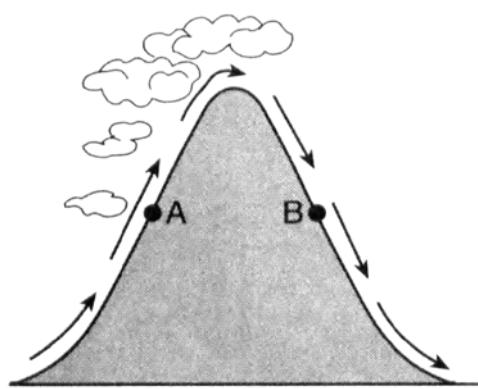


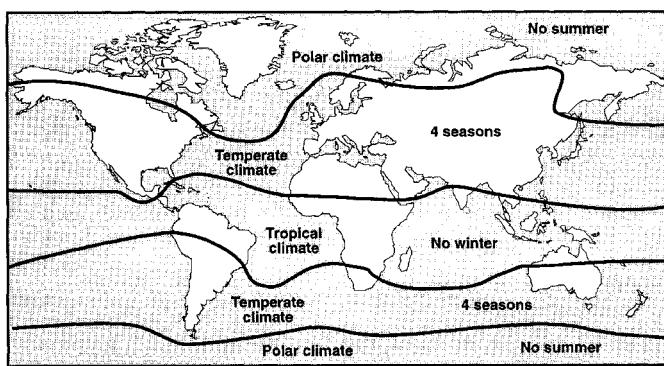
# Water & Climate Review

1. The cross section below shows the direction of air flowing over a mountain. Points A and B are at the same elevation on opposite sides of the mountain.



Compared to the air temperature and humidity at point A, the air temperature and humidity at point B are usually

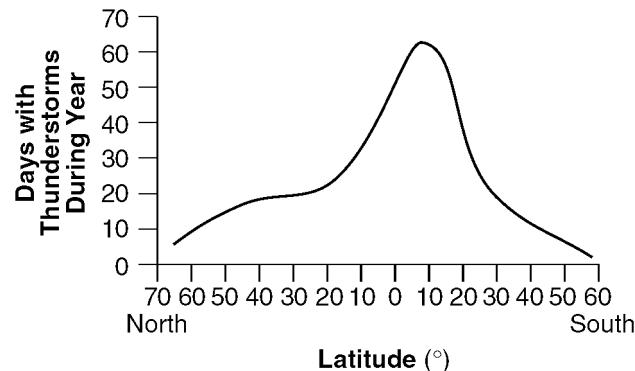
- 1) cooler and drier      3) warmer and drier
  - 2) cooler and wetter      4) warmer and wetter
2. The map below shows the major climate zones on Earth.



The primary factor controlling these climate zones is

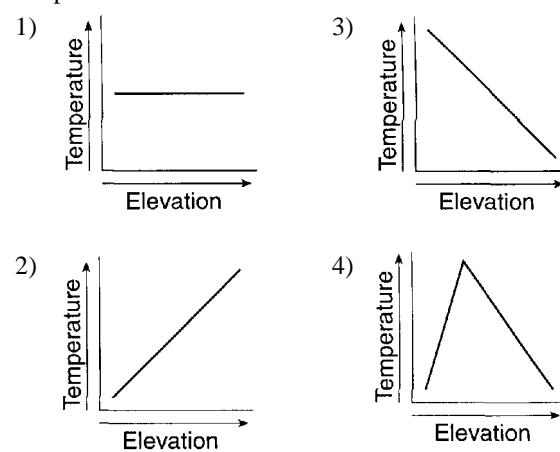
- 1) elevation      3) latitude
  - 2) solar time      4) longitude
3. Which single factor generally has the greatest effect on the climate of an area on the Earth's surface?
- 1) the distance from the Equator
  - 2) the extent of vegetative cover
  - 3) the degrees of longitude
  - 4) the month of the year

4. The graph below shows the average number of days each year that thunderstorms occur at different latitudes on Earth.



According to the graph, what is the approximate number of days each year that thunderstorms occur at locations along the 40°N parallel of latitude?

