

REGENTS REVIEW PACKETS

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Packet Number: _____ Score _____

Material Covered: Topic 13-14 Review Basic ON
Geologic History and LANDSCAPES

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REGENTS REVIEW PACKETS

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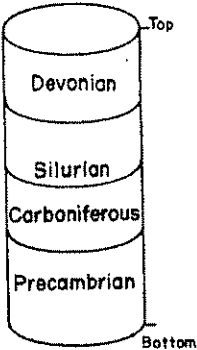
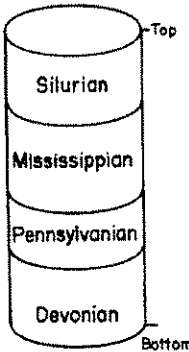
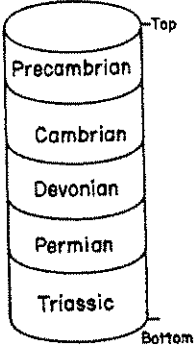
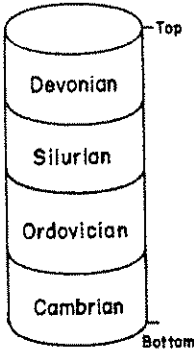
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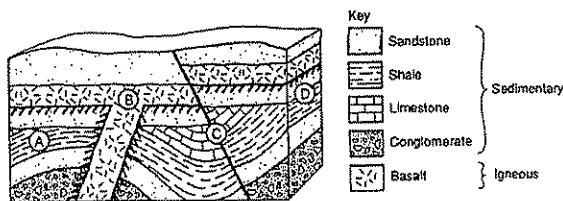
1. Older layers of rock may be found on top of younger layers of rock as a result of

- (1) weathering processes
- (2) igneous extrusions
- (3) joints in the rock layers
- (4) overturning of rock layers

2. A deep drill core was taken through the bedrock at Ithaca, New York. Assume the rock layers have not been overturned and that no unconformity exists. Which diagram best represents the drill core obtained?

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

3. Base your answer on the geologic cross section below.



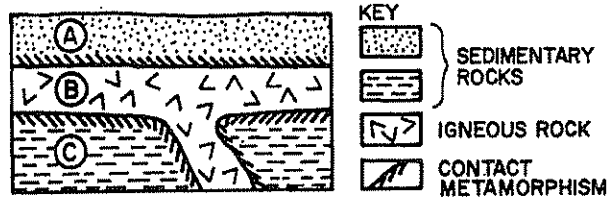
Which geologic event occurred most recently?

- (1) folding at *A*
- (2) the intrusion at *B*
- (3) faulting at *C*
- (4) the unconformity at *D*

4. The age of an igneous intrusion is 50 million years. What is the most probable age of the rock immediately surrounding the intrusion?

- (1) 10 million years
- (2) 25 million years
- (3) 40 million years
- (4) 60 million years

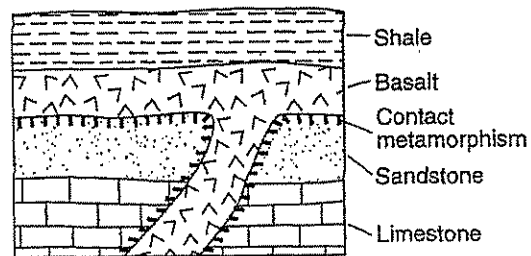
5. The diagram below represents layers of rock.



Rock layer *A* is inferred to be older than intrusion *B* because

- (1) layer *A* is composed of sedimentary rocks
- (2) parts of layer *A* were altered by intrusion *B*
- (3) layer *B* is located between layer *A* and layer *C*
- (4) parts of layer *C* were altered by intrusion *B*

6. Which statement correctly describes an age relationship in the geologic cross section below?

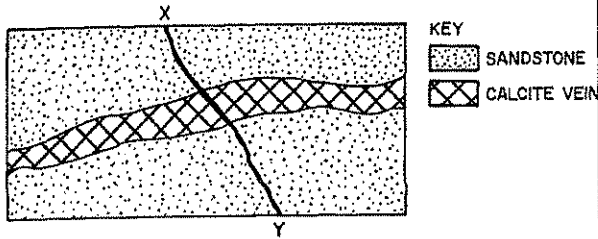


- (1) The sandstone is younger than the basalt.
- (2) The shale is younger than the basalt.
- (3) The limestone is younger than the shale.
- (4) The limestone is younger than the basalt.

7. What is the relative age of a fault that cuts across many rock layers?

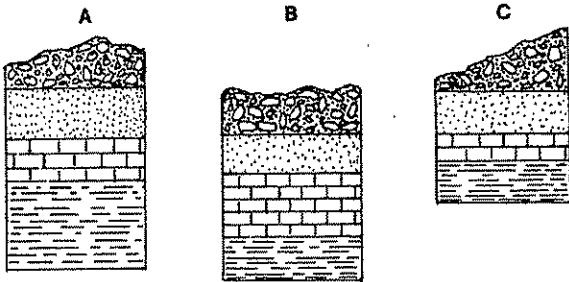
- (1) The fault is younger than all the layers it cuts across.
- (2) The fault is older than all the layers it cuts across.
- (3) The fault is the same age as the top layer it cuts across.
- (4) The fault is the same age as the bottom layer it cuts across.

