

1.	A specific location where pollution is introduced into surface water or groundwater:	
a)	acid mine drainage	
b)	point source	
c)	secondary treatment	
d)	cryptosporidium	
e)	fecal coliform bacteria	
	Ans: b Difficulty: Easy Link to: 22.8	

2.	Step in wastewater purification in which organic material is consumed by bacteria:	
a)	acid mine drainage	
b)	point source	
c)	secondary treatment	
d)	cryptosporidium	
e)	fecal coliform bacteria	
	Ans: c Difficulty: Easy Link to: 22.10	

3.	Intestinal parasite that causes flu-like symptoms and can be transmitted through unfiltered or inadequately filtered drinking water:	
a)	acid mine drainage	
b)	point source	
c)	secondary treatment	
d)	cryptosporidium	
e)	fecal coliform bacteria	
	Ans: d Difficulty: Easy Link to: 22.3	

4.	The "dead zone" in the northern Gulf of Mexico consists of a large ocean area depleted in _____. This problem appears to be caused by _____.	
a)	oxygen; nitrogen from agricultural runoff	
b)	carbon; industrial pollutants	
c)	marine microorganisms; ozone depletion	

d)	oxygen; global warming
e)	chlorophyll; deforestation
	Ans: a Difficulty: Medium Link to: A Closer Look 22.1

5.	The amount of phosphorus and nitrogen in groundwater probably would be greatest:
a)	in undisturbed forest land
b)	in agricultural land in the developed world
c)	in agricultural land in the developing world
d)	downhill from a petroleum refinery
e)	downhill from an urban population center
	Ans: b Difficulty: Medium Link to: 22.9

6.	A severe outbreak of cryptosporidiosis occurred in Milwaukee, Wisconsin in 1993. This outbreak illustrates:
a)	the benefits of reusing waste water
b)	the potential danger of groundwater contaminated by industrial effluent
c)	the threat posed by bacteria resistant to existing antibiotics
d)	the importance of clean drinking water supplies
e)	pollution of surface water during flooding
	Ans: d Difficulty: Medium Link to: 22.3

7.	All of the following activities contribute to sediment pollution except:
a)	farming
b)	winter-time application of road salt
c)	construction
d)	deforestation
e)	off-road vehicle use
	Ans: b Difficulty: Easy Link to: 22.8

8.	All of the following are effective strategies for minimizing sediment pollution except:
a)	trap eroded sediment at construction sites
b)	expose a minimum amount of land
c)	tailor development to natural contours
d)	provide protection for exposed soil
e)	maximize surface runoff from critical areas
	Ans: e Difficulty: Medium Link to: 22.8

9.	The principle advantage of using wetlands for wastewater treatment is:
a)	the resulting water exceeds all drinking water standards
b)	a natural ecosystem replaces industrial methods for secondary and advanced treatment
c)	it removes dioxin and other pollutants in the sediment of the wetland
d)	the method eliminates the production of methane, which contributes to global warming
e)	it replaces all need for a centralized wastewater treatment facility
	Ans: b Difficulty: Medium Link to: 22.1

10.	Groundwater pollution is often difficult to treat because the pool is usually _____ and the rate of throughput is usually _____.
a)	small; slow
b)	small; fast
c)	subterranean; astronomical
d)	large; fast
e)	large; slow
	Ans: e Difficulty: Medium Link to: 22.9

11.	Long Island, New York has a population of several million people, all of whom rely on groundwater for their water supply. Long Island illustrates many of the problems associated with groundwater pollution. Which of the following is not one of the threats to Long Island groundwater?
a)	leachate from solid waste disposal sites
b)	saltwater intrusion
c)	infiltration of salt used to de-ice winter roads
d)	discharge from household septic tanks
e)	high-level nuclear waste disposal
	Ans: e Difficulty: Difficult Link to: 22.9
12.	The amount of the nutrients, phosphorus, and nitrogen in groundwater is usually:
a)	greater in agricultural regions than in natural forests
b)	the same in agricultural regions as in natural forests
c)	an indicator of soil fertility
d)	an indicator of industrial seepage
e)	lowest in areas with calcium-rich bedrock
	Ans: a Difficulty: Medium Link to: 22.9
13.	The <u>best</u> definition of the term "water pollution" is:
a)	release of primary treated sewage into natural waters
b)	water unsuitable for human consumption
c)	overdrafting in coastal areas
d)	uncontrolled dumping of toxic industrial waste
e)	degradation of water quality
	Ans: e Difficulty: Easy Link to: 22.1
14.	Coastal areas are susceptible to saltwater intrusion into groundwater. Saltwater intrusion usually becomes a threat when:
a)	serious storms hit the coast
b)	local water users remove more groundwater than is naturally replaced

c)	petroleum wells bring saline brines to the surface
d)	coastal erosion allows ocean water to get near freshwater aquifers
e)	heavy recreational activity occurs on beaches
	Ans: b Difficulty: Medium Link to: 22.9