- 1) 8 days      3) 24 days
  - 2) 18 days      4) 32 days
5. Which graph best shows the general effect that differences in elevation above sea level have on the average annual temperature?



6. Which ocean current carries cool water toward Earth's equator?

- 1) Alaska Current      3) Peru Current
- 2) East Australia Current      4) North Atlantic Current

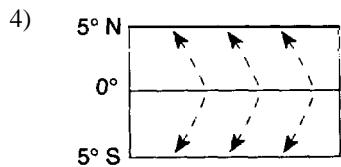
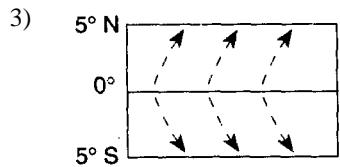
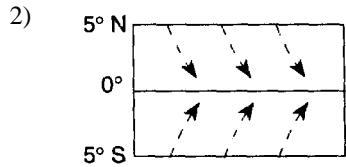
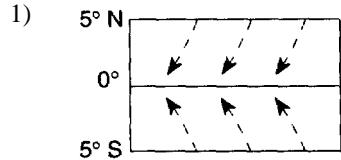
7. Which ocean current transports warm water away from Earth's equatorial region?

- 1) Brazil Current      3) Falkland Current
- 2) Guinea Current      4) California Current

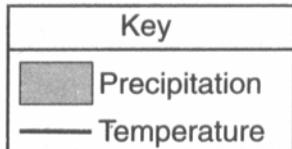
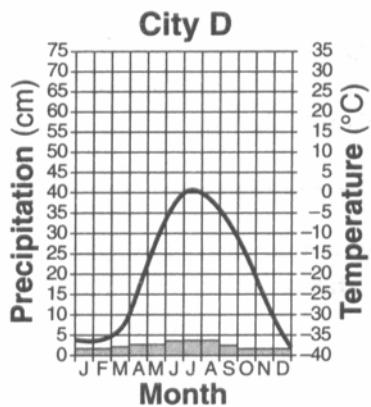
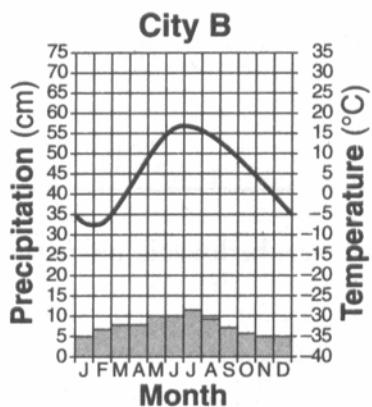
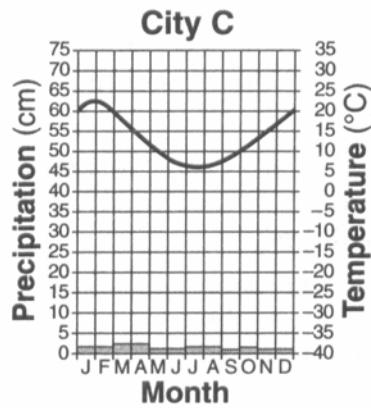
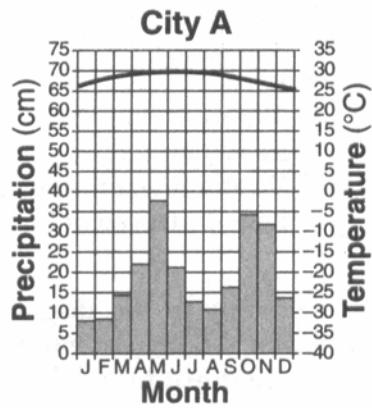
8. Most of the Gulf Stream Ocean Current is

- 1) warm water that flows southwestward
- 2) warm water that flows northeastward
- 3) cool water that flows southwestward
- 4) cool water that flows northeastward

9. According to the *Earth Science Reference Tables*, the prevailing winds at 45° S latitude are from the
- 1) southwest                    3) southeast
  - 2) northwest                    4) northeast
10. Which map correctly shows the general pattern of flow of prevailing surface winds near the Equator on March 21?

