____1. Which graph shows the effect of soil permeability on the amount of runoff in an area?

(1) 

(2) 

(3) 

(4) 

____2. A soil sample with a large amount of space between the particles will have a

(1) high porosity
(2) low permeability rate
(3) high capillarity
(4) low infiltration rate

____3. Flash flooding often occurs in city areas because

(1) roads, pavements, and buildings reduce the infiltration of water into the ground
(2) ground water storage is usually very large
(3) runoff decreases during precipitation
(4) the heat generated by city areas decreases actual evapotranspiration

____4. Which soil-property measurement usually is greater when particles are fine than when particles are coarse?

(1) porosity
(2) permeability rate
(3) infiltration
(4) capillarity

____5. The direct cause of ground water supplies becoming unfit for human use is usually

(1) an uncontrollable moisture deficit
(2) excessive surface runoff
(3) very heavy precipitation
(4) contamination of the saturated zone

____6. Base your answer to the following question on the diagram below, which represents samples of soil and bedrock at Earth’s surface. The arrows represent possible infiltration of rainwater.

Which sample probably has the greatest porosity?

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

____7. If a rock is compressed and its volume decreases, how will the rock's density and porosity be affected?

(1) Density and porosity will both decrease.
(2) Density and porosity will both increase.
(3) Density will increase and porosity will decrease.
(4) Density will decrease and porosity will increase.

____8. Which surface soil type has the slowest permeability rate and is most likely to produce flooding?

(1) pebbles
(2) silt
(3) sand
(4) clay
9. The diagram below is a cross-sectional view of rain falling on a farm field and then moving to the water table.

Which word best describes the movement of the rainwater through zone A?
(1) saturation  (3) precipitation
(2) runoff       (4) infiltration

10. Compared to an area of Earth's surface with gentle slopes, an area with steeper slopes most likely has
(1) more infiltration and more runoff
(2) less infiltration and more runoff
(3) more infiltration and less runoff
(4) less infiltration and less runoff

11. Which set of surface soil conditions on a hillside would result in the most infiltration of rainfall?
(1) steep slope, unsaturated soil, no vegetation
(2) gentle slope, unsaturated soil, vegetation
(3) steep slope, saturated soil, vegetation
(4) gentle slope, saturated soil, no vegetation

12. Water can pass through a sandstone sample because the sample is
(1) permeable
(2) well compacted and cemented
(3) organic in origin
(4) composed of pebble-sized particles

13. During a rainfall, surface runoff will probably be greatest in an area that has a
(1) steep slope and a clay-covered surface
(2) steep slope and a gravel-covered surface
(3) gentle slope and a grass-covered surface
(4) gentle slope and a tree-covered surface

14. Which sediment size would allow water to flow through at the fastest rate?
(1) sand           (3) silt
(2) clay           (4) pebbles

15. Which soil conditions normally result in the greatest amount of runoff?
(1) high permeability and steep slope
(2) low permeability and steep slope
(3) high permeability and gentle slope
(4) low permeability and gentle slope

16. The diagram below shows two identical containers filled with uniform particles that were sorted by size.

Which characteristic is most likely the same for these particle-filled containers?
(1) water retention  (3) infiltration rate
(2) capillarity      (4) porosity
17. The diagrams below represent three containers, \( A \), \( B \), and \( C \), which were filled with equal volumes of uniformly sorted plastic beads. Water was poured into each container to determine porosity and infiltration time.

Which data table best represents the porosity and infiltration time of the beads in the three containers?

(1)

\[
\begin{array}{|c|c|c|}
\hline
\text{Beaker} & \text{Porosity (\%)} & \text{Infiltration Time (sec)} \\
\hline
A & 40 & 5.2 \\
B & 40 & 2.8 \\
C & 40 & 0.4 \\
\hline
\end{array}
\]

(2)

\[
\begin{array}{|c|c|c|}
\hline
\text{Beaker} & \text{Porosity (\%)} & \text{Infiltration Time (sec)} \\
\hline
A & 20 & 5.2 \\
B & 30 & 2.8 \\
C & 40 & 0.4 \\
\hline
\end{array}
\]

(3)

\[
\begin{array}{|c|c|c|}
\hline
\text{Beaker} & \text{Porosity (\%)} & \text{Infiltration Time (sec)} \\
\hline
A & 40 & 0.4 \\
B & 40 & 2.8 \\
C & 40 & 5.2 \\
\hline
\end{array}
\]

(4)

\[
\begin{array}{|c|c|c|}
\hline
\text{Beaker} & \text{Porosity (\%)} & \text{Infiltration Time (sec)} \\
\hline
A & 20 & 0.4 \\
B & 30 & 2.8 \\
C & 40 & 5.2 \\
\hline
\end{array}
\]

Base your answers to questions 18 through 20 on the data table below and on your knowledge of Earth science. The data table shows the average monthly discharge, in cubic feet per second, for a stream in New York State.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge (ft³/sec)</td>
<td>48</td>
<td>52</td>
<td>59</td>
<td>66</td>
<td>70</td>
<td>72</td>
<td>59</td>
<td>55</td>
<td>42</td>
<td>47</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>

18. State the relationship between this stream’s discharge and the amount of suspended sediment that can be carried by this stream.
19. On the grid below, plot with an X the average stream discharge for each month shown in the data table. Connect the Xs with a line.

[Diagram of Average Monthly Stream Discharge]

20. Explain one possible reason why this stream’s discharge in April is usually greater than this stream’s discharge in January.
1. 3
2. 1
3. 1
4. 4
5. 4
6. 3
7. 3
8. 4
9. 4
10. 2
11. 2
12. 1
13. 1
14. 4
15. 2
16. 4
17. 1
18. Examples: — As stream discharge increases, suspended sediment increases. — There is a direct relationship between stream discharge and suspended sediment.
19. 
20. Examples: — Snowmelt in April results in a greater discharge. — greater rainfall in April — Saturated ground would cause more runoff in April.