8. The diagram below represents a layer of sandstone containing a vein of calcite and a crack labeled *XY*.



Which is oldest?

- (1) the calcite vein
 - (2) the crack labeled *XY*
 - (3) the sandstone layer
 - (4) the individual sand grains in the rock
9. Shark and coral fossils are found in the rock record of certain land areas. What does the presence of these fossils indicate about those areas?
- (1) They have undergone glacial deposition.
 - (2) They were once covered by thick vegetation.
 - (3) They have undergone intense metamorphism.
 - (4) They were once covered by shallow seas.
10. According to the *Earth Science Reference Tables*, near which community in New York State would you be *least* likely to find fossils?
- (1) Old Forge
 - (2) Albany
 - (3) Elmira
 - (4) Watertown
11. The diagram below represents cross sections of three rock outcrops approximately 100 kilometers apart. What would be the best method of correlating the rock layers of each outcrop?



- (1) comparing rock types
- (2) comparing mineral composition
- (3) comparing index fossils
- (4) comparing thickness of rock layers

12. Which characteristics of a fossil would make it useful as an index fossil in determining the relative age of widely separated rock layers?
 - (1) a wide time range and a narrow geographic range
 - (2) a wide time range and a wide geographic range
 - (3) a narrow time range and a wide geographic range
 - (4) a narrow time range and a narrow geographic range
13. According to the *Earth Science Reference Tables*, at which location could a geologist find shale containing eurypterid fossils?
 - (1) Old Forge
 - (2) Syracuse
 - (3) New York City
 - (4) Long Island
14. The best indicator of an area's ancient environmental conditions and climates would be the
 - (1) type and distribution of fossils
 - (2) present plant and animal life
 - (3) banding patterns of metamorphosed rocks
 - (4) amount of carbon-14 found in sedimentary layers
15. In order for an organism to be used as an index fossil, the organism must have been geographically widespread and must have
 - (1) lived on land
 - (2) lived in shallow water
 - (3) been preserved by volcanic ash
 - (4) existed for a geologically short time
16. Volcanic ash layers may serve as excellent time markers in the geologic rock record because most volcanic ash
 - (1) contains fine-textured particles
 - (2) contains many minerals
 - (3) has a very low resistance to weathering
 - (4) is rapidly deposited over a wide geographic area
17. According to the *Earth Science Reference Tables*, which event occurred most recently in New York State?
 - (1) Taconian orogeny
 - (2) extinction of dinosaurs
 - (3) formation of the ancestral Adirondacks
 - (4) intrusion of the Palisades Sill
18. Which statement about the species of animals and plants that lived on Earth in the past is best supported by the fossil record?
 - (1) Most became extinct.
 - (2) Most lived on the land.
 - (3) Most were preserved in metamorphic rock.
 - (4) Most appeared during the Cambrian Period.
19. The Geologic Time Scale has been subdivided into a number of time units called periods on the basis of
 - (1) fossil evidence
 - (2) rock thicknesses
 - (3) rock types
 - (4) radioactive dating

20. Using the information in the *Earth Science Reference Tables*, students plan to construct a geologic time line of the Earth's history from its origin to the present time. They will use a scale of 1 meter equals 1 billion years. What should be the total length of the students' time line?

- (1) 10.0 m (3) 3.8 m
 (2) 2.5 m (4) 4.5 m

21. According to the *Earth Science Reference Tables*, dinosaur footprints may be preserved in Triassic and Jurassic rock. In which section of New York State would these footprints most likely be found?

- (1) northeastern (3) central
 (2) southwestern (4) southeastern

22. According to the *Earth Science Reference Tables*, when did the last dinosaurs become extinct?

- (1) 66 million years ago (3) 187 million years ago
 (2) 97 million years ago (4) 230 million years ago

23. A skull was discovered that has human characteristics and is about 2.8 million years old. Based on this information, during which epoch could early humans have existed? [Refer to the *Earth Science Reference Tables*.]

- (1) Pliocene (3) Oligocene
 (2) Miocene (4) Eocene

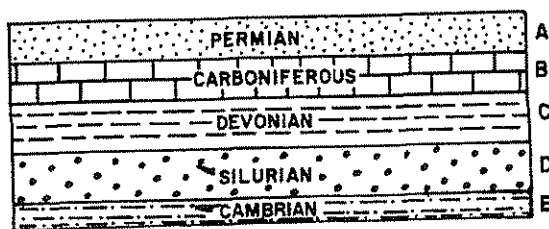
24. According to the *Earth Science Reference Tables*, studies of the rock record suggest that

- (1) the period during which humans have existed is very brief compared to geologic time
 (2) evidence of the existence of humans is present over much of the geologic past
 (3) humans first appeared at the time of the intrusion of the Palisades sill
 (4) the earliest humans lived at the same time as the dinosaurs

25. According to the *Earth Science Reference Tables*, which geologic event is associated with the Grenville Orogeny?

- (1) the initial opening of the Atlantic Ocean
 (2) the separation of South America from Africa
 (3) the formation of the ancestral Adirondack Mountains
 (4) the advance and retreat of the last continental ice sheet

26. The diagram below represents various sedimentary rock layers and the geologic periods during which they formed. According to the *Earth Science Reference Tables*, between which rock layers does a geologic time gap exist?