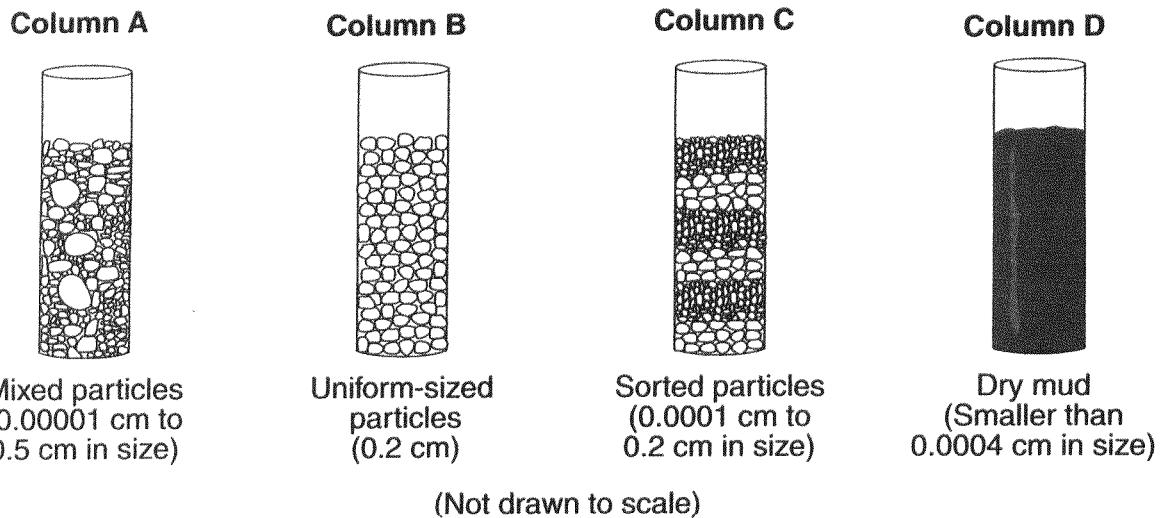


Base your answers to questions 11 and 12 on the climate graphs below, which show average monthly precipitation and temperatures at four cities, A, B, C, and D.



11. City A has very little variation in temperature during the year because city A is located
- on the dry side of a mountain
  - on the wet side of a mountain
  - near the center of a large landmass
  - near the equator
12. During which season does city B usually experience the month with the highest average precipitation?
- spring
  - summer
  - fall
  - winter
-

13. The columns A, B, C, and D shown below contain equal volumes of sediment.



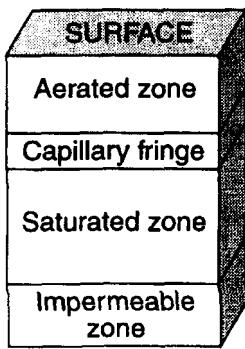
When an equal volume of water is added to each column, the greatest rate of infiltration will occur in which column?

- 1) A      2) B      3) C      4) D

14. Which surface soil conditions allow the most infiltration of rainwater?

- 1) steep slope and permeable soil
- 2) steep slope and impermeable soil
- 3) gentle slope and permeable soil
- 4) gentle slope and impermeable soil

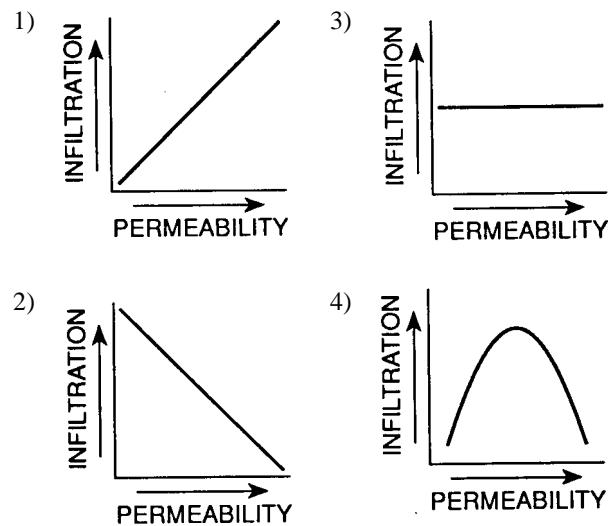
15. The diagram below represents zones within soil and rock. The zones are determined by the kinds of movement or lack of movement of water occurring within them.



