

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

# EARTH SCIENCE

Wednesday, January 28, 1998 — 1:15 to 4:15 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: ⊗ 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.

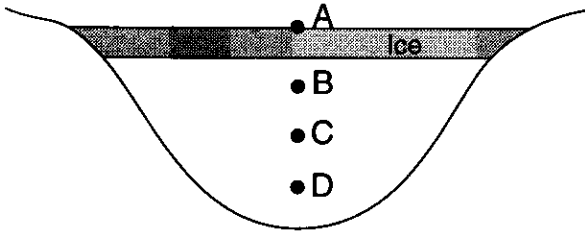
**DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.**

Part I

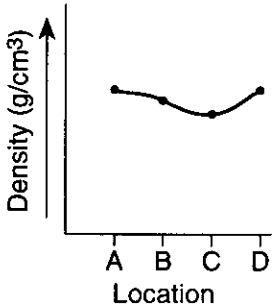
Answer all 55 questions in this part. [55]

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.

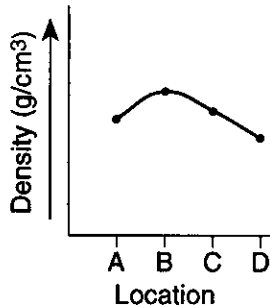
- 1 The diagram below is a cross section of an ice-covered lake in New York State during the month of January. Points A, B, C, and D are locations at various levels in the lake. The temperature of the water at location D is 4°C.



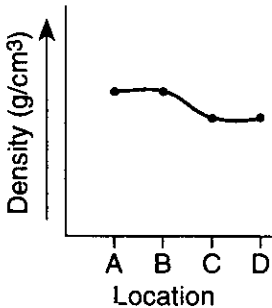
Which graph best represents the relationship between location and density of the ice or water?



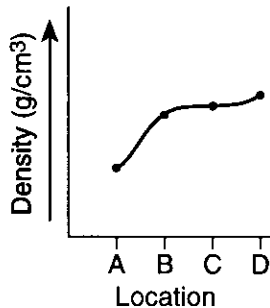
(1)



(3)

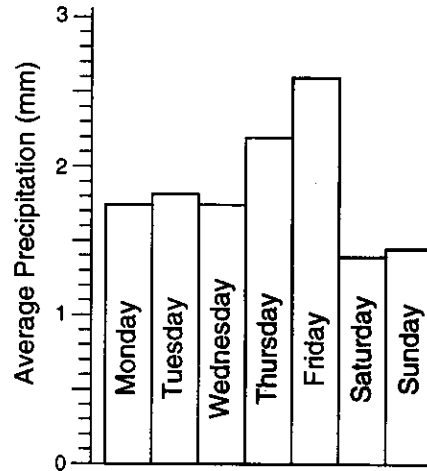


(2)



(4)

- Base your answers to questions 2 and 3 on the graph below, which shows the average daily precipitation for Paris, France, during an 8-year period.



- 2 Which days showed the greatest difference in average precipitation during this 8-year period?

- 1 Mondays and Tuesdays
- 2 Wednesdays and Thursdays
- 3 Thursdays and Fridays
- 4 Fridays and Saturdays

- 3 The average weekly precipitation total for Paris, France, during the 8-year period was approximately

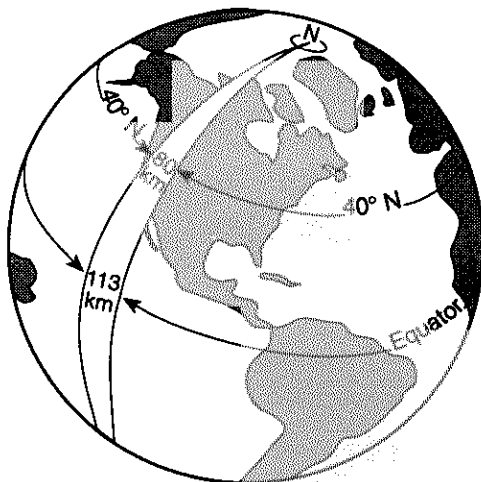
- |                |                |
|----------------|----------------|
| (1) 13 mm/week | (3) 30 mm/week |
| (2) 2 mm/week  | (4) 91 mm/week |

- 4 For an observer in New York State, the altitude of Polaris is 43° above the northern horizon. This observer's latitude is closest to the latitude of

- |                 |               |
|-----------------|---------------|
| 1 New York City | 3 Plattsburgh |
| 2 Utica         | 4 Jamestown   |

- 5 Compared to the weight of a person at the North Pole, the weight of the same person at the Equator would be
- 1 slightly less, because the person is farther from the center of Earth
  - 2 slightly less, because the person is closer to the center of Earth
  - 3 slightly more, because the person is farther from the center of Earth
  - 4 slightly more, because the person is closer to the center of Earth

- 6 The diagram below represents the approximate distances covered by one degree of longitude on Earth's surface at various latitudes.

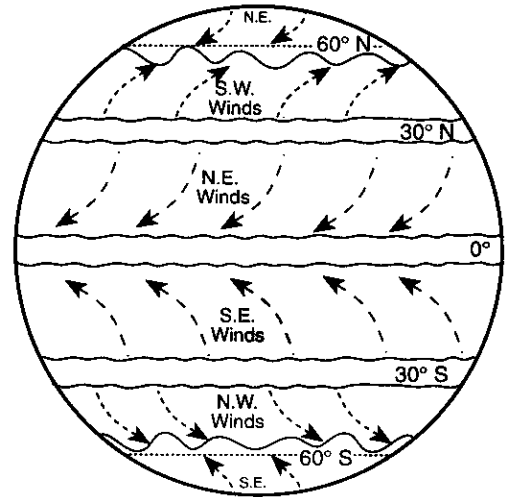


( Not drawn to scale )

What is the distance represented by one degree of longitude at Massena, New York?

- |           |            |
|-----------|------------|
| (1) 78 km | (3) 90 km  |
| (2) 85 km | (4) 113 km |
- 7 Most of the water vapor in the atmosphere is found in the
- |                |                |
|----------------|----------------|
| 1 mesosphere   | 3 troposphere  |
| 2 thermosphere | 4 stratosphere |
- 8 Which planet has the most eccentric orbit?
- |           |           |
|-----------|-----------|
| 1 Mercury | 3 Neptune |
| 2 Venus   | 4 Pluto   |

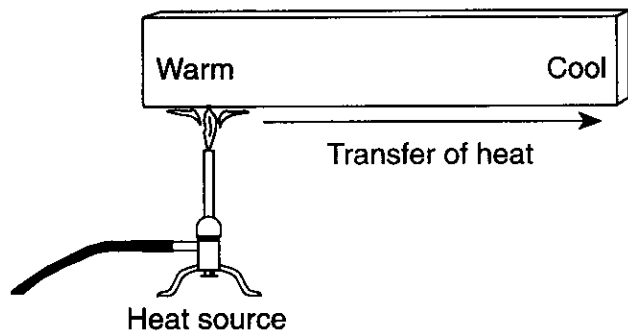
- 9 The planetary winds on Earth are indicated by the curving arrows in the diagram below.