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

27. Unconformities (buried erosional surfaces) are good evidence that

- (1) many life-forms have become extinct
 (2) the earliest life-forms lived in the sea
 (3) part of the geologic rock record is missing
 (4) metamorphic rocks have formed from sedimentary rocks

28. New York State has no bedrock from which geologic time period?

- (1) Cambrian (3) Permian
 (2) Devonian (4) Cretaceous

29. Base your answer to the following question on the *Earth Science Reference Tables*.

At which location in New York State would one least expect to find fossils in the surface bedrock?

- (1) 42° N., 79° W. (3) 44° N., 74° W.
 (2) 43° N., 76° W. (4) 42° N., 75° W.

30. According to the *Earth Science Reference Tables*, the rock record preserved in New York State indicates that

- (1) Jurassic rock is very abundant
 (2) early Paleozoic rock is very abundant
 (3) dinosaurs existed at the time of the Taconian Orogeny
 (4) the Palisades Sill formed before the extinction of the trilobites

31. Base your answer to the following question on the *Earth Science Reference Tables*.

Where in New York State is Precambrian anorthosite bedrock found?

- (1) Atlantic Coastal Lowlands (3) Appalachian Uplands
 (2) Erie-Ontario Lowlands (4) Adirondack Highlands

32. According to the *Earth Science Reference Tables*, what is the geologic age of the salt and gypsum deposits found in New York State bedrock?

- (1) Triassic (3) Silurian
 (2) Devonian (4) Cambrian

33. According to the *Earth Science Reference Tables*, which geologic event occurred most recently in New York State?

- (1) A continental glacier covered most of the State.
- (2) The entire State was uplifted from below sea level.
- (3) The Palisades Sill intruded.
- (4) The Taconic Mountains formed.

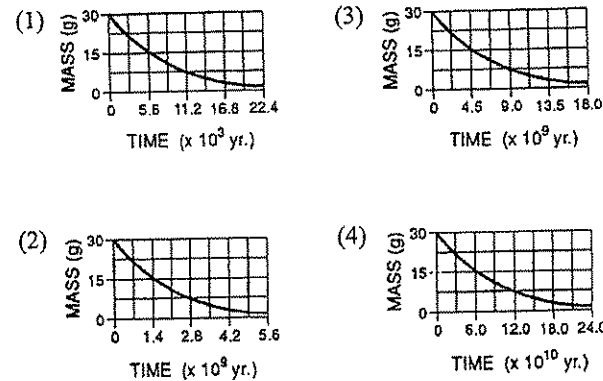
34. Why are radioactive substances useful for measuring geologic time?

- (1) The disintegration of radioactive substances occurs at a predictable rate.
- (2) The ratio of decay products to undecayed products remains constant in sedimentary rocks.
- (3) The half-lives of most radioactive substances are shorter than five minutes.
- (4) Measurable samples of radioactive substances are easily collected from most rock specimens.

35. If a radioactive material were cut into pieces, the half-life of each piece would be

- (1) less than the original specimen's half-life
- (2) greater than the original specimen's half-life
- (3) the same as the original specimen's half-life

36. According to the *Earth Science Reference Tables*, which graph best represents the decay rate of potassium-40?



37. The decay rates of radioactive substances remain constant when the substances are subjected to different temperature and pressure conditions. The best inference that can be drawn from this statement is that decay rates are

- (1) independent of external factors
- (2) independent of the isotope's composition
- (3) affected by the mass of the isotope
- (4) affected by pressure, but not by temperature

38. An archeologist found an ancient skeleton estimated to be 10,000 to 25,000 years old. Which radioactive isotope would be most useful for finding the age of the skeleton?

- (1) carbon-14
- (2) potassium-40
- (3) uranium-238
- (4) rubidium-87

39. The half-life of a radioactive substance is mainly controlled by the

- (1) amount of the substance
- (2) composition of the substance
- (3) pressure acting on the substance
- (4) temperature of the substance

40. Why is carbon-14 *not* usually used to accurately date objects more than 50,000 years old?

- (1) Carbon-14 has a relatively short half-life and too little carbon-14 is left after 50,000 years.
- (2) Carbon-14 has a relatively long half-life and not enough carbon-14 has decayed after 50,000 years.
- (3) Carbon-14 has been introduced as an impurity in most materials older than 50,000 years.
- (4) Carbon-14 has only existed on Earth during the last 50,000 years.

41. The age of a Moon rock can be found by analyzing a sample to compare the relative amounts of

- (1) U^{238} and Pb^{206}
- (2) U^{238} and C^{14}
- (3) C^{14} and Pb^{206}
- (4) U^{238} and Si^{87}

42. The table below gives information about the radioactive decay of carbon-14. [Part of the table has been left blank for student use.]

Half-Life	Mass of Original C-14 Remaining (grams)	Number of Years
0	1	0
1	$\frac{1}{2}$	5,700
2	$\frac{1}{4}$	11,400
3	$\frac{1}{8}$	17,100
4		
5		
6		

What is the amount of the original carbon-14 remaining after 34,200 years?

- (1) $\frac{1}{8}$ g
- (2) $\frac{1}{16}$ g
- (3) $\frac{1}{32}$ g
- (4) $\frac{1}{64}$ g

43. An ancient bone was analyzed and found to contain carbon-14 that had decayed for nearly two half-lives. According to the *Earth Science Reference Tables*, approximately how old is the bone?