15.	The common test for the potential for disease transmission in water is:
a)	measurement of the biological oxygen demand
b)	presence of cholera bacteria
c)	measurement of LDC's
d)	presence of coliform bacteria
e)	total dissolved solids
	Ans: d Difficulty: Easy Link to: 22.3

16.	A septic tank:
a)	is a tank used to collect and treat drinking water
b)	is a tank in a sewage plant where chlorination of wastewater takes place
c)	stores human waste until it is emptied, for use where no sewage system is available
d)	treats waste water in rural households and can be considered as a private sewage treatment plant
e)	is a hermetically sealed contain for storage of food
	Ans: d Difficulty: Easy Link to: 22.3

17.	According to the <u>Environmental Science</u> text, what is the most critical water pollution problem in the world?
a)	lack of clean, disease-free drinking water
b)	thermal pollution
c)	municipal sewage
d)	sediment polluted waters
e)	industrial effluent

	<p>Ans: a Difficulty: Easy Link to: 22.3</p>
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18.	You are a scientist monitoring disease potential of wastewater treated at a sewage treatment plant. You are most concerned with the concentration of which of the following:	
a)	oxygen-demanding waste (BOD)	
b)	heavy metals	
c)	radioactive materials	
d)	fecal coliform bacteria	
e)	phosphorus	
	<p>Ans: d Difficulty: Medium Link to: 22.3</p>	

19.	Rivers draining agricultural land or land that is being urbanized can quickly fill with sediment. This has the effect of _____ of flooding.	
a)	increasing runoff, but decreasing the frequency	
b)	increasing the magnitude and increasing the frequency	
c)	increasing the magnitude and decreasing the frequency	
d)	decreasing runoff and decreasing the magnitude	
e)	increasing runoff and increasing the lag time	
	<p>Ans: b Difficulty: Easy Link to: 22.6</p>	

20.	When nitrogen and phosphorus are added to a body of water, they alter the natural conditions because they:	
a)	are necessary nutrients, usually scarce in nature	
b)	lead to greater biological diversity	
c)	are an additional food source	
d)	kill algae, the base of the fresh water food chain	
e)	cause a long-term increase in fish populations	
	<p>Ans: a Difficulty: Medium Link to: 22.4</p>	

21.	Massive and rapid algae growth is stimulated by the addition of _____ to surface water bodies.	
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a)	oxygen and carbon dioxide
b)	leachate
c)	nitrogen and phosphorus
d)	aerobic bacteria
e)	toxic chemicals
	Ans: c Difficulty: Easy Link to: 22.4

22.	In general, the largest point sources of thermal water pollution are:
a)	manufacturing plants
b)	mass transit systems
c)	electrical generating plants
d)	petroleum refineries
e)	artificial waterways with dark-colored bottoms
	Ans: c Difficulty: Medium Link to: 22.8

23.	Erosion and sediment pollution in rivers and streams result in all of the following ecological problems except:
a)	loss of fertility of farmland
b)	decrease in photosynthesis within the water
c)	smothering of fish eggs
d)	eutrophication
e)	increased flood hazard
	Ans: d Difficulty: Easy Link to: 22.6

24.	What does B.O.D. stand for?
a)	Barometer of Decomposition
b)	Bacterial Oxygen Dependency
c)	Biodegradable Organic Damage
d)	Biological Oxygen Depletion
e)	Biochemical Oxygen Demand
	Ans: e Difficulty: Easy Link to: 22.2

25.	Which of the following is not usually associated with eutrophication?
a)	algal blooms
b)	increased heavy metal concentrations
c)	reduced photosynthesis in the water column
d)	increased nutrient concentrations
e)	reduced dissolved oxygen
	Ans: b Difficulty: Medium Link to: 22.4

26.	What is the most easily accessible supply of fresh water in most locations around the world?
a)	surface water
b)	groundwater
c)	treated wastewater
d)	ocean water
e)	drinking water
	Ans: a Difficulty: Easy Link to: 22.4, 22.8

27.	By weight, the most abundant water pollutant is:
a)	toxic chemicals
b)	leachate from open dumps
c)	organic waste
d)	heavy metals
e)	sediment
	Ans: e Difficulty: Easy Link to: 22.6