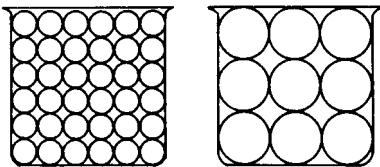
What is the deepest zone into which water can be pulled by gravity?

- 1) aerated zone      3) saturated zone
- 2) capillary fringe      4) impermeable zone

16. Which graph best represents the relationship between soil permeability rate and infiltration when all other conditions are the same?



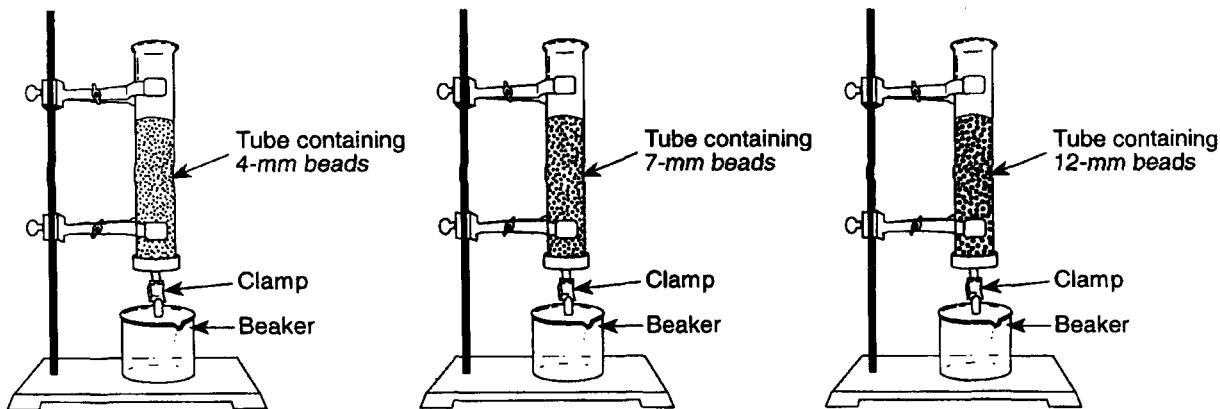
17. The diagrams below represent two identical containers filled with nonporous uniform particles. The containers represent models of two different sizes of soil particles.



Compared to the model containing larger particles, the model containing smaller particles has

- 1) less permeability and greater porosity
  - 2) greater porosity and greater capillarity
  - 3) less permeability and greater capillarity
  - 4) greater permeability and greater porosity
18. A rock with a high porosity will probably
- 1) be resistant to weathering
  - 2) be composed of large grains
  - 3) have a large percentage of space between particles
  - 4) have a small percentage of rounded particles
19. Which condition would cause surface runoff to increase in a particular location?
- 1) covering a dirt road with pavement
  - 2) reducing the gradient of a steep hill
  - 3) planting grasses and shrubs on a hillside
  - 4) having a decrease in the annual rainfall

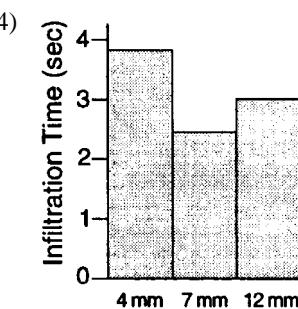
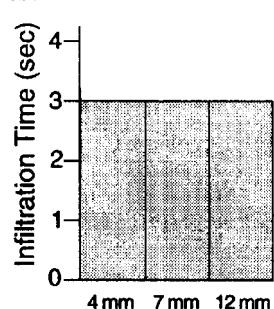
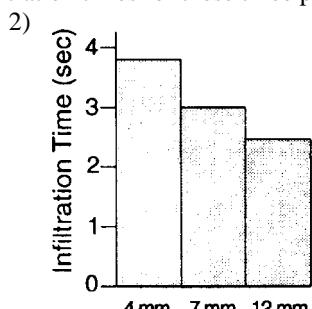
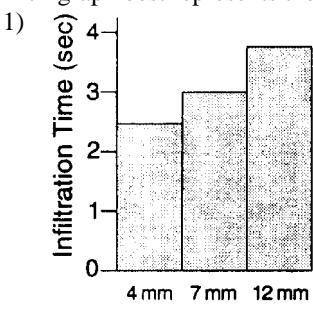
Base your answers to questions **20** through **23** on the diagram, data and information below. The diagram below represents part of the laboratory setup for an activity to investigate the effects of particle size on permeability, porosity, and water retention. Three separate tubes were used, each containing 300 milliliters of beads of uniform size. Bead sizes were 4 millimeters, 7 millimeters, and 12 millimeters in diameter, respectively.



