min
(2) 5 min
(3) 3 min
(4) 10 min

83 Which city would have issued the report: "Heavy furniture moved, everyone felt the earthquake, and many people were frightened and ran outdoors"?

1 Cincinnati
2 Pittsburgh
3 Syracuse
4 Boston

84 Which statement best describes the earthquake waves recorded at Louisville?

(1) *S*-waves arrived ahead of *P*-waves.
(2) *P*-waves arrived ahead of *S*-waves.
(3) *S*-waves arrived but *P*-waves did not arrive.
(4) Neither *S*-waves nor *P*-waves arrived.

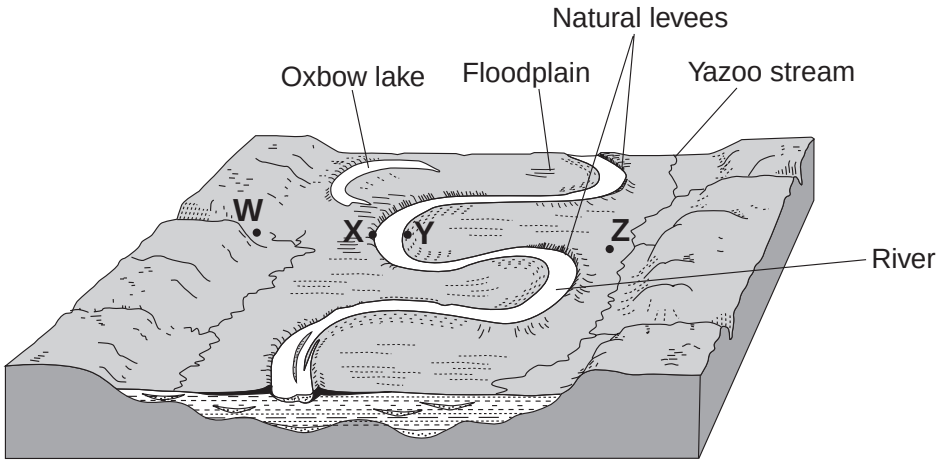
85 For which city was the difference in arrival times between *P*-waves and *S*-waves greatest?

1 Nashville
2 Pittsburgh
3 Syracuse
4 Boston

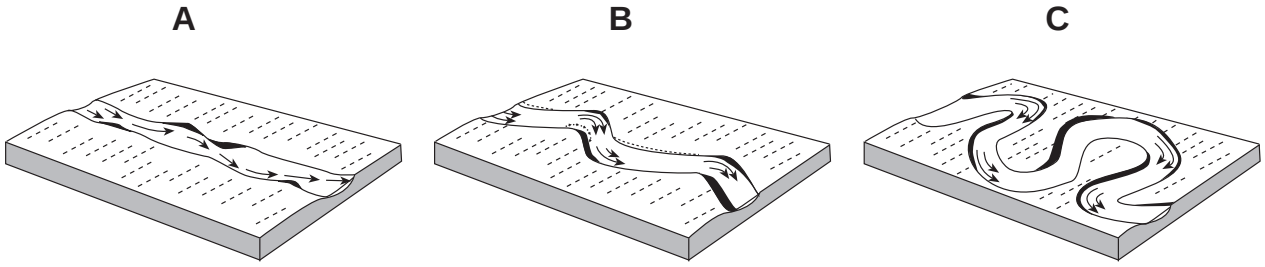
Group 7

If you choose this group, be sure to answer questions 86–90.

Base your answers to questions 86 through 90 on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram represents the landscape features associated with a meandering river. Letters *W*, *X*, *Y*, and *Z* represent locations on the floodplain.



86 The diagram below represents stages in the formation of this meandering river.



Which sequence best represents the usual changes over time?

(1) $A \rightarrow B \rightarrow C$
(2) $A \rightarrow C \rightarrow B$
(3) $C \rightarrow A \rightarrow B$
(4) $C \rightarrow B \rightarrow A$

87 At which location is erosion greatest?

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

88 The natural levees are ridges of sediment that slope away from the riverbank toward the floodplain. Which process most likely formed these levees?