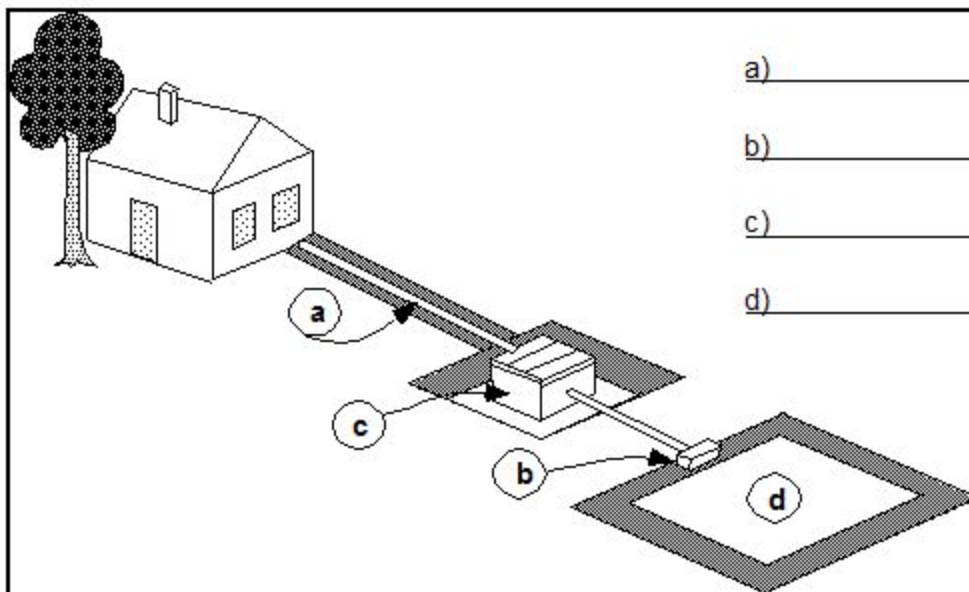
28.	The highest concentrations of nitrogen in surface and ground water generally are found in:
a)	forested areas
b)	urban areas
c)	rural areas
d)	suburban areas
e)	agricultural areas

	<p>Ans: e</p> <p>Difficulty: Easy</p> <p>Link to: 22.6</p>
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29.	Water quality determination is based on all of the following except:
a)	effects on public health
b)	departure from the norm
c)	source of the water
d)	expected end use
e)	impacts on the ecosystem
	<p>Ans: c</p> <p>Difficulty: Medium</p> <p>Link to: 22.1</p>

30.	What is cultural eutrophication?
a)	large scale oil spills in environmentally sensitive areas
b)	addition of fecal coliform bacteria to a body of water
c)	anthropogenic addition of nutrients to a body of water
d)	active decomposition of dissolved oxygen
e)	decay of cultural or moral standards
	<p>Ans: c</p> <p>Difficulty: Easy</p> <p>Link to: 22.4</p>

31. In the figure below, identify the following components of the household septic system:



a) _____

b) _____

c) _____

d) _____

Ans: (a) distribution box
(b) drain field
(c) house sewer
(d) septic tank

Difficulty: Easy
Link to: 22.10

32. Give two reasons why the release of large amounts of heated water discharged into rivers can be hazardous to the environment

Ans: it changes the average water temperature
it changes the concentration of dissolved oxygen
it changes the composition of the biological community

Difficulty: Medium
Link to: 22.8

33. What are the similarities and differences between the problem of acid mine drainage and the problem of acid rain?

Ans: Similarities - both result from the combination of impurities in coal and other mined materials with water to produce acid
Differences - AMD is a problem that is local in scope and mainly affects groundwater. AR is regional in scope and mainly affects surface water.

	Difficulty: Difficult Link to: 22.7
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34.	Name four steps that can be taken to reduce sediment pollution.
Ans:	trap eroded sediment at construction sites expose a minimum amount of land tailor development to natural contours provide protection for exposed soil minimize surface runoff from critical areas
	Difficulty: Medium Link to: 22.6

35.	The intended use of water is important in determining the level of impurity that is acceptable. Why might water be considered severely polluted for household use, when the same water could be considered unpolluted when used for agricultural irrigation?
Ans:	Most vegetation is tolerant of a wide range of water quality, a much wider range than humans tolerate.
	Difficulty: Medium Link to: 22.12

36.	How does converting forested land to agriculture affect 1) runoff, 2) sediment yield, and 3) erosion?
Ans:	it increases all three of these
	Difficulty: Medium Link to: 22.6