The curved paths of the planetary winds are a result of

- |                                |
|--------------------------------|
| 1 changes in humidity          |
| 2 changes in temperature       |
| 3 Earth's rotation on its axis |
| 4 Earth's gravitational force  |
- 10 The Sun's apparent daily path through the daytime sky is best described by an observer in New York State as
- |   |
|---|
| 1 a circle around the North Star                |
| 2 an arc that extends from east to west         |
| 3 a straight line that passes directly overhead |
| 4 a random motion that varies with the seasons  |
- 11 The Moon's cycle of phases can be observed from Earth because the Moon
- |                         |
|-------------------------|
| 1 is smaller than Earth |
| 2 is tilted on its axis |
| 3 rotates on its axis   |
| 4 revolves around Earth |
- 12 All forms of electromagnetic energy have
- |                              |
|------------------------------|
| 1 transverse wave properties |
| 2 the same temperature       |
| 3 the same wavelength        |
| 4 their own half-life        |

- 13 The diagram below shows a solid iron bar that is being heated in a flame.

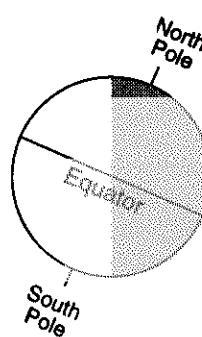


The primary method of heat transfer in the solid iron bar is

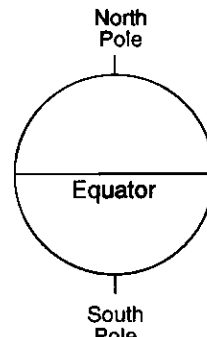
- |              |              |
|--------------|--------------|
| 1 convection | 3 absorption |
| 2 conduction | 4 advection  |
- 14 An object that is a good absorber of electromagnetic energy is most likely a good
- |             |             |
|-------------|-------------|
| 1 convector | 3 radiator  |
| 2 reflector | 4 refractor |
- 15 The hottest climates on Earth are located near the Equator because this region
- 1 is usually closest to the Sun
  - 2 reflects the greatest amount of insolation
  - 3 receives the most hours of daylight
  - 4 receives the most nearly perpendicular insolation

- 16 In which geographic region are air masses most often warm with a high moisture content?
- 1 Central Canada
  - 2 Central Mexico
  - 3 Gulf of Mexico
  - 4 North Pacific Ocean

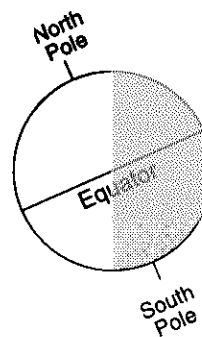
- 17 The diagrams below represent Earth's tilt on its axis on four different dates. The shaded portion represents the nighttime side of Earth. Which diagram best represents the day on which the longest duration of insolation occurs in New York State?



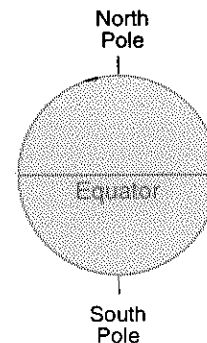
(1)



(3)



(2)

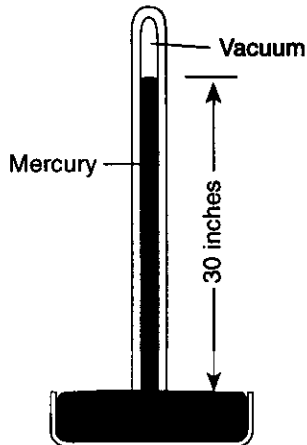


(4)

- 18 If Earth's tilt were to increase from  $23\frac{1}{2}^{\circ}$  to  $33\frac{1}{2}^{\circ}$ , the result would be

- 1 shorter days and longer nights at the Equator
- 2 less difference between winter and summer temperatures in New York State
- 3 colder winters and warmer summers in the Northern Hemisphere
- 4 an increase in the amount of solar radiation received by Earth

Base your answers to questions 19 and 20 on the diagram below of a weather instrument.



19 Which weather variable is this instrument designed to measure?

- 1 visibility
- 2 relative humidity
- 3 dewpoint temperature
- 4 air pressure

20 In New York State, which weather conditions are most likely to exist when the height of the mercury in the tube is much greater than 30 inches?

- 1 cold, dry air with clear skies
- 2 warm, moist air with overcast skies
- 3 strong southerly winds with hail warnings
- 4 a violent storm associated with the autumn season

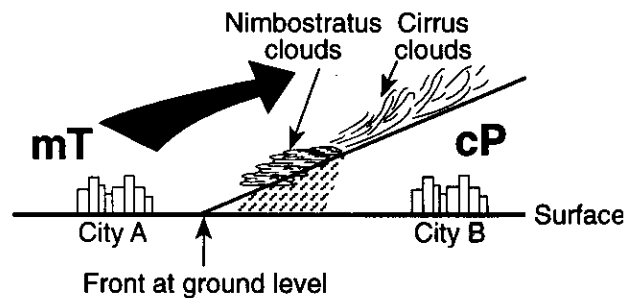
21 Surface ocean currents resulting from the prevailing winds over the oceans illustrate a transfer of energy from

- 1 lithosphere to atmosphere
- 2 hydrosphere to lithosphere
- 3 atmosphere to hydrosphere
- 4 stratosphere to troposphere

22 A low-pressure system near Utica, New York, causes heavy precipitation. If this system followed the usual track, which city most likely had the same weather conditions a few hours earlier?

- |            |               |
|------------|---------------|
| 1 Syracuse | 3 Albany      |
| 2 Kingston | 4 Plattsburgh |

Base your answers to questions 23 and 24 on the diagram below, which shows the frontal boundary between mT and cP air masses.



23 If the front at ground level is moving toward city B, which type of weather front is shown?

- |              |                    |
|--------------|--------------------|
| 1 cold front | 3 occluded front   |
| 2 warm front | 4 stationary front |

24 Why do clouds and precipitation usually occur along the frontal surface?

- 1 The warm air rises, expands, and cools.
- 2 The warm air sinks, expands, and warms.
- 3 The cool air rises, compresses, and cools.
- 4 The cool air sinks, compresses, and warms.

25 What is the name of the warm ocean current that flows along the east coast of the United States?

- 1 California Current
- 2 Florida Current
- 3 Labrador Current
- 4 North Pacific Current

26 Why would a stream in New York State have a lower stream discharge in late summer than in spring?

- 1 Potential evapotranspiration is less in late summer than in spring.
- 2 Plants carry on more transpiration in spring than in late summer.
- 3 The local water budget shows a surplus in late summer.
- 4 The local water budget shows a deficit in late summer.

27 The lines on the map below represent the average yearly amount of precipitation in inches.



Which statement best explains the difference in yearly precipitation between Watertown and Plattsburgh?

- 1 Watertown receives more precipitation because it is farther from the Atlantic Ocean.
- 2 Plattsburgh receives more precipitation because it is closer to the Atlantic Ocean.
- 3 Watertown receives more precipitation because of the effects of change in elevation and prevailing winds.
- 4 Plattsburgh receives more precipitation because of the effects of change in elevation and prevailing winds.

