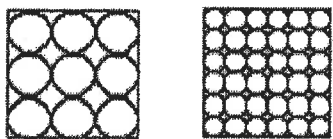


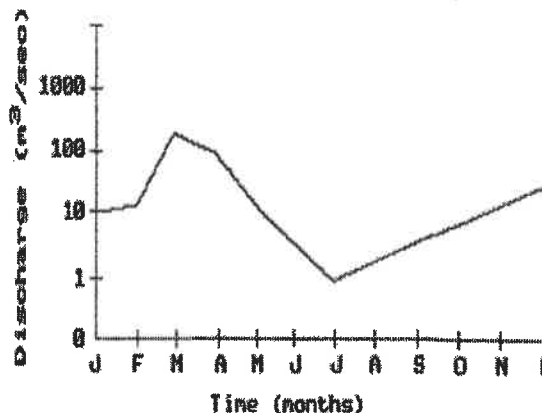
Name: _____

- 1) When rain falls on a soil surface, flooding at that location would most likely occur if the
- A) soil pore spaces are filled to capacity
 - B) soil surface is covered with vegetation
 - C) soil surface is permeable
 - D) infiltration rate exceeds the precipitation rate
- 2) When rainfall occurs, the water will most likely become surface runoff if the surface of the soil is
- A) covered with trees
 - B) highly permeable
 - C) steeply sloped
 - D) loose and sandy
- 3) The diagram below represents two identical containers filled with samples of loosely packed sediments. The sediments are composed of the same material, but differ in particle size. Which property is most nearly the same for the two samples?



- A) porosity
 - B) water retention
 - C) infiltration rate
 - D) capillarity
- 4) As the temperature of the soil decreases from 10°C to -5°C, the infiltration rate of ground water through this soil will most likely
- A) decrease
 - B) remain the same
 - C) increase

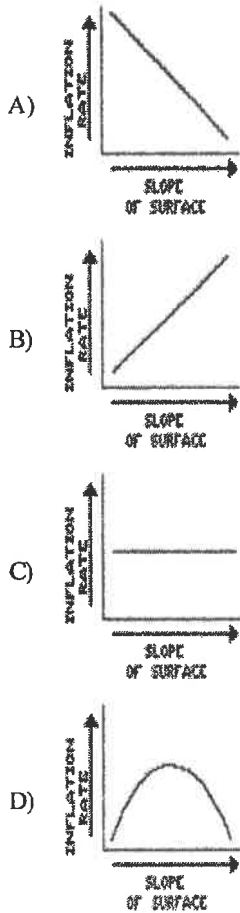
- 5) The graph below represents the relationship between the time of year and the average monthly discharge of a stream located in New York State.



According to the graph, when will maximum surface runoff occur?

- A) June through August
 - B) February through April
 - C) April through June
 - D) October through December
- 6) Which earth material covering the surface of a landfill would permit the *least* amount of rainwater to infiltrate the surface?
- A) sand
 - B) silt
 - C) pebbles
 - D) clay
- 7) Water will infiltrate surface material if the material is
- A) permeable and saturated
 - B) permeable and unsaturated
 - C) impermeable and saturated
 - D) impermeable and unsaturated
- 8) Which property of loose earth materials most likely increases as particle size decreases?
- A) infiltration
 - B) capillarity
 - C) permeability
 - D) porosity

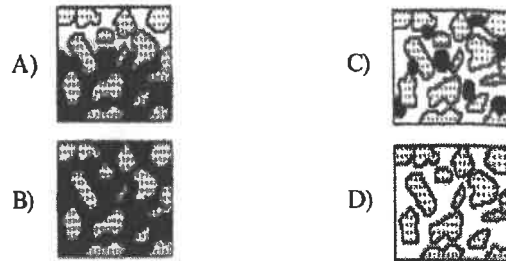
9) Which graph best represents the relationship between the surface slope of a dry, sandy soil and the infiltration rate of rain?