- (1) 1,400 years
- (2) 2,800 years
- (3) 5,600 years
- (4) 11,000 years

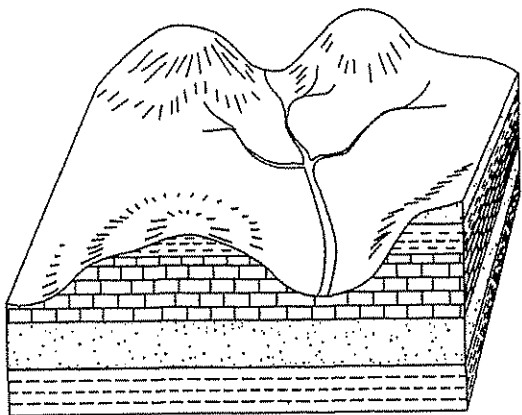
44. According to the *Earth Science Reference Tables*, which inference can be made about the fossil record?

- (1) Very few life forms have become extinct.
- (2) Fossils were extremely rare for most of the geologic past.
- (3) A great variety of plants and animals existed during the Precambrian Era.
- (4) Primitive humans have existed through most of the geologic past.

45. Which animals do scientists believe could have been hunted by humans, based on evidence such as stone spearpoints found embedded in the animals' bones?

- (1) dinosaurs
- (2) mammoths
- (3) armored fishes
- (4) trilobites

46. The geologic cross section below shows surface landscape features that developed because of a humid climate.



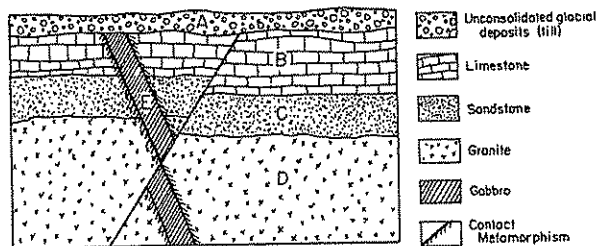
Which change will eventually be observed if the climate of the area becomes very arid?

- (1) The rate of chemical weathering will increase.
- (2) The elevation of the entire region will increase.
- (3) The landscape will gradually become more rounded.
- (4) The slopes will gradually become steeper and more angular.

47. Trilobite fossils from different time periods show small changes in appearance. These observations suggest that the changes may be the result of

- (1) evolutionary development
- (2) a variety of geologic processes
- (3) periods of destruction of the geologic record
- (4) the gradual disintegration of radioactive substances

Base your answers to questions 48 through 52 on your knowledge of Earth science, the *Earth Science Reference Tables*, and the diagram below showing a cross-sectional view of an outcrop found in New York State today in which overturning has not occurred.



48. In which layer would fossils least likely be found?

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

49. Which geologic event occurred most recently at this location?

- (1) deposition of the glacial material (till)
- (2) faulting
- (3) cooling of the granite
- (4) intrusion of the basalt

50. Which Layer has not been altered at any point by intense heat?

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

51. Which statement best explains why rock layer B is thinner on the extreme left side of the diagram than it is on the extreme right side of the diagram?

- (1) Igneous intrusion E destroyed part of rock layer B.
- (2) Rock layer B is an igneous rock.
- (3) Due to uplifting, one part of rock layer B was eroded more than the other part.
- (4) Fewer sediments were deposited at one part of rock layer B than at the other part.

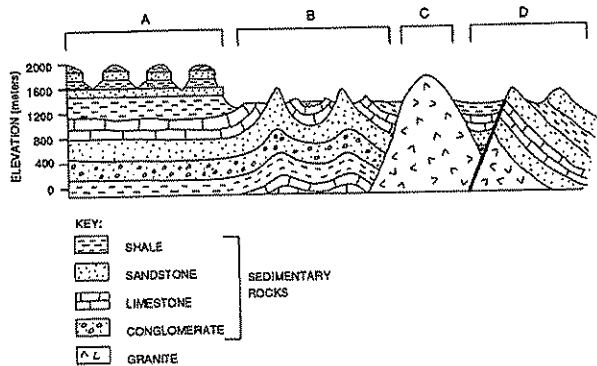
52. If rock layer C was deposited in New York State during the Devonian Period, then rock layer B could only have been deposited during which period? [Use the *Earth Science Reference Tables* .]

- (1) Cambrian
- (2) Devonian
- (3) Permian
- (4) Jurassic

Base your answers to questions 53 and 54 on the *Earth Science Reference Tables*.

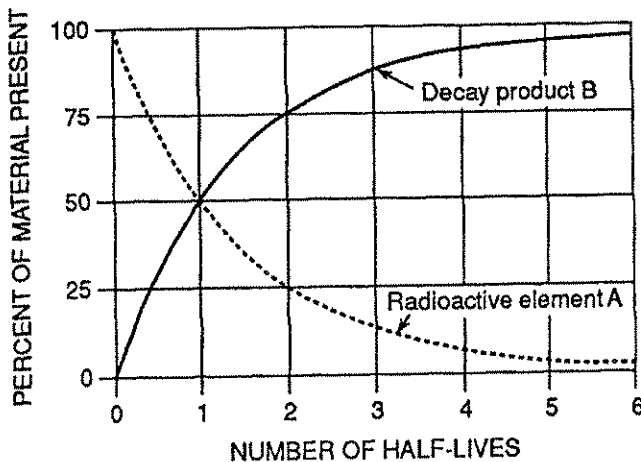
53. Which event was taking place during the Triassic Period?
- (1) The Grenvillian Orogeny was raising the Adirondack Mountains.
 - (2) The most recent continental glaciers were melting over much of North America.
 - (3) The Palisades sill was intruding in the area of New York State.
 - (4) Many kinds of marine animals, including trilobites, were becoming extinct.
54. According to fossil evidence in the rock record, humans have existed on Earth for approximately what percentage of geologic time?
- (1) less than 1%
 - (2) 6%
 - (3) 15%
 - (4) 57%

Base your answers to questions 55 through 58 on the diagram below. The diagram represents a geologic cross section in which no overturning has occurred. The letters identify specific regions in the cross section.