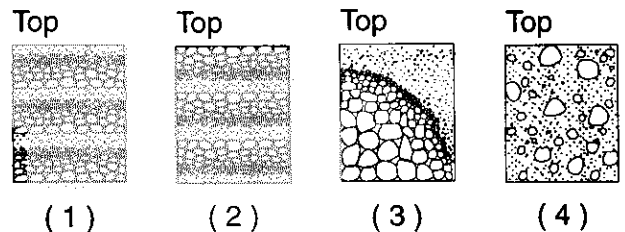
28 Soil with the greatest porosity has particles that are

- 1 poorly sorted and densely packed
- 2 poorly sorted and loosely packed
- 3 well sorted and densely packed
- 4 well sorted and loosely packed

29 Which factor has the most influence on the development of soil?

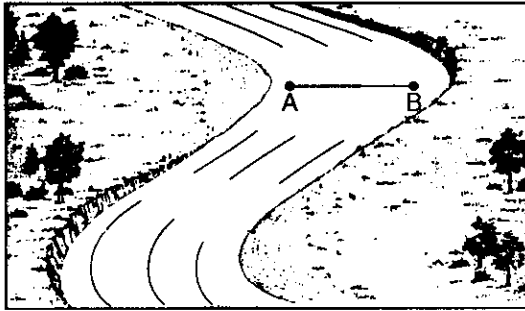
- 1 climate
- 2 longitude
- 3 amount of rounded sediment
- 4 slope of the landscape

30 Which diagram best represents a cross section of the sediment deposited directly by a glacier in New York State?

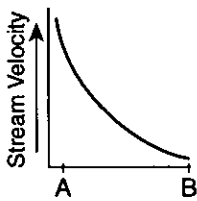


- (1)                      (2)                      (3)                      (4)

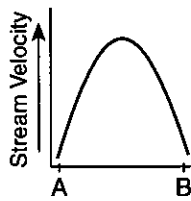
31. The diagram below shows a meandering stream. Measurements of stream velocity were taken along straight line AB.



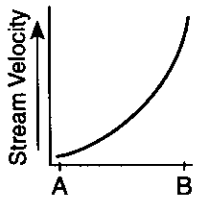
Which graph best shows the relative stream velocities across the stream from A to B?



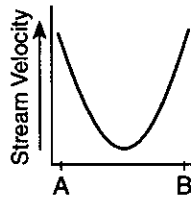
(1)



(3)

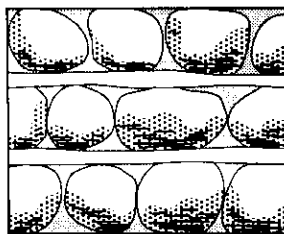


(2)



(4)

32. The diagram below shows cobbles used in the construction of the walls of a cobblestone building.



(Not actual size)

The shape and size of the cobbles suggest that they were collected from

- 1 the channel of a fast-flowing stream
- 2 volcanic ash deposits
- 3 a desert sand dune
- 4 the base of a cliff from which they had weathered

33. Which mineral property is illustrated by the peeling of muscovite mica into thin, flat sheets?

- |          |            |
|----------|------------|
| 1 luster | 3 hardness |
| 2 streak | 4 cleavage |

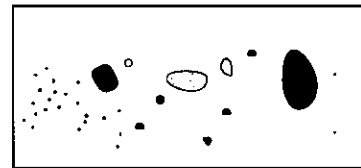
34. Which sedimentary rock may form as a result of biologic processes?

- |             |                    |
|-------------|--------------------|
| 1 shale     | 3 fossil limestone |
| 2 siltstone | 4 breccia          |

35. Which rock type is most likely to be monomineralic?

- |             |                |
|-------------|----------------|
| 1 rock salt | 3 basalt       |
| 2 rhyolite  | 4 conglomerate |

36. The diagram below shows actual sizes and shapes of particles removed from a clastic sedimentary rock.



The sediments are from

- |                      |             |
|----------------------|-------------|
| 1 chemical limestone | 3 granite   |
| 2 conglomerate       | 4 sandstone |

37. Which rock forms by the recrystallization of unmelted rock material under conditions of high temperature and pressure?

- |           |                   |
|-----------|-------------------|
| 1 granite | 3 rock gypsum     |
| 2 gneiss  | 4 bituminous coal |

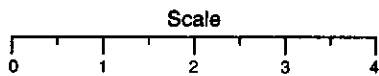
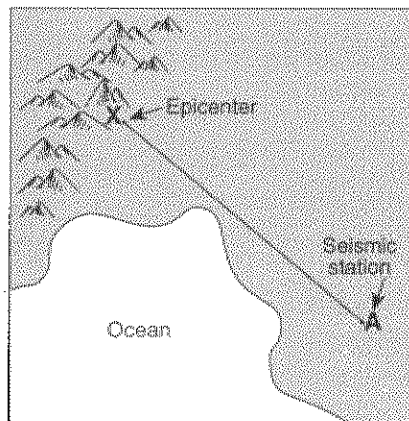
38. Seafloor spreading is occurring at the boundary between the

- 1 African plate and Antarctic plate
- 2 Nazca plate and South American plate
- 3 China plate and Philippine plate
- 4 Australian plate and Eurasian plate

39. In which area of Earth's interior is the pressure most likely to be 2.5 million atmospheres?

- |                  |              |
|------------------|--------------|
| 1 asthenosphere  | 3 inner core |
| 2 stiffer mantle | 4 outer core |

Base your answers to questions 40 and 41 on the map below. The map shows point X, which is the location of an earthquake epicenter, and point A, which is the location of a seismic station.



40 Approximately how long did the earthquake's *P*-wave take to arrive at the seismic station?

- |                  |                  |
|------------------|------------------|
| (1) 3 min 40 sec | (3) 6 min 20 sec |
| (2) 5 min 10 sec | (4) 11 min 5 sec |

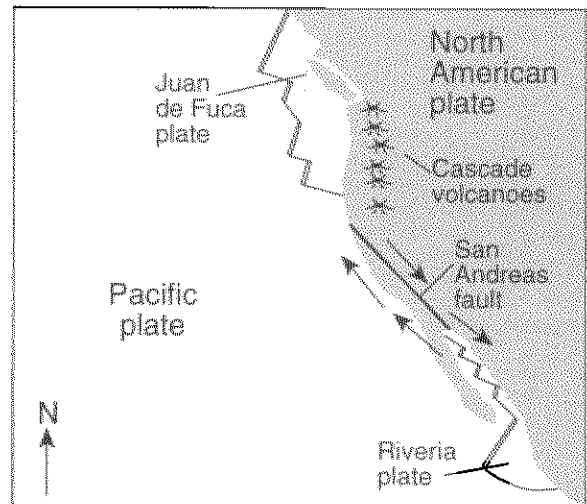
41 Which statement best describes the arrival of the initial *S*-wave at the seismic station?

- 1 It arrived later than the *P*-wave because *S*-waves travel more slowly.
- 2 It arrived earlier than the *P*-wave because *S*-waves travel faster.
- 3 It arrived at the same time as the *P*-wave because *S*-waves and *P*-waves have the same velocity on Earth's surface.
- 4 It never reached location A because *S*-waves can travel only through a liquid medium.

42 Which statement best describes Earth's crust and mantle?

- 1 The crust is thicker and less dense than the mantle.
- 2 The crust is thicker and more dense than the mantle.
- 3 The crust is thinner and less dense than the mantle.
- 4 The crust is thinner and more dense than the mantle.

43 The map below shows continental and oceanic crustal plates along the west coast of North America.



Which conclusion is best supported by the map?

- 1 The boundary of the Pacific plate has very few faults.
- 2 The Pacific plate has stopped moving.
- 3 The west coast of North America is composed of the oldest rocks on the continent.
- 4 The west coast of North America is a zone of frequent crustal movement.