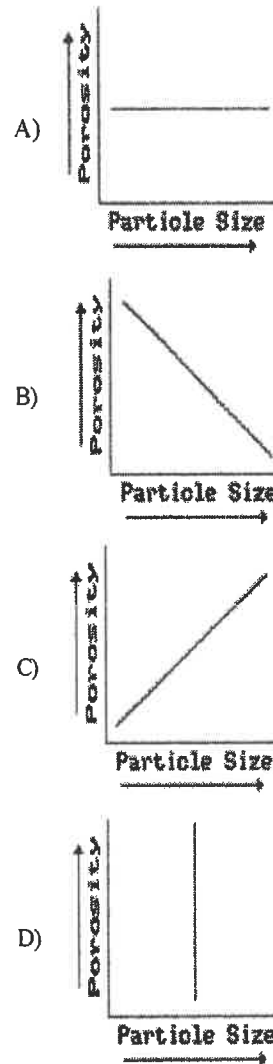
- 10) During a rainstorm, when is surface runoff *least* likely to occur?
- A) when the pore spaces of the ground are saturated with water
 - B) when the rainfall rate exceeds the permeability rate of the soil
 - C) when the slope of the surface is too great for infiltration to occur
 - D) when the permeability rate of the soil equals the rainfall rate
- 11) Why does water move very slowly downward through clay soil?
- A) Clay soil has large pore spaces.
 - B) Clay soil has very small particles.
 - C) Clay soil is composed of very hard particles.
 - D) Clay soil is composed of low-density minerals.

12) Which diagram best illustrates the condition of the soil below the water table?

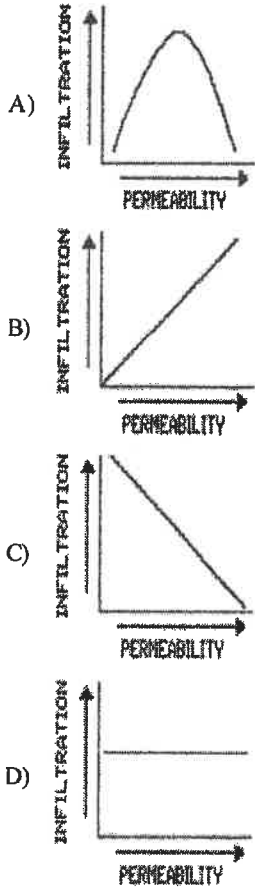
KEY:
 Soil Particles Water Pore Space (air)



13) Which graph best represents the relationship between porosity and particle size for soil samples of uniform size, shape, and packing?



- 14) Which graph best represents the relationship between soil permeability rate and infiltration when all other conditions are the same?

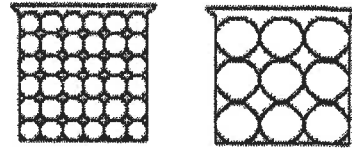


- 15) Most infiltration of precipitation will occur when the Earth's soil is
- A) saturated and permeable
 - B) unsaturated and impermeable
 - C) saturated and impermeable
 - D) unsaturated and permeable

- 16) Which is most important in determining the amount of ground water that can be stored within a rock?

- A) the rock's porosity
- B) the rock's color
- C) the rock's hardness
- D) the rock's geologic age

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

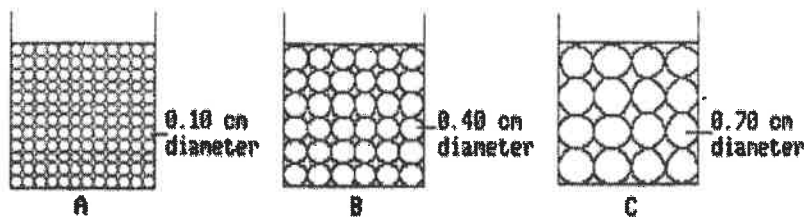


Compared to the model containing larger particles, the model containing smaller particles has

