1.	Anthropogenic sources of radiation include medical and dental x-rays, nuclear weapons tests, and nuclear power plants. A natural source of radiation is/are:
a)	the Sun
b)	granite bedrock
c)	natural radioisotopes in the soil and atmosphere
d)	all of these
e)	none of these – all radiation in the environment is caused by humans

2.	Which of the following is a true statement about exposure to electromagnetic fields (EMF):
a)	appliances and electrical lines commonly expose people to magnetic fields between 10 and 100 times stronger than the Earth's magnetic field
b)	electrical-transmission lines pose the only meaningful threat of EMF exposure and should be avoided at all costs
c)	the only protection against EMF exposure is to put electrical transmission and distribution lines underground
d)	increased exposure to electromagnetic radiation leads to an increased risk of cancer
e)	magnetic fields generated by household appliances drop off sharply just a few meters away from the source

3.	Fungicides are:
a)	chemicals to control weeds
b)	chemicals to control insect pests
c)	chemicals to control fungal plant diseases
d)	fungal plant diseases
e)	any variety of fungus that attacks livestock or humans

4.	Biomagnification is associated with all of the following except:
a)	the accumulation of chemicals in organisms
b)	higher toxin concentrations at successive trophic levels
c)	the development of tolerance to a pesticide or toxin
d)	biomagnification can occur in both aquatic and terrestrial habitats
e)	herbivores are less impacted than carnivores

5.	Explain the term “ecological gradient” in the sense of environmental health and toxicology:
a)	the change in temperature approaching a source of thermal pollution
b)	the change in vegetation with distance from a pollution source
c)	variations in the degree of adaptation and tolerance in plant and animal species
d)	the concentration of a pesticide necessary to kill a given percent of the population of a pest
e)	the maximum slope that will maintain viable vegetation

6.	What is the major source of chronic heat pollution in water systems?

a)	electric power plants
b)	petroleum refineries
c)	geothermal power
d)	volcanic eruptions
e)	friction

7.	The Environmental Science textbook discusses wild leopard frogs that develop hermaphroditism. What is hermaphroditism?
a)	abnormal bone growth
b)	respiratory defects
c)	growth retardation
d)	male and female reproductive organs in the same frog
e)	retardation of the vocal cords

8.	Noise pollution (sound) is measured in units of decibels (dB), which are each one-tenth of a bel. How much louder is 50 dB than 30 dB?
a)	about 1.67 times
b)	2 times
c)	20 times
d)	100 times
e)	2^{20} times

9.	The word “toxic” refers to materials that are:
a)	poisonous
b)	retained in tissue by biomagnification
c)	a form of synergism with other chemicals
d)	increasing the risk of cancer.
e)	all of these

10.	The term "ideal pesticide" refers to:
a)	a chemical that harms nothing in the environment
b)	a pesticide that is active only briefly and then degrades into harmless substances
c)	a chemical that kills all varieties of pests that threaten a crop
d)	a pesticide that needs to be applied only once
e)	a chemical that affects only one pest and no other living thing or aspect of the environment

11.	The content of heavy metals in human and in animal bodies is referred to as:
a)	heavy body
b)	ferric contamination
c)	body burden
d)	synergism
e)	biomagnification

12.	What is synergism?
a)	the association of two dissimilar species, to the benefit of both
b)	the transmission of heat energy in greenhouses
c)	the addition of herbicides to fertilizers in order to make crops pest-resistant
d)	the primary interaction between two substances in order to build up genetic resistance to a toxin
e)	the interaction of different substances such that the effect combined is greater than the sum of the separate effects

13.	Why do small plants with a relatively short life time cope with pollution better than larger plants with a longer span?
a)	smaller biomass accumulates smaller quantities of pollutants
b)	they develop immunity
c)	they are exposed to less polluted air
d)	they are better able to develop a tolerance over multiple generations
e)	the adaptation rate of these plants is much smaller than of plants with a long lifetime

14.	If the below curve were for the effects of fluoride on humans, what dose should a dentist recommend to his patient?
a)	dose 1
b)	dose 2
c)	dose 3
d)	dose 4
e)	dose 5

15.	All of the following are infectious agents except:
a)	giardiasis
b)	salmonella
c)	dioxin
d)	malaria
e)	cryptosporidosis

16.	Major concepts in evaluating and treating the effects of environmental pollutants include all of the following except:
a)	individuals vary in their response to exposure to the same dose of a pollutant
b)	some pollutants have minimum thresholds
c)	effects of environmental toxins are nonreversible
d)	the chemical form of the pollutant has a great effect on its toxicity
e)	the pollutant and its activity are changed by ecological and biological processes

17.	The lessons learned from the pollution episode at Minamata, Japan include all of the following except:
a)	pollutants can be chemically transformed in the environment into more toxic forms
b)	DDT can cause damage to the environment that may last for decades
c)	humans are themselves susceptible to toxic pollutants
d)	toxic pollutants may be naturally concentrated through the process of biomagnification
e)	a pollution problem may be slow to be recognized, admitted, and remedied