44 Which feature of a sandstone rock layer usually is the youngest?

- 1 sand grains that make up the rock
- 2 cement that binds the sand grains together
- 3 fossils found in the rock
- 4 faults that have broken the rock

45 Which bedrock would be most likely to contain fossils?

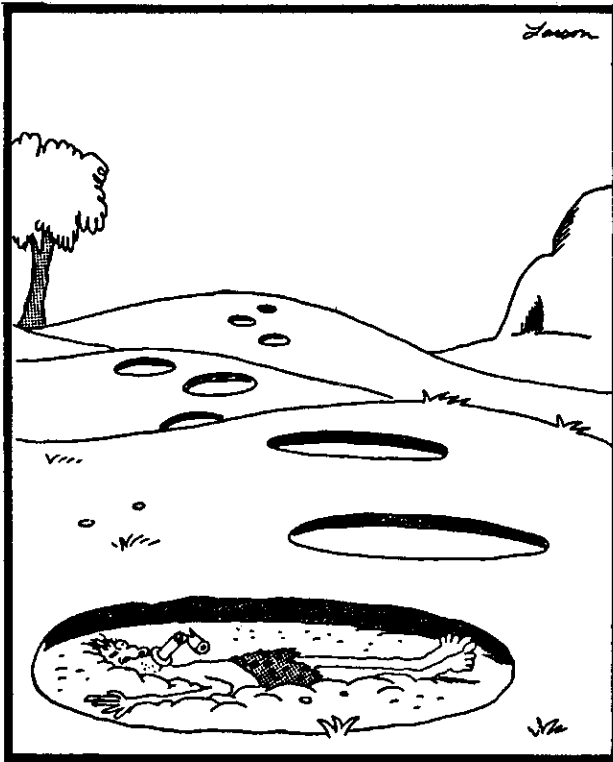
- 1 Precambrian granite
- 2 Cambrian shale
- 3 Pleistocene basalt
- 4 Middle-Proterozoic quartzite

46 Which life-forms existed on Earth during the same time period?

- 1 trilobites and mastodonts
- 2 ammonoids and Naples trees
- 3 armored fish and flowering plants
- 4 dinosaurs and early humans



47 The cartoon below is a humorous interpretation of the results of an invention.



50,000 B.C.: Gak invents the first and last silent mammoth whistle.

The dominant life-forms existing on Earth at the time represented by the cartoon are classified as

- |            |                 |
|------------|-----------------|
| 1 mammals  | 3 amphibians    |
| 2 reptiles | 4 invertebrates |

48 What is the age of most of the surface bedrock found in New York State at a latitude of 45°?

- 1 Precambrian Middle Proterozoic
- 2 Triassic and Jurassic
- 3 Silurian and Devonian
- 4 Cambrian and Ordovician

49 Radioactive carbon-14 dating has determined that a fossil is  $5.7 \times 10^3$  years old. What is the total amount of the original  $C^{14}$  still present in the fossil?

- |         |         |
|---------|---------|
| (1) 0%  | (3) 50% |
| (2) 25% | (4) 75% |

50 Using radioactive dating methods and mathematical inferences, scientists have estimated the date of Earth's formation to be approximately

- (1)  $1.1 \times 10^6$  years ago
- (2)  $2.4 \times 10^6$  years ago
- (3)  $3.3 \times 10^9$  years ago
- (4)  $4.6 \times 10^9$  years ago

51 A landscape region that has broad, U-shaped valleys with polished and grooved bedrock was most likely formed by

- |            |                 |
|------------|-----------------|
| 1 glaciers | 3 wave action   |
| 2 wind     | 4 running water |

52 Continents are divided into landscape regions on the basis of

- 1 bedrock fossils and depositional patterns
- 2 rainfall and temperature changes
- 3 surface features and bedrock structure
- 4 boundaries of the drainage basins of major rivers

53 In which New York State landscape region is Albany located?

- 1 Catskills
- 2 Taconic Mountains
- 3 Hudson-Mohawk Lowlands
- 4 Champlain Lowlands

54 Bedrock in the area of Binghamton, New York, consists of

- 1 plutonic igneous rock
- 2 sedimentary rock layers
- 3 faulted and tilted volcanic rock
- 4 folded metamorphic rock

55 Which New York State landscape region is composed primarily of metamorphic bedrock at its surface?

- 1 Manhattan Prong
- 2 Allegheny Plateau
- 3 St. Lawrence Lowlands
- 4 Erie-Ontario Lowlands

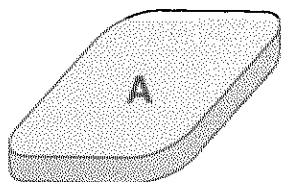
## Part II

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]

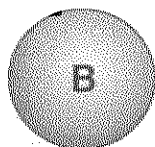
### Group 1

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

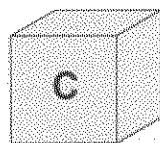
Base your answers to questions 56 through 60 on the *Earth Science Reference Tables*, the diagrams below, and your knowledge of Earth science. The diagrams represent four different mineral samples with different shapes and masses. Diagrams are not drawn to scale.



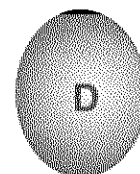
Mass = 12.0 g  
Volume = 4.0 cm<sup>3</sup>



Mass = 16.0 g  
Volume = 4.0 cm<sup>3</sup>



Mass = 20.0 g  
Volume = 4.0 cm<sup>3</sup>



Mass = 24.0 g  
Volume = 4.0 cm<sup>3</sup>

56 Which instrument was most likely used to find the volume of each sample?

- |                      |                |
|----------------------|----------------|
| 1 graduated cylinder | 3 thermometer  |
| 2 balance            | 4 psychrometer |

57 A second sample of mineral A has a mass of 48 grams. What is the volume of this sample?

- |                          |                          |
|--------------------------|--------------------------|
| (1) 24.0 cm <sup>3</sup> | (3) 12.0 cm <sup>3</sup> |
| (2) 16.0 cm <sup>3</sup> | (4) 4.0 cm <sup>3</sup>  |

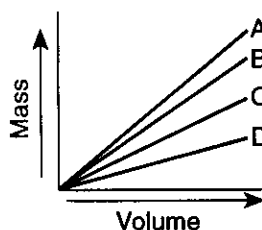
58 A student finds the mass of sample B to be 17.5 grams. What is the student's approximate percent deviation (percentage of error)?

- |          |          |
|----------|----------|
| (1) 1.5% | (3) 8.8% |
| (2) 6.7% | (4) 9.4% |

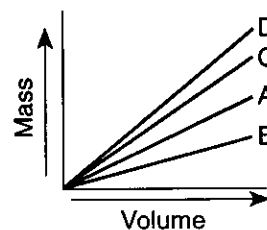
59 Which sample would most likely be the slowest to settle in a quiet body of water?

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

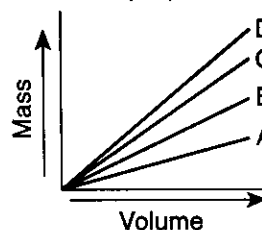
60 Which graph best represents the density of each sample?