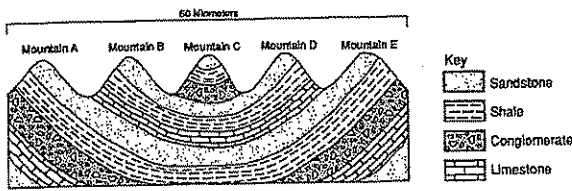
55. The surface features in region *A* were produced primarily as a result of the process of
- (1) folding
 - (2) faulting
 - (3) erosion
 - (4) glaciation
56. Which type of crustal movement is shown in region *B*?
- (1) faulting
 - (2) volcanic eruptions
 - (3) jointing
 - (4) folding
57. Which region shows the typical characteristics of a plateau?
- (1) *A*
 - (2) *B*
 - (3) *C*
 - (4) *D*
58. Which region is *least* likely to have fossils in the surface bedrock?
- (1) *A*
 - (2) *B*
 - (3) *C*
 - (4) *D*

Base your answers to questions 59 through 62 on the *Earth Science Reference Tables* and the graph below. The graph shows the rate of radioactive decay of element *A* and the rate at which decay product *B* is formed.



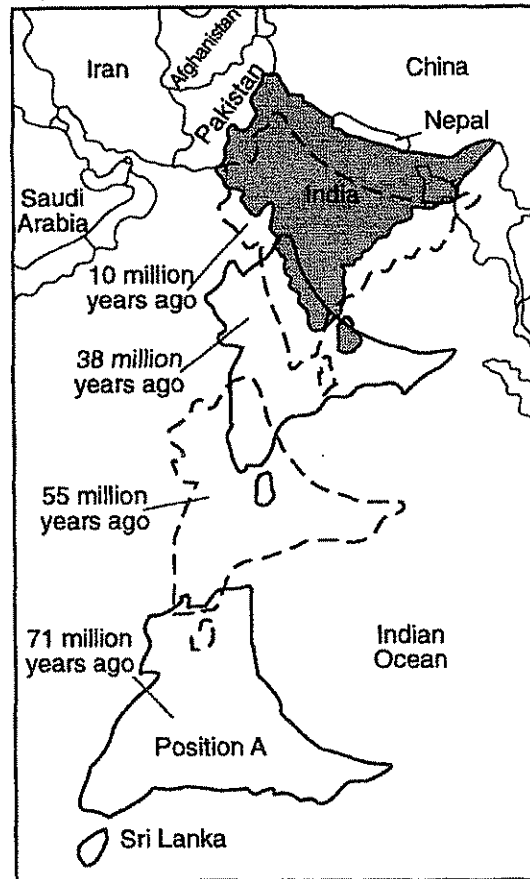
59. According to the graph, what is the total percentage of radioactive element *A* present after 3 half-lives?
- (1) 12.5%
 - (2) 25.0%
 - (3) 75.0%
 - (4) 87.5%
60. An igneous rock contains 2 grams of radioactive element *A* and 2 grams of decay product *B*. How old is the rock sample?
- (1) 1 half-life
 - (2) 2 half-lives
 - (3) 3 half-lives
 - (4) less than 1 half-life
61. If the half-life of radioactive element *A* is 10,000 years, for which time interval would this element be most useful in determining the age of rock?
- (1) Precambrian
 - (2) Devonian
 - (3) Mississippian
 - (4) Pleistocene
62. Two rocks containing radioactive element *A* were taken from a mine. One had a mass of 2 grams; the other had a mass of 4 grams. Compared to the half-life of element *A* in the 4-gram sample, the half-life of element *A* in the 2-gram sample will be
- (1) shorter
 - (2) longer
 - (3) the same

Base your answers to questions 63 through 66 on the *Earth Science Reference Tables* and the diagram below. The diagram represents a geologic cross section of a portion of the Earth's crust. The rock layers have not been overturned.