The amount of water added to each tube to cover the beads was determined. The clamp was then removed, the flow of the water was timed, and its volume was measured. Data are shown in the table below. (The amount of water retained on the 7-millimeter beads has been omitted.)

	Particle Size		
	4 mm	7 mm	12 mm
Infiltration Time (seconds)	3.7	3.0	2.4
Amount of Water Needed To Cover All Beads (mL)	147	145	147
Water Recovered from Tube After Clamp Was Removed (mL)	111	123	135
Water Retained on Beads (mL)	36		12

20. Which graph best represents the infiltration times for these three particle sizes?



21. The data table shows that all three tubes of beads had approximately the same  
1) porosity                    2) water retention                    3) permeability time                    4) capillarity

22. Soil composed of which kind of particles would have the longest infiltration time? [Assume that all particles allow some water through.]  
1) pebbles                    2) sand                            3) silt                            4) clay

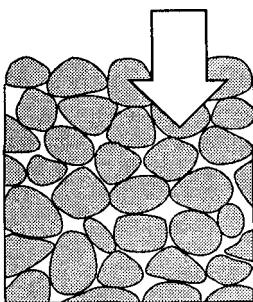
23. Water can infiltrate loose soil when the soil is

- 1) saturated and permeable
- 2) saturated and impermeable

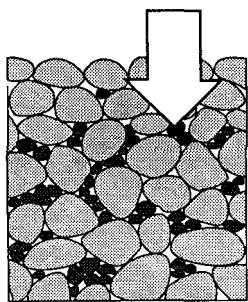
- 3) unsaturated and permeable

- 4) unsaturated and impermeable

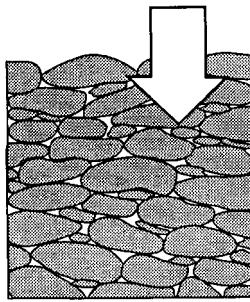
Base your answers to questions **24** and **25** on the diagram below, which represents samples of soil and bedrock at Earth's surface. The arrows represent possible infiltration of rainwater.



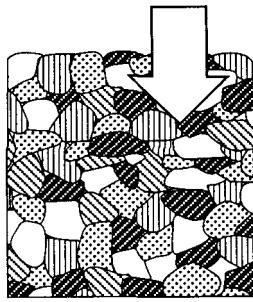
Pebble soil



Pebble-and-sand soil



Conglomerate bedrock



Granite bedrock

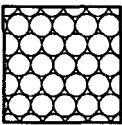
24. The least amount of rainwater will infiltrate the surface of the

- 1) pebble soil
- 2) pebble-and-sand soil
- 3) conglomerate bedrock
- 4) granite bedrock

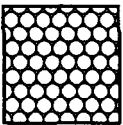
25. Which sample probably has the greatest porosity?

- 1) pebble soil
- 2) pebble-and-sand soil
- 3) conglomerate bedrock
- 4) granite bedrock

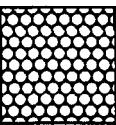
26. Base your answer to the following question on the diagrams below, which represent cross sections of four samples of loosely packed, uniformly sorted soil particles. The diameter of the particles is given below each diagram. All soil samples consist of solid spherical particles.



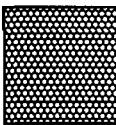
A  
(0.7 cm)



B  
(0.5 cm)



C  
(0.4 cm)

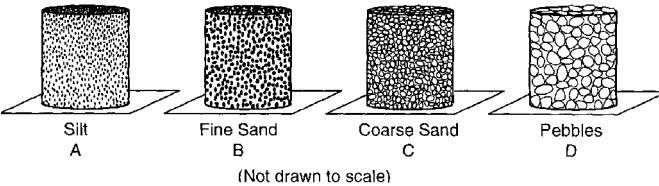


D  
(0.2 cm)

If equal amounts of 0.2-centimeter soil particles are mixed into each sample, which sample's porosity will *not* be affected?