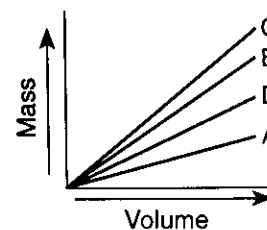
(1)



(3)



(2)

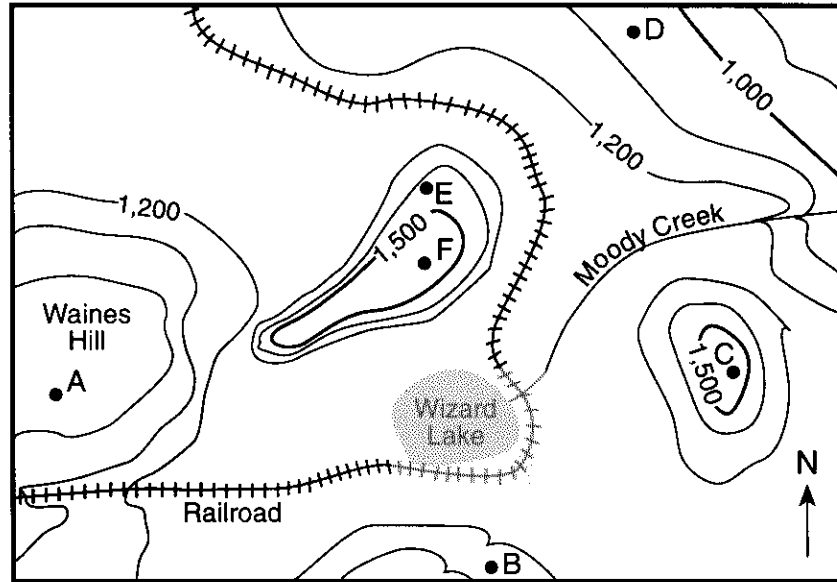


(4)

**Group 2**

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

Base your answers to questions 61 through 65 on the topographic map below and on your knowledge of Earth science. Letters A through F represent locations on the map.



61 What is the contour interval of this map?

- (1) 10 m
- (2) 50 m
- (3) 100 m
- (4) 150 m

62 Toward which direction does Moody Creek flow?

- 1 southwest
- 2 northwest
- 3 northeast
- 4 southeast

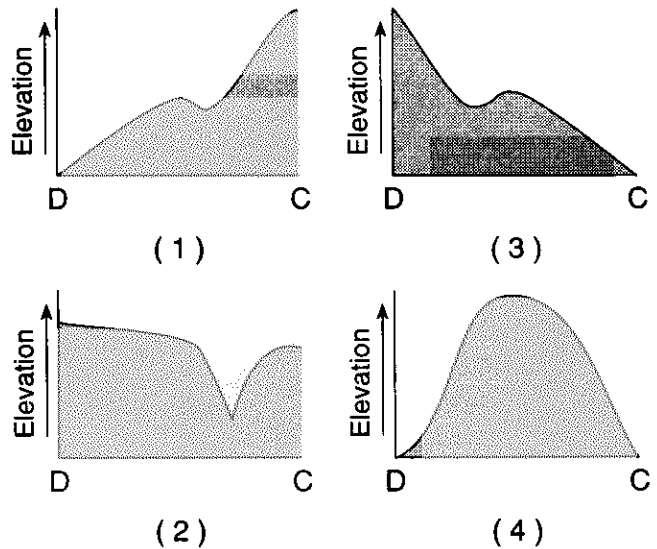
63 Which location has the lowest elevation?

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

64 What is the approximate length of the railroad tracks shown on the map?

- (1) 15 km
- (2) 12 km
- (3) 8 km
- (4) 4 km

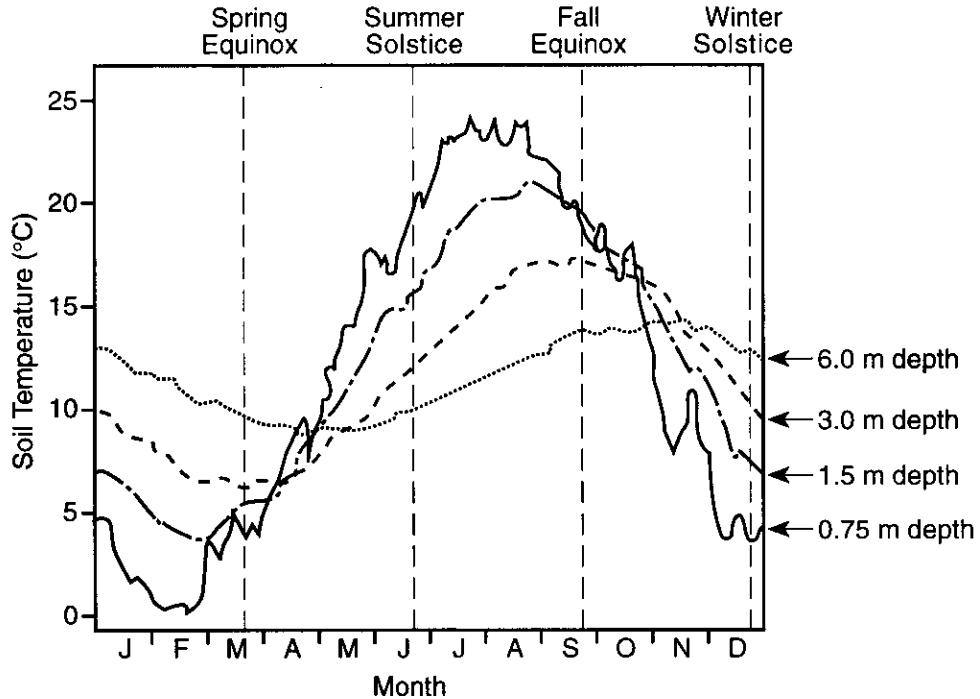
65 Which diagram best represents the profile along a straight line from point D to point C?



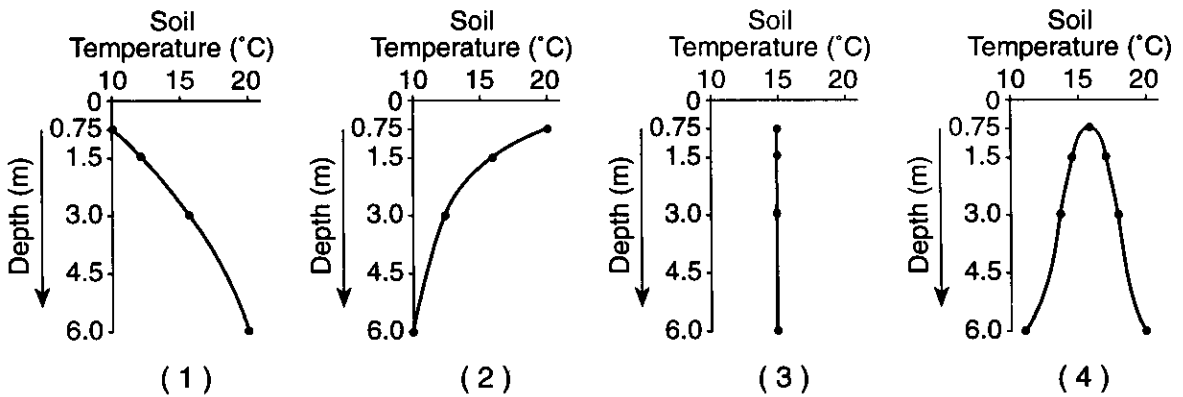
**Group 3**

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

Base your answers to questions 66 through 70 on the graph below and on your knowledge of Earth science. The graph shows temperature data taken at four different depths in the soil at one location on Long Island, New York, for one year.