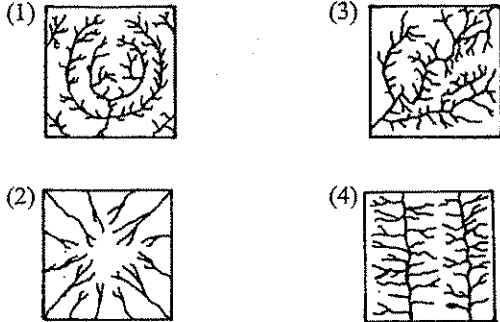
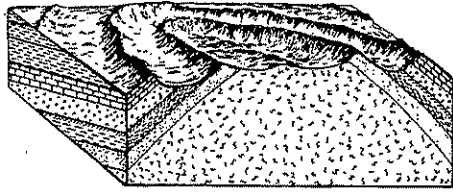
63. The top of which mountain is composed of the youngest bedrock?
 (1) A (3) C
 (2) B (4) D
64. The two conglomerate layers represented in the diagram have the same texture, but only one layer contains sandstone pebbles. This observation leads to the inference that these two rock layers probably were
 (1) affected by contact metamorphism
 (2) solidified deep in the Earth's interior
 (3) formed from sediments originating from different sources
 (4) formed from sediments deposited at the same time
65. Which type of rock appears to be most resistant to weathering?
 (1) sandstone (3) conglomerate
 (2) shale (4) limestone
66. Which inference is best supported by this diagram?
 (1) The region shows no evidence of crustal movement.
 (2) The region shows evidence of several extinct volcanoes.
 (3) The region has had extensive folding.
 (4) The region has had extensive faulting.

Base your answers to questions 67 and 68 on the map below. The map represents the movement of tectonic plates that resulted in the collision of India with Asia. Scientists believe that 71 million years ago, India was at position A.

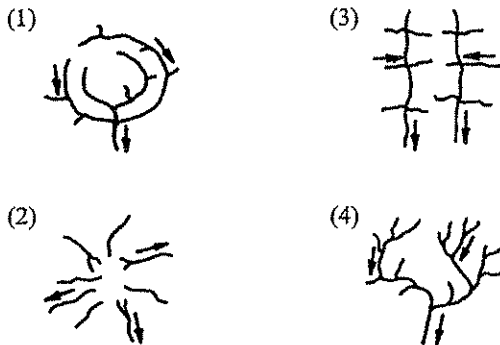


67. Which present-day geologic feature in Nepal resulted from this collision?
 (1) a rift valley (3) an oceanic ridge
 (2) a mountain range (4) an oceanic trench
68. Which life-forms were living on Earth when India was at position A?
 (1) humans (3) trilobites
 (2) dinosaurs (4) armored fishes

69. Which kind of stream pattern would most likely be found on the type of landscape shown in the diagram?



70. Which stream drainage pattern would most likely develop on the surface of a volcano?



71. Which feature would most likely indicate the boundary between two landscape regions?

- (1) deposits of unsorted sediments adjacent to polished and scratched bedrock
 (2) a sharp change in elevation between two different adjoining bedrock structures
 (3) a large stream flowing down a long V-shaped valley
 (4) bedrock containing two distinctly different fossil types

72. According to the *Earth Science Reference Tables*, which city is located in the St. Lawrence Lowlands?

- (1) Kingston (2) Massena (3) Rochester (4) Albany

73. According to the *Earth Science Reference Tables*, which city is located in a landscape region showing distorted and altered bedrock structure?

- (1) Old Forge (2) Niagara Falls (3) Syracuse (4) Binghamton

74. Which evidence could be used to help classify a landscape region as a plateau?

- (1) rounded peaks (2) trellis drainage pattern (3) V-shaped river valleys (4) horizontal rock structure

75. According to the *Earth Science Reference Tables*, which New York State landscape surface is composed of gneisses, quartzites, marbles, and anorthositic bedrock?

- (1) Allegheny Plateau (2) Erie-Ontario Lowlands (3) the Catskills (4) Adirondack Mountains

76. The surface bedrock of the Hudson Highlands is best described as

- (1) Middle Proterozoic gneisses and quartzites
 (2) unconsolidated Cretaceous gravels, sands, and clays
 (3) Pennsylvanian conglomerates and sandstones
 (4) Devonian limestones and shales

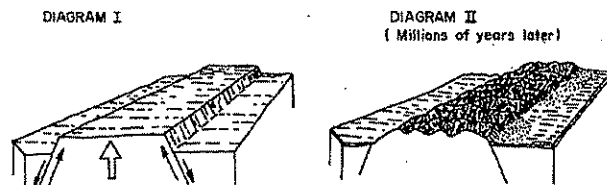
77. Which New York State landscape region is composed mainly of metamorphosed surface bedrock?

- (1) Taconic Mountains (2) Allegheny Plateau (3) Atlantic Coastal Plain (4) Erie-Ontario Lowlands

78. The Tug Hill Plateau is classified as a plateau because the landscape has

- (1) low elevation and nearly horizontal bedrock structure
 (2) high elevation and nearly horizontal bedrock structure
 (3) low relief and deformed bedrock structure
 (4) high relief and deformed bedrock structure

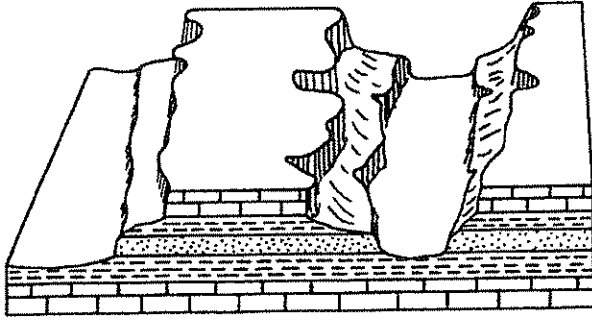
79. The diagrams below show the same region of the Earth's crust at two different times.