37.	Conventional wastewater treatment falls into three classes: primary, secondary and advanced treatment. Describe the three steps of treatment.
Ans:	primary treatment: mechanical removal of solid materials secondary treatment: biological oxidation of dissolved organic material tertiary treatment: removal of remaining solids, particularly dissolved minerals or organic compounds and chlorination

	Difficulty: Difficult Link to: 22.10
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38.	The definition for a “pollutant” given in the <u>Environmental Science</u> text is: “any biological, physical, or chemical substance which, in identifiable excess, is known to be harmful to other desirable living organisms.” According to this definition, when does a chemical pesticide first become a “pollutant”?
Ans:	when it harms the first organism other than the intended pest
	Difficulty: Medium Link to: 22.1

39.	What is the definition of water pollution?
Ans:	water pollution is the degradation of quality that renders water unusable for its intended purpose
	Difficulty: Easy Link to: 22.1

40.	List five major sources of pollution that threaten groundwater.
Ans:	leaks from waste disposal sites leaks from buried tanks and pipes seepage from agriculture salt water intrusion seepage from cesspools and septic systems seepage from accidental spills seepage of chemicals and radioactive materials from commercial sites
	Difficulty: Medium Link to: 22.9

41.	How is dissolved oxygen in a body of water related to biochemical oxygen demand?
Ans:	the higher the BOD, the lower the levels of dissolved oxygen
	Difficulty: Medium Link to: 22.2

42.	Why are lakes and bays particularly vulnerable to thermal pollution?
Ans:	The rate of water exchange is low, and hot water gets stored in these ecosystems.
	Difficulty: Medium Link to: 22.1

43.	As a newly hired urban planner you have to protect a growing urban area from soil erosion. List three basic sediment control practices that you can institute to minimize erosion.
Ans:	tailoring development to the natural topography minimum exposure of exposed soil protection of exposed soil trap eroded sediment minimize surface runoff from critical areas
	Difficulty: Medium Link to: 22.6

44.	According to the <u>Environmental Science</u> text, four criteria are used to evaluate water pollution: 1) effects on public health, 2) departure from the norm, 3) expected end use, and 4) impacts on the ecosystem. Water from a pristine natural swamp is acidic, full of bacteria, and unsuitable for almost all human uses, but it is <u>not</u> polluted. By which of the criteria listed here is this determination made?
Ans:	no deviation from the norm
	Difficulty: Difficult Link to: Chap. 22

45.	List five major sources of pollution that threaten surface water.
Ans:	urban runoff agricultural runoff industrial effluent accidental spills of chemicals radioactive materials leakage of hydrocarbons sediment

	Difficulty: Medium Link to: 22.8
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46.	How do urban areas contribute to surface and groundwater pollution? List five different ways or processes.
Ans:	pollutants in surface runoff industrial effluent and seepage leakage of gas and oil from cars and storage tanks thermal pollution of surface waters increased B.O.D. in surface waters sedimentation
	Difficulty: Medium Link to: 22.2

47.	The Illinois River (Critical Thinking Issue, Chap. 21, "How Can Polluted Waters be Restored?") suffers from degradation of its fish and waterfowl populations, high turbidity, low oxygen, and high levels of various pollutants. List the principal causes of the problems and some of the measures taken to solve them.
Ans:	causes: municipal sewage, agricultural runoff solutions: sewage treatment plants, Chicago Tunnel and Reservoir Plan to capture and treat sewage overflows
	Difficulty: Difficult Link to: Critical Thinking Issue

48.	List three major categories of water pollutants.
Ans:	disease causing organisms dead organic materials heavy metals organic chemicals acids sediment heat radioactivity
	Difficulty: Medium Link to: 22.1

49.	Medical Lake in the state of Washington suffered a severe bout of eutricification in the summer of 1971. What is eutricification and how are the organisms living in the lake effected?	
Ans:	The process by which a body of water develops a high concentration of nutrients (nitrates, phosphates). The nutrients cause aquatic plants to grow excessively, in particular algae. They form surface mats reducing photosynthetic action because they block the sunlight. This leads to the death of algae and bacteria. As they decompose the BOD increases, and the oxygen content is reduced. If the oxygen content is reduced sufficiently other organisms such as fish will die.	
	Difficulty: Medium Link to: 22.4	

50.	What is the difference between a point source and a non-point-source of pollution?	
Ans:	Point sources are distinct and confined, such as pipes from industrial or municipal sites that empty into rivers or streams. Nonpoint sources are diffused and intermittend and are influenced by factors such as land use, hydrology, topography and native vegetation. Examples for nonpoint sources are runoff from streets or fields.	
	Difficulty: Easy Link to: 22.8	