66 Which graph best represents the relationship between soil temperature and depth in the soil on June 21?



67 When did maximum soil temperature occur at depths in the soil of less than 5 meters?

- 1 at the spring equinox
- 2 between the spring equinox and the summer solstice
- 3 at the summer solstice
- 4 between the summer solstice and the fall equinox

68 On what date was the temperature at the 3-meter depth greater than the temperature at any of the other three depths?

- |             |               |
|-------------|---------------|
| 1 July 11   | 3 November 1  |
| 2 August 31 | 4 December 21 |

69 The general yearly pattern shown in the diagram of temperature changes at each depth in the soil is best described as

- 1 a one-way change
- 2 a random change
- 3 an unpredictable change
- 4 a cyclic change

**Note that question 70 has only three choices.**

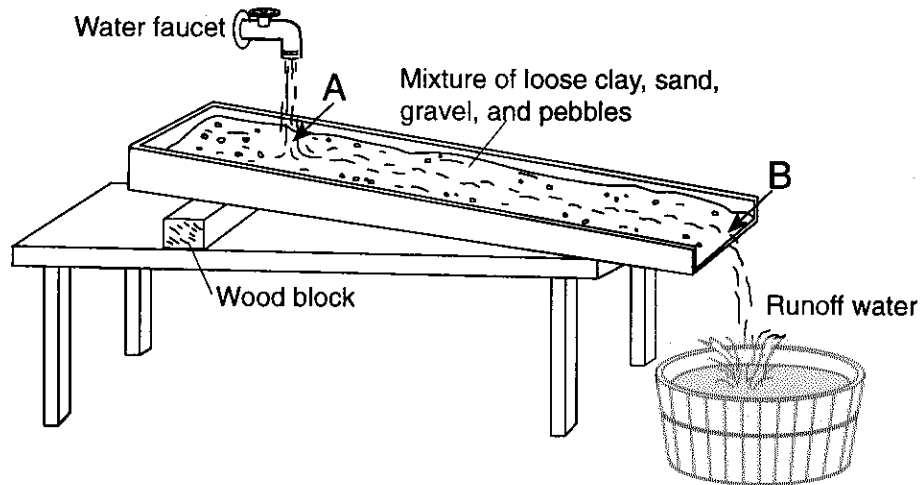
70 The graph shows that as depth increases, the annual temperature range

- 1 decreases
- 2 increases
- 3 remains the same

### Group 4

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

Base your answers to questions 71 through 75 on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram represents a laboratory stream table.



71 Which equation should be used to determine the gradient of the stream?

1  $\text{gradient} = \frac{\text{height of faucet above the floor (cm)}}{\text{water discharge from the tube (m}^3/\text{sec)}}$

2  $\text{gradient} = \frac{\text{falling distance of runoff water (cm)}}{\text{volume of water collected in pan (mL)}}$

3  $\text{gradient} = \frac{\text{volume of water in the stream between points A and B (mL)}}{\text{height of the wood block (cm)}}$

4  $\text{gradient} = \frac{\text{difference in elevation between points A and B (cm)}}{\text{distance between points A and B (m)}}$

72 Which particles are transported most easily by the water in this stream?

- |        |           |
|--------|-----------|
| 1 clay | 3 silt    |
| 2 sand | 4 pebbles |

**Note that question 73 has only three choices.**

73 When stream volume increases after the faucet is opened, stream velocity will

- 1 decrease
- 2 increase
- 3 remain the same

74 Water flowing in the stream can move sediments along the stream channel because of an exchange of energy from the

- 1 channel to the water
- 2 water to the sediment
- 3 sediment to the channel
- 4 channel to the sediment

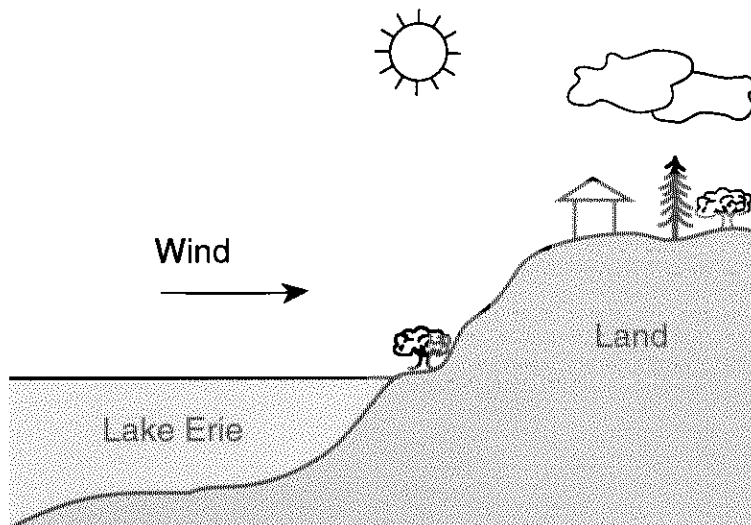
75 How do streams transport sediments?

- 1 in suspension, only
- 2 by rolling, only
- 3 in suspension and by rolling, only
- 4 in solution, in suspension, and by rolling

**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 diagram below, and your knowledge of Earth science. The diagram represents a cross section of the shoreline of Lake Erie.



76 From 9 a.m. to 1 p.m. each day, the land surface temperature will usually

- 1 rise, then fall
- 2 fall, then rise
- 3 rise steadily
- 4 fall steadily

77 Which characteristics of the land surface have the greatest effect on the amount of insolation the land surface absorbs?

- 1 hardness and age
- 2 density and hardness
- 3 age and roughness
- 4 roughness and color

78 Most water vapor enters the atmosphere by the processes of

- 1 conduction and convection
- 2 radiation and condensation
- 3 absorption and infiltration
- 4 evaporation and transpiration

79 Compared with the change in temperature of the water surface, the change in temperature of the land surface will be

- 1 faster, because the land has a lower specific heat
- 2 faster, because the land has a higher specific heat
- 3 slower, because the land has a lower specific heat
- 4 slower, because the land has a higher specific heat

80 The direction of the wind shown in this diagram is probably due to air moving from areas of

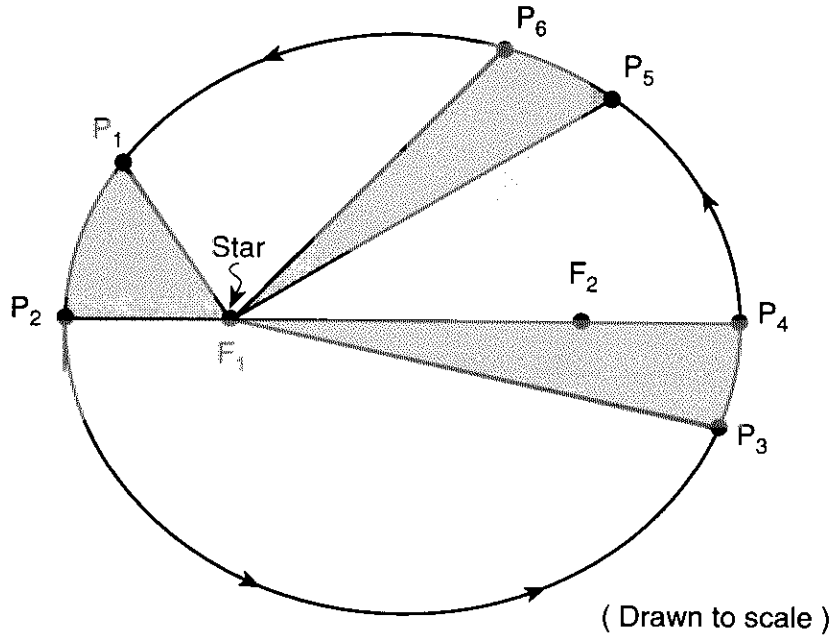
- 1 low air pressure to areas of high air pressure
- 2 high air pressure to areas of low air pressure
- 3 low air humidity to areas of high air humidity
- 4 high air humidity to areas of low air humidity



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 diagram below, and your knowledge of Earth science. The diagram represents a planet,  $P$ , in an elliptical orbit around a star located at  $F_1$ . The foci of the elliptical orbit are  $F_1$  and  $F_2$ . Orbital locations are represented by  $P_1$  through  $P_6$ .