These diagrams seem to indicate that landscape features are the result of

- (1) only uplifting forces within the Earth's crust
 (2) only leveling forces within the Earth's crust
 (3) both uplifting and leveling forces acting on the Earth's crust
 (4) neither uplifting nor leveling forces acting on the Earth's crust

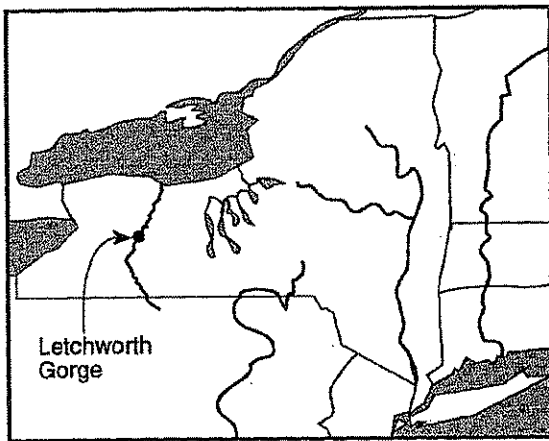
80. Base your answer on the diagram below.



Which change would probably be noted if the climate in this area became more humid?

- (1) The elevation of the entire region will increase.
- (2) The rate of erosion will decrease.
- (3) The landscape features will become more rounded.
- (4) The limestone will weather more slowly.

Base your answers to questions 81 through 85 on the *Earth Science Reference Tables* and the New York State map below. The map shows the location of Letchworth Gorge, called the Grand Canyon of the East.



81. Which river is responsible for the erosion of Letchworth Gorge?

- | | |
|------------|-------------|
| (1) Mohawk | (3) Niagara |
| (2) Hudson | (4) Genesee |

82. In which landscape region of New York State is Letchworth Gorge located?

- | | |
|---------------------------|----------------------|
| (1) Erie-Ontario Lowlands | (3) Catskills |
| (2) Allegheny Plateau | (4) Tug Hill Plateau |

83. Letchworth Gorge is located at approximately

- | | |
|------------------------|------------------------|
| (1) 43°00' N, 77°00' W | (3) 41°35' N, 78°30' W |
| (2) 42°35' N, 78°00' W | (4) 41°00' N, 77°30' W |

84. Which feature provides the best evidence that Letchworth Gorge formed as a result of running water?

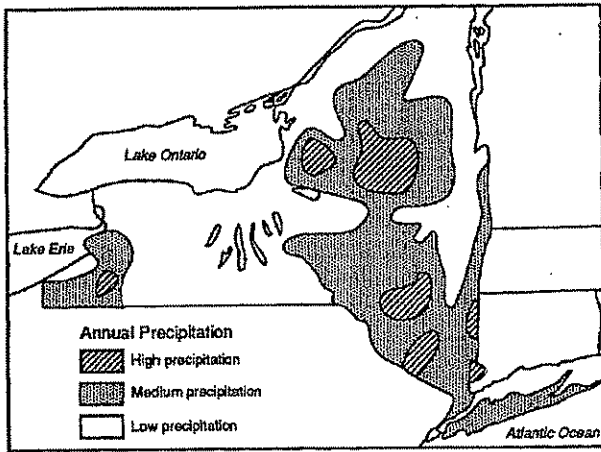
- (1) bedrock containing marine fossils
- (2) striations on the surface bedrock
- (3) a steep V-shaped valley
- (4) deep residual soil

85. Which rocks are most likely visible at Letchworth Gorge?

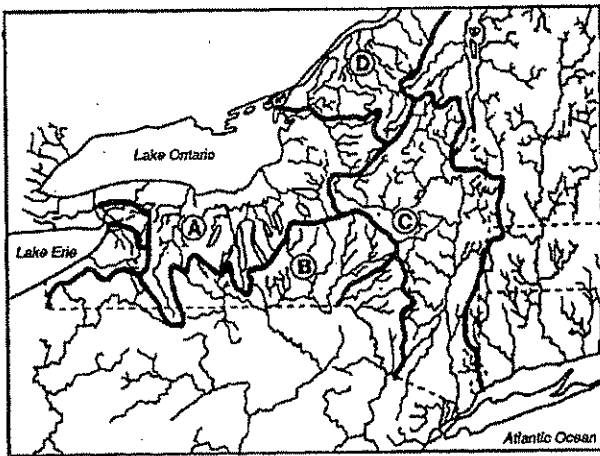
- (1) conglomerate and sandstone
- (2) gneiss and quartzite
- (3) dolostone and marble
- (4) shale and schist

Base your answers to questions 86 through 89 on the *Earth Science Reference Tables* and the maps below. Map I shows the relative annual precipitation in areas of New York State. Map II shows the watershed boundaries in New York State with four watersheds labeled A through D.

