Introduction to Part 6
1. What is a modern view of the “four basic elements” defined by the ancients?

2. What % of Earth’s surface is covered by water (liquid or solid)? What% of all of Earth’s water is freshwater? What % is “available” as drinking and irrigation water?

3. What role does soil play in supporting a growing population?

Chapter 11
4. What are the major sources (reservoirs) of water on earth, and what proportion of the total water is contained in each?

5. What are the main parts/steps in the hydrologic cycle?

6.a. What is the definition of heat capacity?
   b. How does water’s high heat capacity affect the global temperature? (I.e., what properties of water give it a “thermal punch”, and how do these effects occur?)

7. What limits the “renewability” of water as a resource? Give at least 2 limitations.

8.a. Define “evapotranspiration.”
   b. What factors affect the (proportion of) transpiration in a given area?

9.a. What is “groundwater”? Why is it important to us?
   b. Why is groundwater commonly a nonrenewable resource?

10. What is the difference between the terms porosity and permeability? (Read text’s glossary and a dictionary.)
Self-Questions for Ch. 11 Water Resources

11. What are the meanings of the following terms?
   a. Water table  
   b. Vadose zone  
   c. Saturated zone
   d. Capillary action  
   e. Aquifer
   f. Caliche
   g. Recharge  
   h. Hydrograph
   i. Equivalent rainfall
   j. Channelization

12. What are the main problems that occur as a population makes major use of local groundwater?

13. What effect do ice caps and glaciers have on world-wide sea level? Why?

14. a. What is the typical decrease in permeable land area that a place undergoes when it becomes “urbanized”?
    b. What is the effect on run-off of creating parking lots, etc.?

15. What was the intended purpose in channelizing the Kissimmee River in Florida? What were the positive consequences? What were the negative consequences?

16. What are two ways that we typically use to control flooding?

17. What are the good and bad aspects of constructing dams along waterways? How have these advantages and disadvantages affected modern outlooks on building dams?

18. What is the difference between the terms “water withdrawal” and “water consumption”? Is this just semantics, or is this an important distinction? Explain.

19. As you read through the sections on water usage, make a table that shows the different types of use (e.g., domestic-commercial, irrigation) and the % of the total US water demand that is used in each way. (Fig. 11.18 is rather “busy”, but shows this information)

20. What is the history and the present use of aqueducts?

21. How much of the area’s water usage does irrigation account for in the US? In Mexico?

22. What proportion of the water “used” by industry is “returned” to the system? What are the concerns about industrial water use?

23. What does the term “thermoelectric power” mean? What is the problem with the huge
proportion of water returned after use in thermoelectric power plants?

24. How can hydroelectric power plants in the US use more water each day than the total daily runoff water of all the streams and rivers?!

25. If you evaporated 100 pounds of seawater, how much salt would be left behind?

26. What are the sources of the different natural and human-produced components in surface waters?

27. What was/is the nature of the “water poisoning” in Bangladesh?

28. What are the major contaminants (of both natural and manmade sources) that produce acid rain?

29.a. In most aquifers, what is the % of pore space, i.e., the open volume that can hold water?
   b. How fast does most groundwater move?

30.a. What process(es) does “desalination” involve?
   b. What are the drawbacks to desalination?

31. Consider the long history of water-provision in New York City and the recent history of desalination in the Middle East. What happens when the regional authorities are successful in providing more water to an area?

32. What are some of the historic and ongoing complexities in allocating water use from the Colorado River?

33. Where is the Ogallala aquifer, and what is its significance?

34. What are the consequences of over-withdrawal of groundwater?

35. How does soil deteriorate through mis-use of irrigation?

OVER
36. Where is the Aral Sea? How did it almost dry up over a period of a decade? What are the consequences of the huge decrease in water that it has suffered?

37. What are the water problems that Los Angeles faces? What actions has the city taken?

Focus on:
Boxes 11.1, 11.2, 11.3, 11.4;
Tables 11.1, 11.2, 11.3.