1 weathering of the soil on the riverbanks
2 erosion on the inside curves of the meanders
3 deposition by the yazoo stream
4 deposition when the river overflowed its banks

89 During transport by this river, a sediment particle will most likely become

1 more rounded
2 more dense
3 heavier
4 larger

90 Which change would most likely increase the velocity of the river?

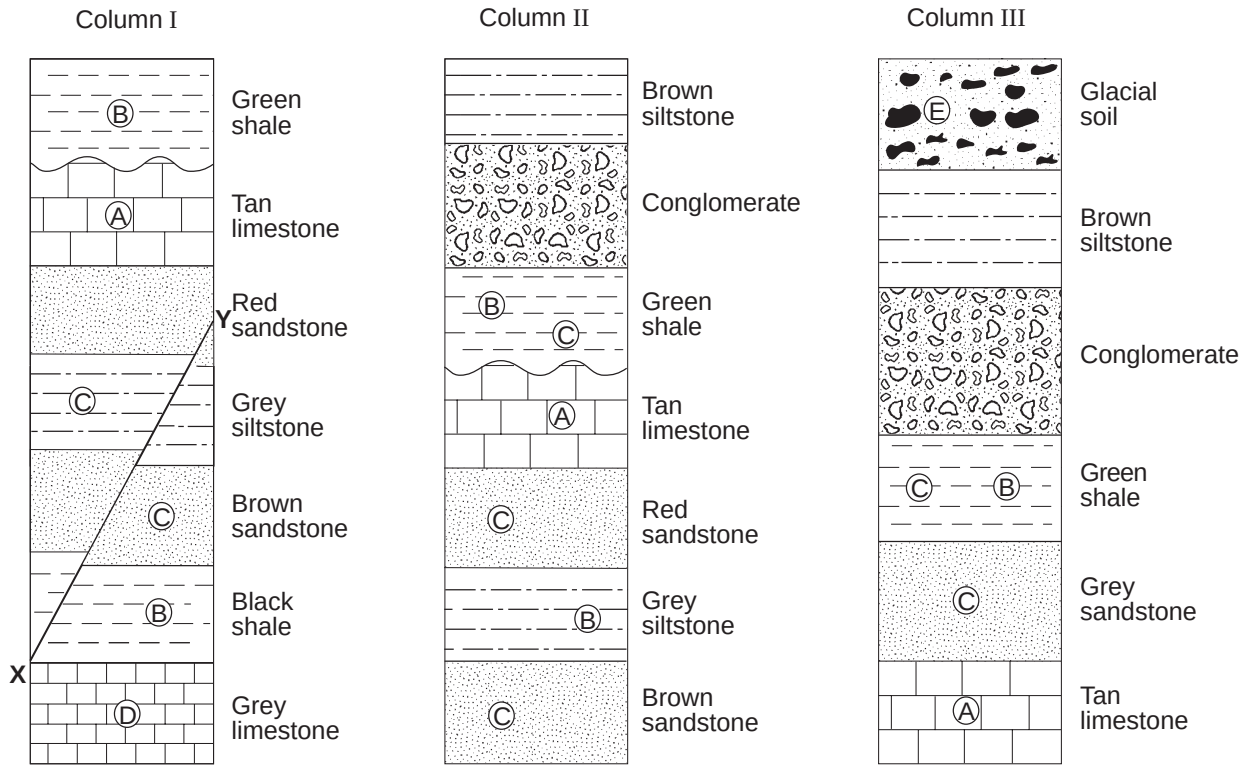
1 a decrease in the slope of the river
2 a decrease in the temperature of the river
3 an increase in the river's discharge
4 an increase in the width of the river

Group 8

If you choose this group, be sure to answer questions 91–95.

Base your answers to questions 91 through 95 on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram shows three geologic columns representing widely separated rock outcrops. Letters *A* through *E* represent fossils found in the outcrops. Line *XY* represents a fault in column I. The layers have not been overturned.

Rock Outcrops



91 What is the oldest layer shown?

1 glacial soil
2 brown sandstone
3 tan limestone
4 grey limestone

92 When did fault *XY*, located in column I, most likely occur?

1 before the formation of the grey limestone
2 during the formation of the grey siltstone
3 during the formation of the black shale
4 after the formation of the red sandstone

93 Which rock would most likely be produced by the metamorphism of the grey limestone?

1 quartzite
2 slate
3 marble
4 gneiss

94 The wavy line located between the green shale and the tan limestone layers in columns I and II most likely represents

1 contact metamorphism
2 a volcanic ash layer
3 a buried erosional surface
4 an igneous intrusion

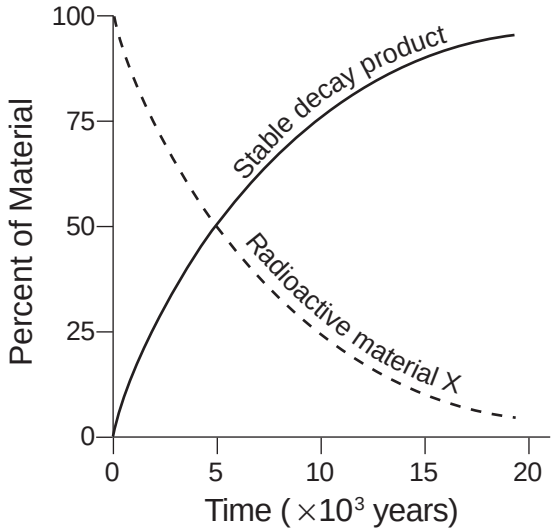
95 Fossil *A*, in the tan limestone layer, is a fossil of the first known coral. This tan limestone layer was most likely deposited during which geologic time interval?