MAP I - PRECIPITATION AREAS



MAP II - WATERSHEDS

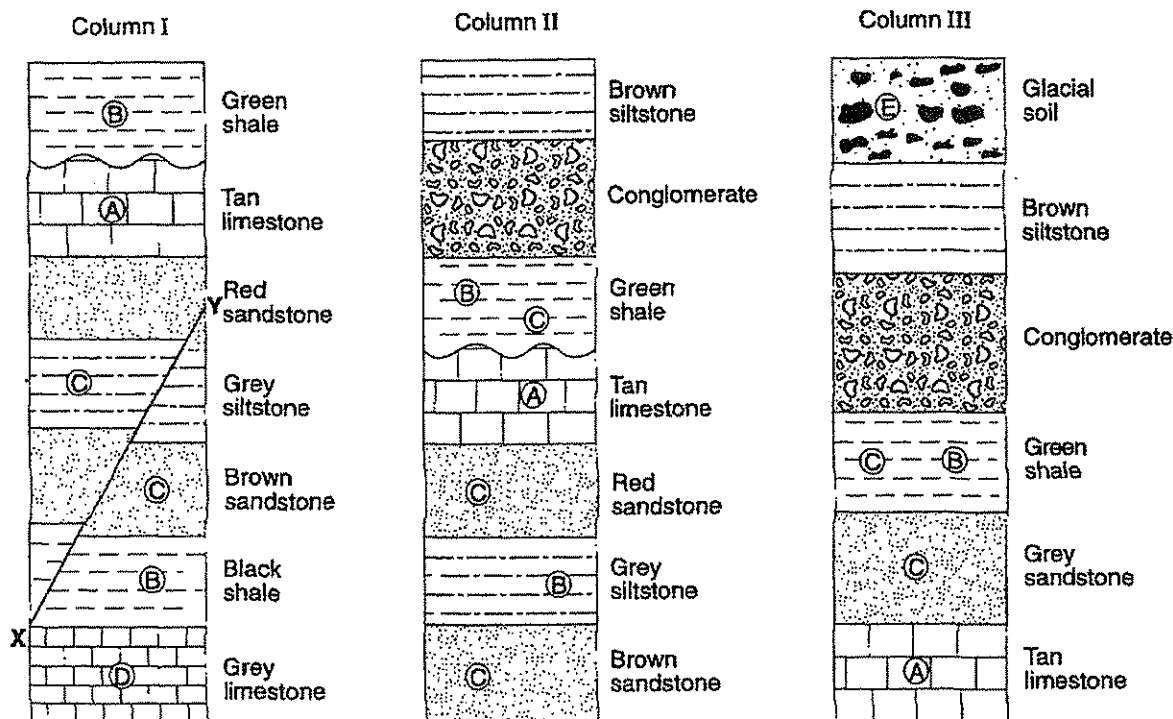


86. The pattern of stream drainage shown on map II is influenced most by the
- (1) structural features of the bedrock
 - (2) differences in soil associations
 - (3) activities of humans
 - (4) temperature of the area
87. Streams in the Hudson-Mohawk Lowlands eventually flow into
- (1) Lake Erie
 - (2) Lake Ontario
 - (3) Lake Champlain
 - (4) the Atlantic Ocean
88. Most high-precipitation areas of New York State have
- (1) relatively high elevations
 - (2) relatively warm temperatures
 - (3) Atlantic Coastal Plain locations
 - (4) volcanic bedrock

89. In which watershed area is the source region for the Susquehanna River located?
- (1) A
 - (2) B
 - (3) C
 - (4) D
-
90. According to the *Earth Science Reference Tables*, which geologic event is associated with the Grenville Orogeny?
- (1) the formation of the ancestral Adirondack Mountains
 - (2) the advance and retreat of the last continental ice sheet
 - (3) the separation of South America from Africa
 - (4) the initial opening of the Atlantic Ocean
91. The landscape of northeastern New York State was formed mainly by
- (1) mountain building and glacial erosion
 - (2) faulting and volcanic activity
 - (3) changes in the water level of Lake Ontario
 - (4) erosion of Devonian sedimentary bedrock by rivers
92. Which characteristics are used to classify the different landscape regions of New York State?
- (1) latitude, longitude, and county boundaries
 - (2) density of human population and type of industrial activities
 - (3) types of climate and plant life
 - (4) elevation, type of bedrock, and stream drainage systems
93. What is the only difference between the Adirondacks and the Catskills that can be distinguished from the *Earth Science Reference Tables*?
- (1) The Adirondacks have metamorphic bedrock, but the Catskills have sedimentary bedrock.
 - (2) The Adirondacks have mostly rounded hilltops and the Catskills have jagged hilltops.
 - (3) The Catskills have vegetation, but the Adirondacks do not.
 - (4) The Catskills are much higher in elevation than the Adirondacks.
94. According to the *Earth Science Reference Tables*, which New York State landscape region has the lowest elevation, the most nearly level land surface, and is composed primarily of Cretaceous through Pleistocene unconsolidated sediments?
- (1) the Hudson-Mohawk Lowlands
 - (2) the Atlantic Coastal Lowlands
 - (3) the Champlain Lowlands
 - (4) the Erie-Ontario Lowlands
95. Which landscape region separates the Adirondack Mountains from the Catskills?
- (1) Taconic Mountains
 - (2) Tug Hill Plateau
 - (3) Hudson-Mohawk Lowlands
 - (4) Champlain Lowlands

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 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



96. What is the oldest layer shown?
 (1) glacial soil (2) brown sandstone (3) tan limestone (4) grey limestone
97. When did fault *XY*, located in column I, most likely occur?
 (1) before the formation of the grey limestone (3) during the formation of the black shale
 (2) during the formation of the grey siltstone (4) after the formation of the red sandstone
98. Which rock would most likely be produced by the metamorphism of the grey limestone?
 (1) quartzite (2) slate (3) marble (4) gneiss
99. 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
100. 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