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

Base your answers to questions **27** through **30** on the diagrams below, which 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.



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

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

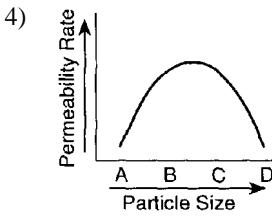
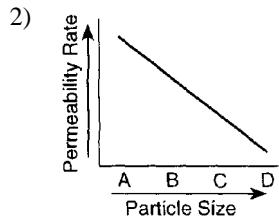
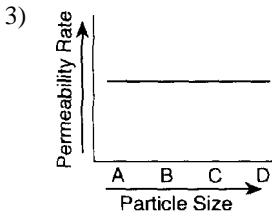
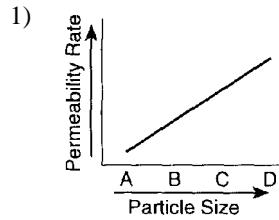
28. Assume that the samples in each container were taken from surface soil in different locations. Which location would produce the *least* amount of runoff during a heavy rainfall?

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

29. 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
- 2) B
- 3) C
- 4) D

30. Which graph best represents the rate of permeability of the samples?



- 
31. The water table usually rises when there is

- 1) a decrease in the amount of infiltration
- 2) a decrease in the amount of surface area covered by vegetation
- 3) an increase in the amount of precipitation
- 4) an increase in the slope of the land

32. During a dry summer, the flow of most large New York State streams generally

- 1) continues because some groundwater seeps into the streams
- 2) increases due to greater surface runoff
- 3) remains unchanged due to transpiration from grasses, shrubs, and trees
- 4) stops completely because no water runs off into the streams

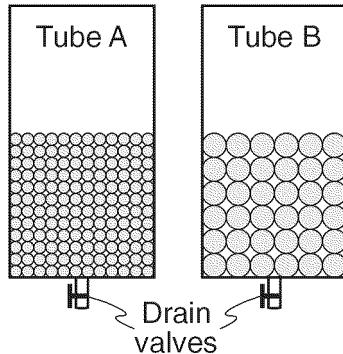
33. During a 3-week period without rain in June, water continued to flow in a small Maryland stream. The water in the stream most likely came from

- 1) the roots of trees along the stream bank
- 2) evapotranspiration in a region far away and unaffected by the dry period
- 3) ground water flowing into the streambed
- 4) condensation on the surface of rocks in the stream

34. An area with a high potential for evapotranspiration has little actual evapotranspiration and precipitation. The climate of this area is best described as

- |                  |                   |
|------------------|-------------------|
| 1) hot and arid  | 3) cold and arid  |
| 2) hot and humid | 4) cold and humid |

35. The diagram below shows tubes A and B partly filled with equal volumes of round plastic beads of uniform size. The beads in tube A are smaller than the beads in tube B. Water was placed in tube A until the pore spaces were filled. The drain valve was then opened, and the amount of time for the water to drain from the tube was recorded. The amount of water that remained around the beads was then calculated and recorded. Data table 1 shows the measurements recorded using tube A.



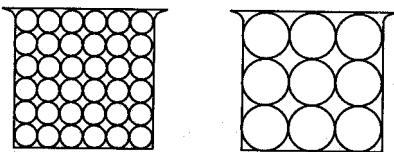
**Data Table 1: Tube A**

Data Table 1: Tube A	
water required to fill pore spaces	124 mL
time required for draining	2.1 sec
water that remained around the beads after draining	36 mL

If the same procedure was followed with tube B, which data table shows the measurements most likely recorded?