1 Precambrian
2 Paleozoic
3 Mesozoic
4 Cenozoic

Group 9

If you choose this group, be sure to answer questions 96–100.

Base your answers to questions 96 through 100 on the *Earth Science Reference Tables*, the graph below, and your knowledge of Earth science. The graph represents the decay of radioactive material *X* into a stable decay product.



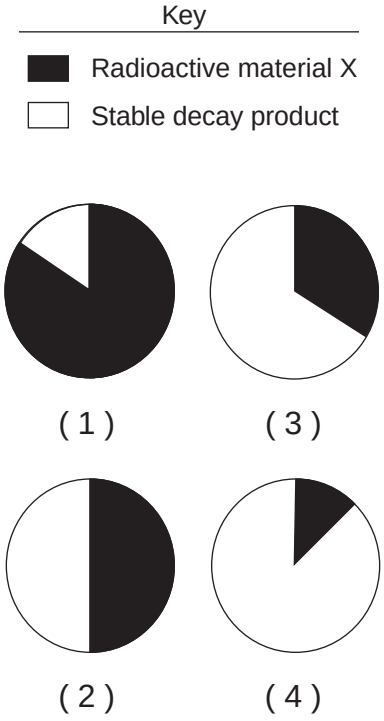
96 What is the approximate half-life of radioactive material *X*?

(1) 5,000 yr
(2) 10,000 yr
(3) 50,000 yr
(4) 100,000 yr

97 Radioactive material *X* can only be used to date young geologic material because radioactive material *X*

1 has only recently become radioactive
2 has a relatively short half-life
3 never existed in older rocks
4 has only recently been discovered

98 Which graph best represents the relative percentages of radioactive material *X* and its stable decay product after 15,000 years?



99 Each of the objects below has different amounts remaining of the original radioactive material *X*. Which object is most likely the oldest?

Rock

10% of the radioactive material remains

(1)

Wood

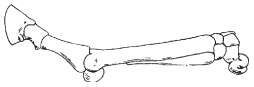
33% of the radioactive material remains

(2)

Shell

41% of the radioactive material remains

(3)



Bone

52% of the radioactive material remains

(4)

Note that question 100 has only three choices.

100 If radioactive material *X* were heated, the length of its half-life period would

1 decrease
2 increase
3 remain the same

Group 10

If you choose this group, be sure to answer questions 101–105.

Base your answers to questions 101 through 105 on the *Earth Science Reference Tables* and on your knowledge of Earth science.

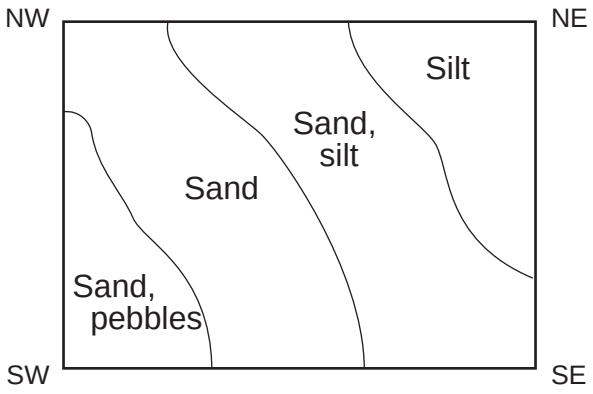
101 A fine-grained igneous rock composed mostly of plagioclase feldspar and hornblende and containing no quartz or pyroxene would be classified as

1 granite
2 andesite
3 peridotite
4 scoria

102 Trilobite fossil remains are most likely to be found in bedrock of

1 Precambrian age near Mt. Marcy
2 Cretaceous age on Long Island
3 Triassic age northwest of New York City
4 Ordovician age near Plattsburgh

103 A stream entering a lake deposits sediments on the lake bottom in the pattern shown on the map below.



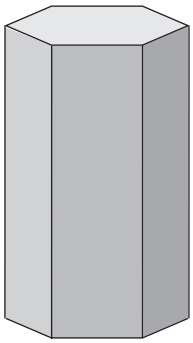
Which corner of the map is nearest to the point where the stream flows into the lake?