18.	Once absorbed, some toxic compounds are retained in the tissue of various life forms for long periods of time. These pollutants pose special risks to humans and other organisms high on the food chain through the process of:
a)	carcinogenesis
b)	compound contamination
c)	synergism
d)	threshold effect
e)	biomagnification

19.	Sulfur dioxide and particulates are both pollutants with harmful effects to human health. However when humans are exposed to both simultaneously, the effects are much more severe. This process is known as:
a)	carcinogenesis
b)	compound contamination
c)	synergism
d)	threshold effect
e)	biomagnification

20.	If the curve above represents the incidental mortality of apple trees after spraying of a pesticide to control apple weevils, what is the largest dose that an apple grower should choose?
a)	dose 1
b)	dose 2
c)	dose 3
d)	dose 4
e)	dose 5

21.	Reducing waste volumes through the combination of more sustainable use of materials and resource consideration is called:		
A)	ecological engineering	D)	materials management
B)	integrated waste management	E)	industrial ecology
C)	green manufacturing		

22.	Which of the following, among other things, first established the fund for cleaning up the worst abandoned hazardous waste sites (the fund is known as “Superfund”):

A)	Superfund Amendment and Reauthorization Act (SARA) of 1986
B)	Hazardous Waste Liability Act (HWLA) of 1965
C)	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
D)	Toxic Waste Funding Act (TWFA) of 1992
E)	Resource Conservation and Recovery Act (RCRA) of 1976

23.	The study of the relationships among industrial systems and their links to natural systems is called:		
A)	ecological engineering	D)	materials management
B)	integrated waste management	E)	industrial ecology
C)	green manufacturing		

24.	Why is e-waste considered to be a problem?
A)	reclamation of raw materials can be hazardous to the health of recycling workers
B)	e-waste may contain toxic materials
C)	in the U.S., e-waste cannot be recycled profitably without charging the people who dump them a large fee
D)	all of these
E)	reclamation of raw materials can be hazardous to the health of recycling workers and e-waste may contain toxic materials

25.	Disposing of biodegradable toxic waste by land application is a cheap and efficient method because:
A)	the concept of dilute and disperse is adequate for toxic waste
B)	these materials are degraded by the microorganisms in the soil
C)	there is no limit to the amount of waste that can be applied to the soil
D)	the waste is a good fertilizer
E)	the practice is difficult to regulate and laws against it are difficult to enforce

26.	Why has Europe been more successful in recycling than the U.S.? I. landfill fees in Europe are much higher than in the U.S. II. the manufacturers are responsible for the disposal cost of packaging and industrial goods they produce III. recycling is required by law in almost all European countries
	A) I only B) II only C) III only D) I and II E) I, II and III
	D
	Difficulty: Medium Link to: critical thinking issue

27.	Deep-well injection of hazardous chemical waste may be a suitable method of disposal where:
A)	extensive fractures penetrate to depth
B)	a deep, porous rock formation is isolated from surface and near-surface systems
C)	extensive seismic activity occurs
D)	impermeable material underlies porous, permeable rocks at depth
E)	deep groundwater systems are saline or brackish, and circulation is rapid
	B
	Difficulty: Medium Link to: 29.8

28.	Potential dangers of deep-well injection of hazardous waste include all of the following except:		
A)	blow-out of over pressured wells	D)	earthquakes
B)	groundwater pollution	E)	land subsidence
C)	corrosion of the well		
	E		
	Difficulty: Easy Link to: 29.8		

29.	Love Canal, near Niagara Falls, New York, illustrates which of the following principles or problems?
A)	disposal of hazardous chemical waste in an uncontrolled site
B)	economic mineral reserves from sewage sludge
C)	wild species re-establishing themselves in an urban setting
D)	poor understanding of flood hazard
E)	the difficulty in finding new solid waste sites as old dumps are filled to capacity
	A
	Difficulty: Medium Link to: A Closer Look, 29.3

30.	The Resource Conservation & Recovery Act of 1979:
A)	defined hazardous waste by four characteristics
B)	established the Superfund for clean-up of toxic waste sites
C)	is an environmental protection organization founded in 1979
D)	placed limitations and controls on surface mining
E)	outlined land-use policy for the national parks and forests

31.	The major component of solid waste in United States is:		
A)	paper	D)	plastic
B)	garden (plant) waste	E)	construction debris
C)	food waste		

32.	The most abundant components of solid waste are, in order from most abundant to least:		
A)	metals, textiles, paper products	D)	garden waste, metals, food waste
B)	food waste, paper products, textiles	E)	metals, garden waste, food waste
C)	paper products, food waste, textiles		