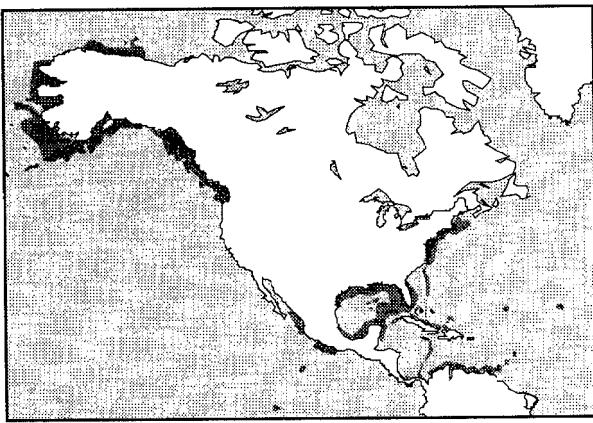
- |    |   |                             |
|----|---|-----------------------------|
| 1) | <b>Data Table 2: Tube B</b>                         | <b>Data Table 2: Tube B</b> |
|    | water required to fill pore spaces                  | 124 mL                      |
|    | time required for draining                          | 1.4 sec                     |
|    | water that remained around the beads after draining | 26 mL                       |
| 3) | water required to fill pore spaces                  | 124 mL                      |
|    | time required for draining                          | 3.2 sec                     |
|    | water that remained around the beads after draining | 36 mL                       |
| 2) | <b>Data Table 2: Tube B</b>                         | <b>Data Table 2: Tube B</b> |
|    | water required to fill pore spaces                  | 168 mL                      |
|    | time required for draining                          | 3.2 sec                     |
|    | water that remained around the beads after draining | 46 mL                       |
| 4) | water required to fill pore spaces                  | 168 mL                      |
|    | time required for draining                          | 1.4 sec                     |
|    | water that remained around the beads after draining | 36 mL                       |

40. The diagrams below represent two containers, each filled with a sample of nonporous particles of uniform size.



Compared to the sample of larger particles, the sample of smaller particles has

- 1) lower permeability      3) less porosity
  - 2) higher permeability      4) more porosity
41. In general, the probability of flooding decreases when there is an increase in the amount of
- 1) precipitation      3) runoff
  - 2) infiltration      4) snow melt
42. The shaded areas of the map below indicate concentrations of pollutants along the coastlines of North America.



Polluting material may have been carried to the Alaska area by the

- 1) California Current      3) Florida Current
  - 2) North Pacific Current      4) Labrador Current
43. Compared to an inland location of the same elevation and latitude, a coastal location is likely to have
- 1) warmer summers and cooler winters
  - 2) warmer summers and warmer winters
  - 3) cooler summers and cooler winters
  - 4) cooler summers and warmer winters
44. The Florida and Gulf Stream ocean currents along the east coast of North America are both
- 1) warm currents that flow northeastward
  - 2) warm currents that flow southwestward
  - 3) cool currents that flow northeastward
  - 4) cool currents that flow southwestward

45. Which ocean current provides warm water that moderates the climate of South America?

- 1) Benguela Current      3) Falkland Current
- 2) Brazil Current      4) Peru Current

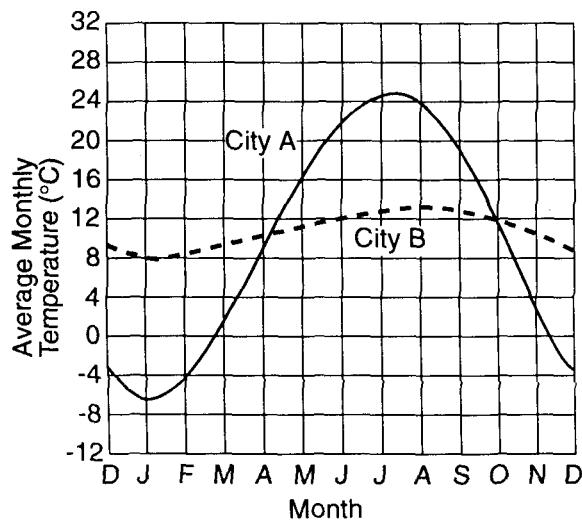
46. Bodies of water have a moderating effect on climate primarily because

- 1) water gains heat more rapidly than land does
- 2) water surfaces are flatter than land surfaces
- 3) water temperatures are always lower than land temperatures
- 4) water temperatures change more slowly than land temperatures do

47. Two coastal cities have the same latitude and elevation, but are located near different oceans. Which statement best explains why the two cities have different climates?