1 northeast (NE)
2 northwest (NW)
3 southeast (SE)
4 southwest (SW)

104 Approximately how long ago did the first dinosaurs appear on Earth?

(1) 66 million years ago
(2) 187 million years ago
(3) 230 million years ago
(4) 374 million years ago

105 A student measured the mass and volume of the mineral crystal below and recorded the data shown below. The student used these data to calculate the density of the crystal.



Data
Mass = 80 g
Volume = 32 cm^3
Density = ?

What will be the student's percent error using the recorded data if the actual density of the crystal is 2.7 grams per cubic centimeter?

(1) 0.4%
(2) 5.0%
(3) 7.4%
(4) 8.0%

Part II (35 credits)

Answer the questions in only seven of the ten groups in this part. Be sure to mark the answers to the groups of questions you choose in accordance with the instructions on the front cover of the test booklet. Leave blank the three groups of questions you do not choose to answer.

Tear Here

Group 1				
56	1	2	3	4
57	1	2	3	4
58	1	2	3	4
59	1	2	3	4
60	1	2	3	4

Group 2				
61	1	2	3	4
62	1	2	3	4
63	1	2	3	4
64	1	2	3	4
65	1	2	3	4

Group 3				
66	1	2	3	4
67	1	2	3	4
68	1	2	3	4
69	1	2	3	4
70	1	2	3	4

Group 4				
71	1	2	3	4
72	1	2	3	4
73	1	2	3	4
74	1	2	3	4
75	1	2	3	4

Group 5				
76	1	2	3	4
77	1	2	3	4
78	1	2	3	4
79	1	2	3	4
80	1	2	3	4

Group 6				
81	1	2	3	4
82	1	2	3	4
83	1	2	3	4
84	1	2	3	4
85	1	2	3	4

Group 7				
86	1	2	3	4
87	1	2	3	4
88	1	2	3	4
89	1	2	3	4
90	1	2	3	4

Group 8				
91	1	2	3	4
92	1	2	3	4
93	1	2	3	4
94	1	2	3	4
95	1	2	3	4

Group 9				
96	1	2	3	4
97	1	2	3	4
98	1	2	3	4
99	1	2	3	4
100	1	2	3	

Group 10				
101	1	2	3	4
102	1	2	3	4
103	1	2	3	4
104	1	2	3	4
105	1	2	3	4

Tear Here

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

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

EARTH SCIENCE

Wednesday, August 16, 2000 — 12:30 to 3:30 p.m., only

ANSWER SHEET

Part I Credits	.....
Part II Credits	.....
Performance Test Credits . .	.....
Total (Official Regents) Examination Mark	.....
Reviewer's Initials:	_____

Student . . . . . Sex: ☐ Male ☐ Female

Teacher . . . . . School . . . . . .

Grade (circle one) 8 9 10 11 12

Record all of your answers on this answer sheet in accordance with the instructions on the front cover of the test booklet.

Part I (55 credits)

1	1	2	3	4	**16**	1	2	3	4	**31**	1	2	3	4	**46**	1	2	3	4
2	1	2	3	4	**17**	1	2	3	4	**32**	1	2	3	4	**47**	1	2	3	4
3	1	2	3	4	**18**	1	2	3	4	**33**	1	2	3	4	**48**	1	2	3	4
4	1	2	3	4	**19**	1	2	3	4	**34**	1	2	3	4	**49**	1	2	3	4
5	1	2	3	4	**20**	1	2	3	4	**35**	1	2	3	4	**50**	1	2	3	4
6	1	2	3	4	**21**	1	2	3	4	**36**	1	2	3	4	**51**	1	2	3	4
7	1	2	3	4	**22**	1	2	3	4	**37**	1	2	3	4	**52**	1	2	3	4
8	1	2	3	4	**23**	1	2	3	4	**38**	1	2	3	4	**53**	1	2	3	4
9	1	2	3	4	**24**	1	2	3	4	**39**	1	2	3	4	**54**	1	2	3	4
10	1	2	3	4	**25**	1	2	3	4	**40**	1	2	3	4	**55**	1	2	3	
11	1	2	3	4	**26**	1	2	3	4	**41**	1	2	3	4					
12	1	2	3	4	**27**	1	2	3	4	**42**	1	2	3	4					
13	1	2	3	4	**28**	1	2	3	4	**43**	1	2	3	4					
14	1	2	3	4	**29**	1	2	3	4	**44**	1	2	3	4					
15	1	2	3	4	**30**	1	2	3	4	**45**	1	2	3	4					

Record your answers for Part II on the back of this sheet.

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