81 The gravitational attraction between planet  $P$  and the star is greatest when the planet is located at position

- |           |           |
|-----------|-----------|
| (1) $P_1$ | (3) $P_3$ |
| (2) $P_2$ | (4) $P_4$ |

82 When observed from the planet, the star would have its greatest apparent angular diameter when the planet is located at position

- |           |           |
|-----------|-----------|
| (1) $P_1$ | (3) $P_3$ |
| (2) $P_2$ | (4) $P_4$ |

83 What is the approximate eccentricity of planet  $P$ 's orbit?

- |          |          |
|----------|----------|
| (1) 0.52 | (3) 2.11 |
| (2) 0.83 | (4) 4.47 |

84 If the shaded portions of the orbital plane are equal in area, the time period between  $P_1$  and  $P_2$  will be equal to the time period between

- |                     |                     |
|---------------------|---------------------|
| (1) $P_2$ and $P_3$ | (3) $P_4$ and $P_5$ |
| (2) $P_3$ and $P_4$ | (4) $P_6$ and $P_1$ |

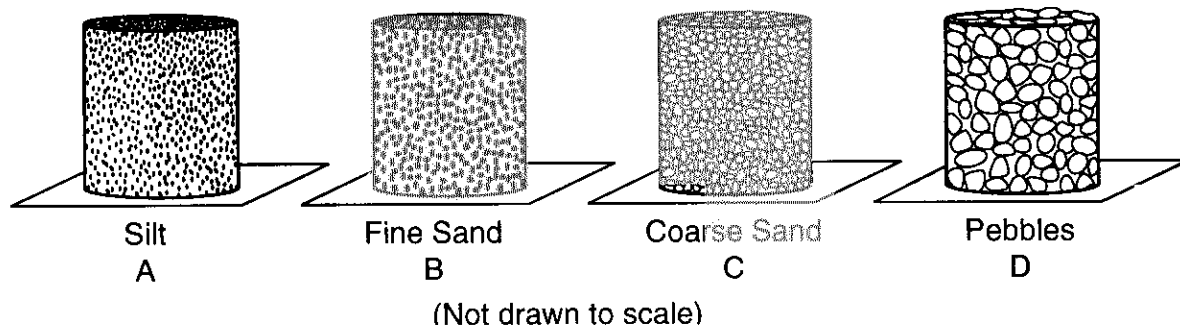
85 If the mass of planet  $P$  were tripled, the gravitational force between the star and planet  $P$  would

- 1 remain the same
- 2 be two times greater
- 3 be three times greater
- 4 be nine times greater

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* and on the diagrams below. The diagrams represent 500-milliliter containers that are open at the top and the bottom and filled with well-sorted, loosely packed particles of uniform size. A piece of screening placed at the bottom of each container prevents the particles from falling out.



86 Container A is filled with particles that could have a diameter of

- (1) 0.0001 cm                      (3) 0.01 cm  
 (2) 0.001 cm                        (4) 0.1 cm

87 The sample in which container would have the greatest capillarity when placed in water?

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

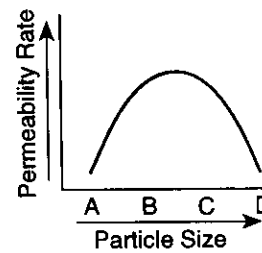
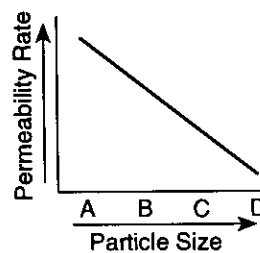
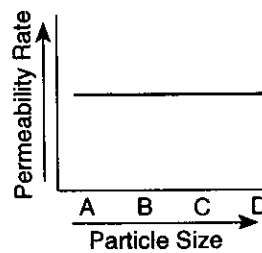
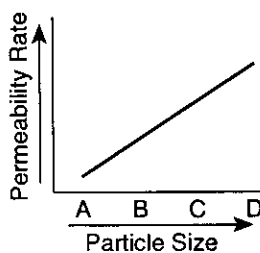
88 Assume that the samples in each container were taken from surface soil in different locations. Which location would produce the *least* amount of runoff during a heavy rainfall?

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

89 The sample in which container would retain the most water on the particles after 500 milliliters of water is poured through the sample?

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

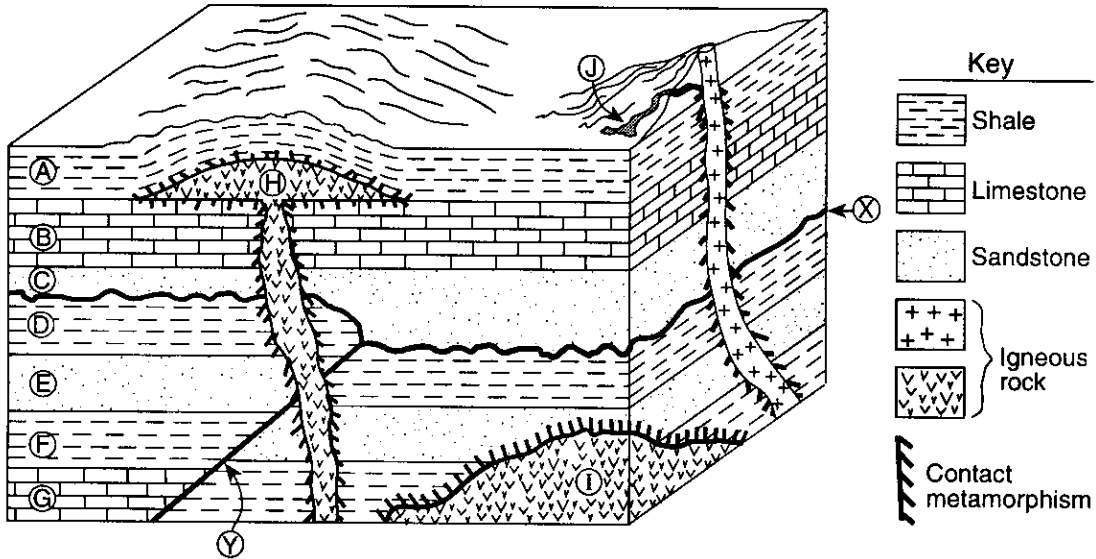
90 Which graph best represents the rate of permeability of the samples?



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 cross section below, and your knowledge of Earth science. Letters A through J represent rock units. An unconformity is shown at letter X. A fault is shown at letter Y.