- 1) They are at different longitudes.
- 2) They are near different ocean currents.
- 3) They have different angles of insolation.
- 4) They have different numbers of daylight hours.

48. The graph below shows the average monthly temperatures for two cities, A and B, which are both located at 41° north latitude.



Which statement best explains the difference in the average yearly temperature range for the two cities?

- 1) City B is located in a different planetary wind belt.
- 2) City B receives less yearly precipitation
- 3) City B has a greater yearly duration of insolation.
- 4) City B is located near a large body of water.

49. Which ocean current cools the climate of some locations along the western coastline of North America?

- 1) Florida Current      3) Canaries Current
- 2) California Current      4) Alaska Current

50. What is the best explanation for these two statements?

- Some mountains located near the Earth's Equator have snow-covered peaks.
  - Icecaps exist at the Earth's poles.
- 1) High elevation and high latitude have a similar effect on climate.
  - 2) Both mountain and polar regions have arid climates.
  - 3) Mountain and polar regions receive more energy from the Sun than other regions do.
  - 4) An increase in snowfall and an increase in temperature have a similar effect on climate.

51. Snowfall is rare at the South Pole because the air over the South Pole is usually

- 1) rising and moist
- 2) rising and dry
- 3) sinking and moist
- 4) sinking and dry

52. The cartoon below presents a humorous look at wave action.

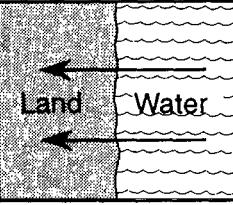
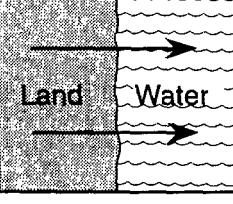
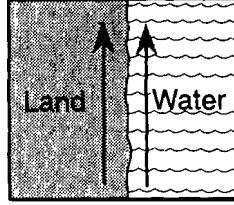
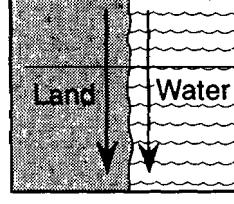


**"Here comes another big one, Roy, and here—we—  
gooooowheeeeeeeeoo!"**

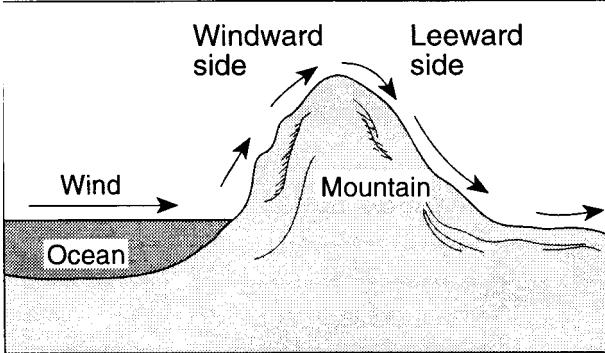
The ocean waves that are providing enjoyment for Roy's companion are the result of the

- 1) interaction of the hydrosphere with the moving atmosphere
- 2) interaction of the lithosphere with the moving troposphere
- 3) absorption of short-wave radiation in the stratosphere
- 4) absorption of energy in the asthenosphere

53. 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) 
- 2) 
- 3) 
- 4) 

54. The diagram below shows the flow of planetary winds over a mountain ridge.



As air rises on the windward side of the mountain ridge, the air's temperature decreases. Which process usually causes this temperature decrease?

- 1) expansion of rising air
- 2) compression of rising air
- 3) precipitation from clouds
- 4) evaporation from clouds

**Answer Key**  
**[New Exam]**

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

31. 3  
32. 1  
33. 3  
34. 1  
35. 1  
36. 3  
37. 3  
38. 1  
39. 1  
40. 1  
41. 2  
42. 2  
43. 4  
44. 1  
45. 2  
46. 4  
47. 2  
48. 4  
49. 2  
50. 1  
51. 4  
52. 1  
53. 1  
54. 1
-