33.	Application of waste material to the soil surface is referred to as “land application”. Land application is a suitable means for disposal of:		
A)	toxic materials in low concentrations	D)	biodegradable waste
B)	low-level nuclear waste	E)	material with a high biopersistence
C)	agricultural waste		

34.	Which of the following approaches would be the most appropriate alternative for disposal of organic waste from residential gardens and kitchens?		
A)	secure landfill	D)	composting
B)	deep well disposal	E)	ocean dumping
C)	open dump		

35.	Which of the following would be the best setting for deep-well injection of hazardous wastes?
A)	porous sandstone overlain by an aquifer
B)	tilted limestone layer overlain by sandstone
C)	faulted volcanic rocks
D)	a cavernous limestone aquifer
E)	porous sandstone, overlain by clay

36.	Adverse effects of deep-well injection of hazardous chemical wastes include:
A)	ground surface subsidence
B)	saltwater intrusion
C)	increased earthquake activity
D)	dilution of petroleum in subsurface reservoirs
E)	all of these are adverse effects of deep well injection

37.	Permanent disposal of high-level radioactive waste is considered safest in:		
A)	densely populated areas	D)	the ocean
B)	impermeable bedrock	E)	the craters of active volcanoes
C)	oil- and gas-producing areas		

38.	Which of the following rock types is the best suited for subsurface storage of high-level radioactive waste?		
A)	faulted basalt	D)	welded tuff
B)	cavernous limestone	E)	sandstone
C)	salt diapers		

39.	Incineration of combustible material leaves:		
A)	no residue	D)	toxic residue
B)	gaseous emissions only	E)	a bad taste in your mouth
C)	noncombustible materials and ash		

40.	A secure landfill for hazardous chemical waste should include which of the following safety features:
A)	permeable liner
B)	porous clay cap
C)	system for discharging leaching into the local sewer system
D)	electronic systems to detect leaks
E)	self-destruct system

41.	What does point B signify?

42.	In the figure above, what does point C signify?

43.	Point D in the figure above is a significant threshold between point C and point E (death of the organism). What does point D signify?

44.	If the above curve were for the effects of fluoride on humans, what dose should a dentist recommend to his patient?

45.	If the above curve were for the effects of an agricultural pesticide, what dose should a farmer apply to his land?

46.	Dose 2 is known as:

47.	In the figure above, Dose 3 is known as:

48.	If the curve shown above represented the effects of an agricultural pesticide on a severe pest, what is the maximum dose a farmer should apply to his crop?

49.	What would be the effect of a higher dose?

50.	How would an increasing tolerance in the pests to this chemical affect the position of the curve?

51.	The textbook lists seven major categories of pollutants. List these seven categories and give an example of a source for each one.

52.	Distinguish between environmentally benign and hazardous organic compounds.

53.	List the four general steps involved in the process of risk assessment. identification of the hazard

54.	Arsenic was one of the first pesticides used on potatoes, cotton and apples. Why is this pesticide not ideal for the whole environment?

55.	You want to trace an artificial organic compound through the environment. How can you determine the likely pathways?

56.	List three major effects of lead poisoning.

57.	Name three effects of oil on marine life.

58.	Name four of six major categories of environmental pollutants listed in the textbook. toxic chemical compounds

59. What are organic compounds?

60. What is genetic tolerance? Give an example.

61. What is a hormonally active agent (HAA) and what are its effects?

62. The Case Study in Chap. 29 outlined some of the issues and challenges associated with cell phones and other electronic devices. What kinds of problems arise when we dispose of these high-tech products?

63. For each of the options for disposing of solid waste listed below, list one advantage of that method and one disadvantage.

		advantage	disadvantage
	on-site disposal		
	composting		
	incineration		
	open dumps		
	sanitary landfills		

64. For the disposal of waste such as dredged spoil into the ocean, a cap of uncontaminated sediment can be used to isolate contaminated material from the marine environment. What is the main problem with this method?

65. List two possible solutions to the problem of chemicals, metals, and other environmental toxins that may be present is waste water (sewage).

66. Is there a connection between incineration of solid waste and acid rain?

67. Name four of five classes of hazardous waste.

68. Define the term “leachate.” What is an example of a source of this? What type of problems are associated with it?

69.	What was the main purpose of the 1976 Resource Conservation and Recovery Act?
70.	Why is monitoring the movement of groundwater particularly important at solid-waste disposal sites that have been filled and abandoned?
71.	What makes a sanitary landfill sanitary?
72.	The northwestern Hawaiian Island are very remote and unspoiled, yet enormous amounts of plastic trash can be found along the beaches of these islands. Why?
73.	Why are the best sites for waste disposal in arid regions?
74.	What are two main advantages of incineration of solid waste?
75.	There are four characteristics sufficient to designate waste as hazardous. One is ignitability. List two of the remaining three.
76.	What are the two major hazards from open dumps?
77.	There are four major options for hazardous waste management. One is disposal. List two of the other three.
78.	List four methods for disposal of hazardous waste.