91 Rock units A through H all contain

- |                       |            |
|-----------------------|------------|
| 1 intergrown crystals | 3 fossils  |
| 2 sediments           | 4 minerals |

92 If rock layer B was deposited during the Carboniferous Period, igneous intrusion H could have occurred during the

- |                   |                   |
|-------------------|-------------------|
| 1 Cambrian Period | 3 Permian Period  |
| 2 Devonian Period | 4 Silurian Period |

93 Rock I was formed deep underground and is composed of 70% pyroxene, 15% plagioclase, 10% olivine, and 5% hornblende. Rock I is classified as

- |           |            |
|-----------|------------|
| 1 granite | 3 rhyolite |
| 2 gabbro  | 4 basalt   |

94 Which process occurred most recently?

- 1 formation of fault Y
- 2 development of unconformity X
- 3 formation of intrusion H
- 4 deposition of rock layers D, E, and F

95 Rock J in the diagram represents a lava flow that has cooled rapidly at the surface of Earth. Which diagram and description best represents rock J?



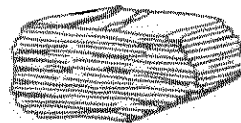
Bands of alternating light and dark minerals

(1)



Glassy black rock that breaks with a shell-shape fracture

(3)



Easily split layers of 0.0001-cm-diameter particles cemented together

(2)



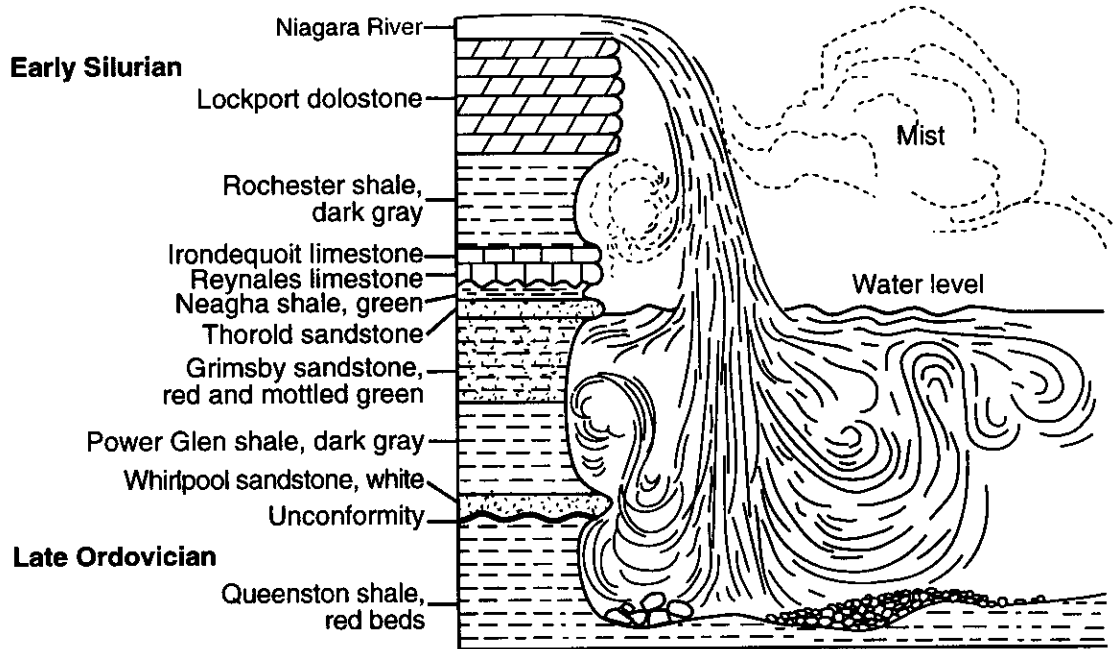
Interlocking 0.5-cm-diameter crystals of various colors

(4)

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 diagram below, and your knowledge of Earth science. The diagram shows a cross section of the bedrock where the Niagara River flows over Niagara Falls.



96 The Rochester shale and the Queenston shale are similar in that both

- 1 contain the same index fossils
- 2 have the same color
- 3 are the same age
- 4 contain the same size sediment

97 What is the most probable age of the Irondequoit limestone?

- |            |            |
|------------|------------|
| 1 Silurian | 3 Devonian |
| 2 Cambrian | 4 Permian  |

98 The unconformity above the Queenston shale was most likely caused by

- |            |             |
|------------|-------------|
| 1 faulting | 3 erosion   |
| 2 folding  | 4 volcanism |

99 The sediment carried by the Niagara River will have its greatest potential energy at the level of the

- 1 Lockport dolostone
- 2 Rochester shale
- 3 Thorold sandstone
- 4 Queenston shale

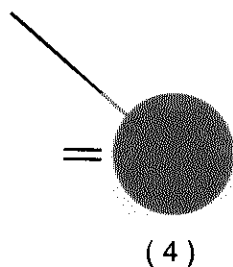
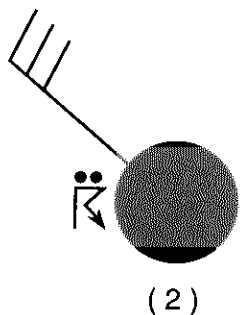
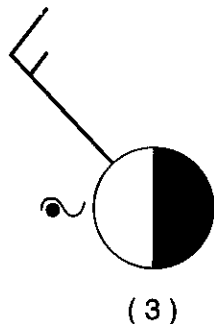
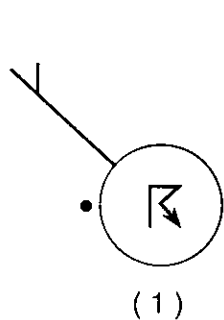
100 Which kind of rock in this formation appears to be *least* resistant to weathering?

- |            |             |
|------------|-------------|
| 1 dolomite | 3 limestone |
| 2 shale    | 4 sandstone |

Group 10

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

101 Which station model correctly shows the weather conditions of a thunderstorm with heavy rain?



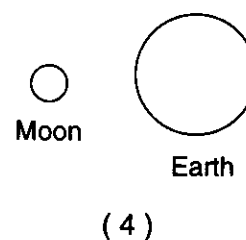
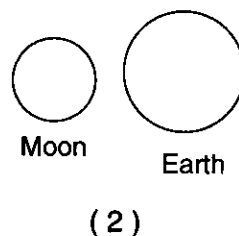
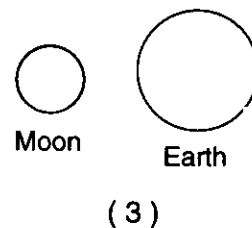
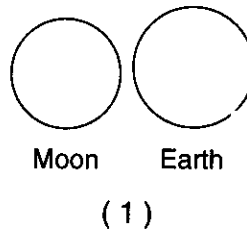
102 Which type of radiation has the shortest wavelength?

- |                 |               |
|-----------------|---------------|
| 1 radar         | 3 ultraviolet |
| 2 visible light | 4 infrared    |

103 What is the dewpoint temperature when the dry-bulb temperature is 12°C and the wet-bulb temperature is 7°C?

- |          |         |
|----------|---------|
| (1) 1°C  | (3) 6°C |
| (2) -5°C | (4) 4°C |

104 Which diagram most accurately represents the diameter of the Moon and the diameter of Earth?



105 The end product of the weathering of gabbro or basalt rocks is a solution of dissolved material that most likely would contain high amounts of

- 1 iron and magnesium
- 2 magnesium and potassium
- 3 aluminum and iron
- 4 aluminum and potassium

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.

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

Group 4

- 71 1 2 3 4
- 72 1 2 3 4
- 73 1 2 3
- 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 4

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

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, January 28, 1998 — 1:15 to 4:15 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 | 4 |
| 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.

Tear Here

Tear Here