1. The majority of MSW, or municipal solid, is sent where in the US?
   (A) Waste treatment plants
   (B) Deep wells
   (C) Recycling centers
   (D) Sanitary landfills
   (E) Mass burn incinerators

2. Which of the following is NOT accurate regarding recycling?
   (A) It decreases pollution.
   (B) It saves energy.
   (C) It increases the demand for new landfills.
   (D) It prevents the emission of greenhouse gases.
   (E) It decreases the increases in global warming.

3. To neutralize acidic lakes, the government is currently
   (A) adding nitrate fertilizer to lakes
   (B) adding limestone or lime to lakes
   (C) adding phosphate fertilizer to lakes
   (D) doing nothing
   (E) adding magnesium to lakes

4. Which of the following solid-waste disposal methods does NOT encourage waste production?
   (A) Surface impoundments
   (B) Sanitary landfills
   (C) They all encourage waste production
   (D) Incineration
   (E) Deep underground wells

5. Beaches are sometimes closed to swimming following runoff events. Which of the following is an accurate description of the water in the runoff?
   (A) Bacteria in runoff water make it a point source of pollution.
   (B) Acid rain contaminates streams, which produce runoff.
   (C) Pollution dumped into the oceans is the direct cause of the closings.
   (D) Droughts cause decreases in the water levels leading to pollution.
   (E) Increased rain leads to runoff, which causes increased ocean water levels, which are hazardous.

6. Seawater is naturally acidic because it contains
   (A) dissolved sodium chloride (salt)
   (B) dissolved carbon dioxide
   (C) dissolved oxygen
   (D) phytoplankton
   (E) none of the above

7. Thermal shock, which kills multitudes of fish and other organisms, is usually caused by
   (A) Global warming
   (B) Increased dissolved CO₂ levels
   (C) The opening of a nuclear power plant near a body of water
   (D) Radioactive isotopes polluting a body of water
   (E) Glacier melting and ice floes

8. The EPA has stated that the most environmentally sound method of waste disposal is
   (A) composting
   (B) source reduction
   (C) landfills
   (D) demanufacturing
   (E) recycling

9. Which of the following would not increase the biochemical oxygen demand of a river?
   (A) Mobil Springfield
   (B) Exxon Baton Rouge
   (C) Shell Duchess
   (D) Exxon Valdez
   (E) Amoco Enterprise

10. In 1989, a supertanker from a large oil corporation spilled over the then pristine Prince William Sound in Alaska. The name of the tanker was
    (A) Mobil Springfield
    (B) Exxon Baton Rouge
    (C) Shell Duchess
    (D) Exxon Valdez
    (E) Amoco Enterprise
11. Phytoremediation is the process by which
(A) plants are used to remove or destroy contamination in groundwater or surface water
(B) solutions of toluene or methane are injected into contaminated groundwater to support the co-metabolic breakdown of contaminants
(C) organic contaminants in groundwater are destroyed by high-frequency radiation
(D) contaminated wastewater is concentrated through chemical and physical means
(E) steam is forced into an aquifer to vaporize volatile and semivolatile contaminants

12. Bioventing is the process by which
(A) contaminated soil is removed from a site and mixed with organic amendments
(B) contaminated soils are mixed with organic matter and placed in above-ground enclosures
(C) contaminated surface soil is treated by tilling the soil to increase aeration
(D) oxygen is injected into soils to stimulate biodegradation
(E) waste-contaminated soil and solvents are mixed

13. Which of the following is an effective strategy in farming to prevent eutrophication of nearby lakes and consequent algae blooms?
(A) Alternating planting between row crops and soybeans or other nitrogen-fixing plants
(B) Deforesting nearby watersheds
(C) Increasing the use of pesticides to reduce the need for fertilizers
(D) Increasing use of manure instead of inorganic fertilizers such as nitrate and phosphate
(E) Moving farmland closer to lakes

14. Which of the following is LEAST affected by acid rain?
(A) Pine forests
(B) Deep sea thermal vent ecosystems
(C) Rivers
(D) Buildings
(E) Small ponds

15. The optimum soil pH for most plant growth is
(A) 3.5 to 4.5
(B) 4.5 to 5.5
(C) 5.5 to 6.5
(D) 6.5 to 7.5
(E) 7.5 to 8.5

16. Power plant water pollution most likely would result in ________, agricultural water pollution most likely would result in ________,
(A) thermal pollution; eutrophication
(B) eutrophication; fishkill
(C) atrophy; contamination
(D) phytoremediation; bioremediation
(E) thermal pollution; biotic pollution

17. Below are listed ways in which soil and hazardous waste can be managed or prevented. Which of the following is the correct order in which these techniques should be prioritized according to the low-waste approach?
I. Bury waste in landfills
II. Reduce packaging and materials in products
III. Repair products
(A) II, III, I
(B) II, I, III
(C) I, II, III
(D) II, III, I
(E) III, II, I
18. Which of the following is a direct result of toxic mercury pollution in nearby aquatic systems downwind of coal-burning plants? (hint: the highly toxic methylmercury is non-polar)

(A) Small organisms convert mercury compounds to methylmercury which is then absorbed by bacteria and consequently biomagnified throughout the food chain.

(B) Small organisms convert mercury compounds to methylmercury which is then absorbed by fish and consequently biomagnified throughout the food chain.

(C) Methylmercury is leached into aquatic systems, directly absorbed by bacteria, and consequently biomagnified throughout the food chain.

