

KEY

Optional GEOL 103 Writing Assignment: Streams and Sediment Transport

Name KEY

1. Is laminar or turbulent flow more erosive? **turbulent flow**

2. In what form do streams transport non-solid material? **dissolved ions**

3. What are the three ways that streams transport solid materials?

As suspended particles (entrained in the moving water), as bed load (rolling and tumbling), and by saltation (medium-sized particles bouncing, resting, bouncing again)

4. Discuss Fig. 14.3 in your text.

Large particles are picked up and deposited at high stream velocities. Sand-size grains are picked up by medium or high stream velocities; they are deposited at medium stream velocities. Cohesive small particles required high velocities to be picked up, and they only settle at low velocities. Non-cohesive small particles require medium or high stream velocities to be picked up, and they only settle at low velocities.

5. What is a floodplain?

A relatively flat region area above the banks of a stream or river channel; this area temporarily stores water during floods. Primarily fine sediments are deposited on floodplains as floodwaters are going down. Cross-sections of floodplains reveal old channel gravels and sandbars, but most of the material is usually fine-grained.

6. Where are high and low velocity zones in a meandering river? How do they related to erosion, deposition of sediment, and sediment sizes?

Water on the outside of bends flows fastest, erodes the outside banks, and carries the largest particles. Water on the inside of bends flows slowest, carries smaller particles, and deposit sand on point bars.

7. How can meandered become incised (entrenched)?

Uplift causes rapid downcutting, so entrenched meanders become more permanent, and the river is usually unable to cut off meanders.

8. What is an 20-year flood? How often do they occur?

A 20-year flood is a flood with a discharge that occurs in a particular area on average every 20 years. They can occur at virtually any time, but in the long run, they occur about every 20 years.

9. Why is a 100-year flood a rare occurrence? Is it possible to have two 100-year floods in a three year period in the same area?

A 100-year flood is rare because it is relatively unlikely for climatic conditions to produce enough rain to cause such a flood. For example, a severe winter causing snow to accumulate rather than melt followed by a week of rain and relatively warm weather could induce a big flood, but this combination of events is unlikely to occur together. It is possible, but unlikely, to have two 100-year floods in a three year period in the same area.

10. What is the effect of urbanization or cultivation on the hydrograph for a region that was originally mainly forested? What does this imply for flooding?

Urbanization or cultivation would cause a hydrograph to have steeper slopes, thus floods would be more intense (higher discharge, floodwaters rise more quickly and fall more quickly).

11. How does the hydrograph (a discharge *versus* time plot) for a "flashy" stream compare to one that's not flashy? Why does the Susquehanna River not experience flash floods?

Hydrographs for "flashy" streams have steeper slopes. Susq. R. (a big river) not flashy because it get most of its waters from surrounding smaller streams hours after the floods crest and start to fall on the smaller streams.

12. How does building levees affect flooding behind the levees or flood walls? Downstream of levees?

Downstream flooding is increased. Behind the levees, floods don't occur, saving developed areas, UNLESS the wall breaks or the flood rises above the walls. Then floods can be very devastating because the river carries more water than it would have without the wall.