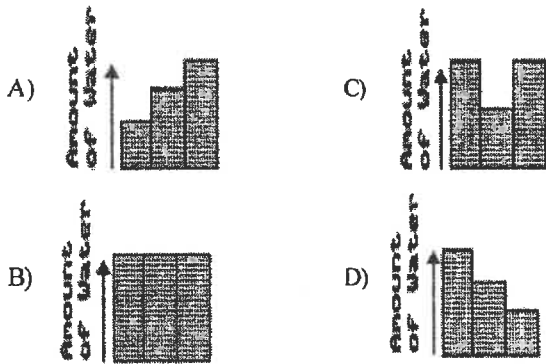
- A) greater permeability and greater porosity
 - B) less permeability and greater porosity
 - C) greater porosity and greater capillarity
 - D) less permeability and greater capillarity
- 18) In which area will surface runoff most likely be *greatest* during a heavy rainfall?
- A) wooded forest
 - B) paved city street
 - C) level grassy field
 - D) sandy desert
- 19) Surface runoff will generally be *greatest* when the
- A) ground is permeable and unsaturated
 - B) rainfall is light and the ground is permeable
 - C) infiltration rate is greater than the rainfall rate
 - D) slope of the land is too great to permit infiltration

Questions 20 through 23 refer to the following:

The diagrams below represent three identical beakers, A, B, and C. Each beaker contains solid plastic spheres. The diameter of the spheres in each beaker is shown.

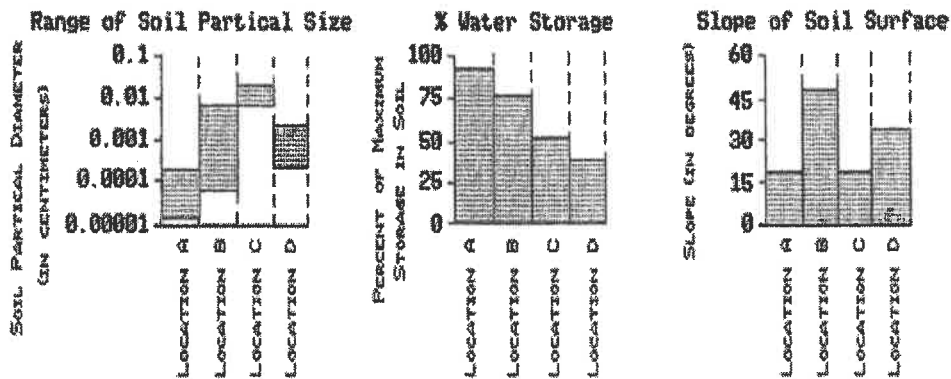


20) If water is added to each beaker to the level of the line, which graph best shows the amount of water added to each beaker?



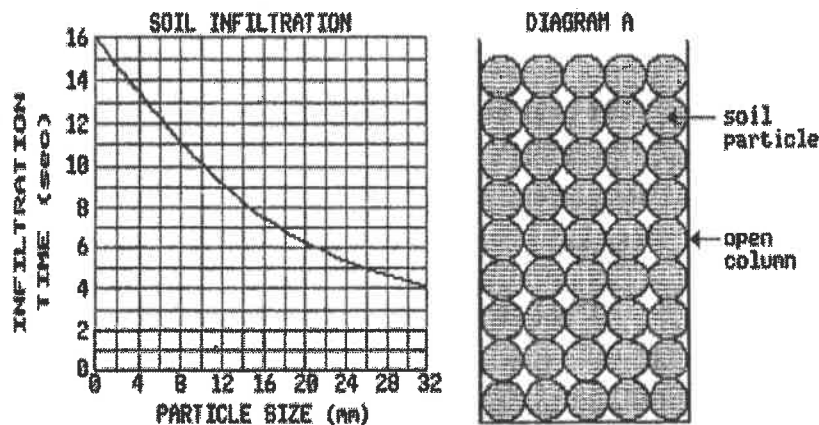
- 21) Which beaker contains material with the *greatest* capillarity?
 A) C B) B C) A
- 22) A mixture of 0.10-centimeter spheres and 0.70-centimeter spheres is placed in a fourth beaker, D. Beaker D is filled to the same level as beaker C. Compared to the porosity of C, the porosity of D is
 A) less
 B) the same
 C) greater
- 23) Which beaker contains material with the *greatest* permeability?
 A) B B) C C) A

24) The three graphs below show information about the soil characteristics of four locations in a river valley in western New York State. Which location would probably experience the *greatest* rate of water infiltration at the start of the next rainstorm?



- A) location B B) location D C) location A D) location C

25) Particles of uniform shape and size were placed in an open column. The time required for water to infiltrate through the column from top to bottom was recorded. The procedure was repeated using several different particle sizes. The data were plotted on the graph below.



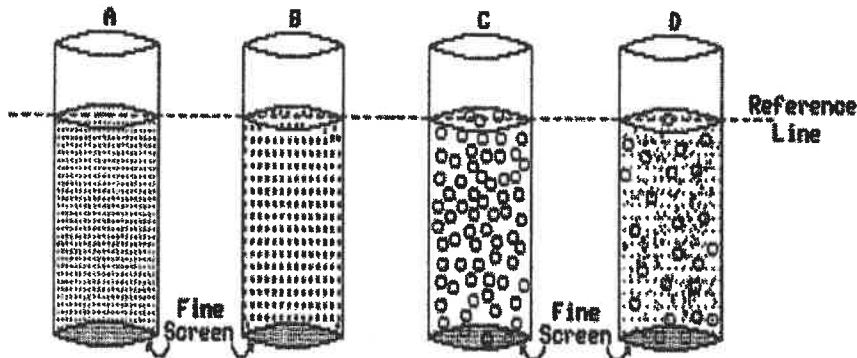
What would be the time required for water to infiltrate the soil sample shown actual size in diagram A?

- A) 3-5 sec B) 11-13 sec C) 14-16 sec D) 20-22 sec

Questions 26 through 28 refer to the following:

the diagrams below which describe an investigation with soils.

Three similar tubes, each containing a specific soil of uniform particle size and shape were used to study the effect that different particle size has on porosity, capillarity, and permeability. A fourth tube containing soil which was a mixture of the same sizes found in the other tubes was also studied and its data are recorded in the table. [Assume that the soils were perfectly dry between each part of the investigation.]



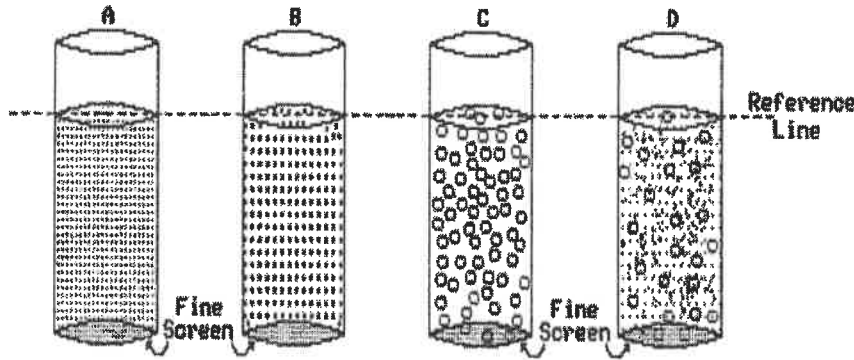
Tube	Particle Size (diameter in cm)	Porosity (%)	Capillarity (mm)	Permeability (sec)
A	Fine (0.025 cm)	40	20	14
B	Medium (0.1 cm)	40	15	8
C	Coarse (0.3 cm)	40	7	6
D	Mixed (0.025 to 0.3 cm)	20	12	20

- 26) Each tube was placed in a shallow pan of water. In which tube did the water rise the highest?
A) C B) A C) D D) B
- 27) The bottom of each tube was closed and water was slowly poured into each tube until the water level reached the dotted line. Which statement best describes the amount of water held by the tubes?
A) Tube A and D held the same amount of water and twice as much as tubes B and C.
B) Tube C held more water than any other tube and tube D the least.
C) Tube A, B and C held the same amount of water and tube D half as much.
D) Tube D held more water than any other tube and tube A the least.
- 28) When water was poured into the top of each tube at the same time, which tube allowed the water to pass through most quickly?
A) B B) D C) C D) A

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 A) B B) D C) C D) A

- 1) A
- 2) C
- 3) A
- 4) A
- 5) B
- 6) D
- 7) B
- 8) B
- 9) A
- 10) D
- 11) B
- 12) B
- 13) A
- 14) B
- 15) D
- 16) A
- 17) D
- 18) B
- 19) D
- 20) B
- 21) C
- 22) A
- 23) B
- 24) D
- 25) B
- 26) B
- 27) C
- 28) C