(D) Small organisms convert mercury compounds to methylmercury which is then absorbed by phytoplankton and consequently biomagnified throughout the food chain.

(E) Methylmercury is leached into aquatic systems, directly absorbed by phytoplankton, and consequently biomagnified throughout the food chain.

19. Acid deposition can be formed by

I. NO$_2$ reacting with water vapor
II. SO$_3$ reacting with water vapor
III. CO$_2$ reacting with water vapor

(A) I, II, and III (D) I and II only
(B) II and III only (E) I and III only
(C) I only

20. Which of the following atmospheric pollutants is entirely anthropogenic in origin?

(A) Carbon dioxide
(B) Nitrogen oxides
(C) Polychlorinated biphenyls
(D) Methane
(E) All of the above

21. Which of the following does NOT lead to drinking water contamination?

(A) Nonpoint runoff of pesticides
(B) Forcing cities to withdraw their water downstream
(C) Malfunctioning sewage treatment plants
(D) Nonpoint runoff of animals waste and fertilizer
(E) Deliberate releases of toxic inorganic chemicals from industries

22. Which of the following countries was reported by the World Health Organization in 1998 to be home to 7 of the 10 most polluted cities in the world?

(A) Mexico (D) United States
(B) India (E) China
(C) Russia

23. During the advanced treatment phase, sewage is

(A) allowed to settle and skimmed off
(B) dried into sludge cakes on sand drying beds
(C) disinfected by adding chlorine or using ultraviolet light
(D) drained of its excess phosphorous and nitrogen
(E) screened for large particles

24. If a sample of radioactive waste has an activity level of 4 curies and a half-life of 5 years, after how many years will the activity level of the sample be reduced to 0.50 curie?

(A) 30  (B) 15  (C) 60  (D) 45  (E) 7.5

25. A combined sewer system is one in which

(A) many urban areas process their wastes
(B) industry uses the sewer system and houses use septic tanks
(C) human and industrial wastes as well as urban runoff flow into one sewage treatment plant
(D) some houses are connected to the sewer system and others use septic tanks
(E) sewage is treated multiple times using several different methods
26. Runoff from fertilized lawns and agricultural fields and the dumping of municipal wastes, resulting in higher concentrations of phosphorus and nitrogen would do what to lakes?

(A) Higher concentrations of phosphorus and nitrogen would have no effect on lakes.
(B) A population explosion of algae, the production of more detritus, and stable concentration of dissolved oxygen
(C) A population decrease in algae, the production of less detritus, and eventual increase in dissolved oxygen
(D) A population explosion of algae, the production of more detritus, and eventual depletion of dissolved oxygen
(E) A population decrease in algae, the production of more detritus, and eventual depletion of dissolved oxygen

27. The half-life of Uranium 238 is approximately

(A) 25 years
(B) 10,000 years
(C) 3,000,000 years
(D) 50,000,000 years
(E) 4,500,000,000 years

28. The largest portion of the municipal solid waste produced in the United States is

(A) plastic
(B) metal
(C) food
(D) glass
(E) paper

29. Which of the following is NOT a point source of pollution?

(A) Oil spill
(B) Runoff from streets
(C) Nuclear meltdown
(D) Industrial waste drain
(E) Smokestacks

30. Which of the following is NOT a federal standard for all new landfills opened after 1993?

(A) Landfills must be zoned at least 35 miles from populated regions
(B) Landfills may not be zoned near airports
(C) Landfills may not be sited on wetlands or floodplains
(D) Landfills must have liners
(E) Landfill operators must monitor groundwater for the presence of harmful chemicals

31. The primary component of untreated sludge is

(A) sand
(B) coliform bacteria
(C) gravel
(D) water
(E) food particles

32. A waste disposal firm has been illegally dumping disposable diaper wastes into a reservoir to increase profits. A likely effect of this unsound policy is

(A) a decrease in externalized costs
(B) an increase in the cost of waste disposal
(C) the detection of fecal coliform bacteria in the drinking water
(D) the detection of methylmercury in groundwater
(E) none of the above

Base your answers to questions 33 through 35 on the following elements.

(A) Iron
(B) Chlorine
(C) Aluminum
(D) Nitrogen
(E) Oxygen

33. Attacks O₃ molecules to create O₂ molecules.

(A) E  (B) B  (C) A  (D) C  (E) D

34. The second most abundant element in the troposphere

(A) B  (B) E  (C) D  (D) C  (E) A

35. The most abundant element in seawater

(A) B  (B) A  (C) D  (D) C  (E) E
36. A bay is polluted with mercury. Based on what you know about bioaccumulation, which of the animals listed below would have the highest levels of mercury in their system?

(A) Otters  (D) Zooplankton
(B) Clams  (E) Phytoplankton
(C) Oysters

37. In order for biomagnification to occur, a pollutant must be

I. concentrated by the producers
II. soluble in water
III. long-lived

(A) I only  (D) II and III only
(B) I and II only  (E) I, II and III
(C) I and III only

38. Which of the following items would be least beneficial to add to a compost pile?

(A) Leftover meats  (D) Fireplace ashes
(B) Coffee grounds  (E) Yard clippings
(C) Sawdust

39. Which of the following laws, instead of actively preventing pollution is mainly directed at cleaning up pollution?

(A) Clean Water Act
(B) Superfund Act
(C) Clean Air Act
(D) Toxic Substances Control Act
(E) National Environmental Policy Act

40. Which of the following processes does not take place entirely within an organism?

(A) metastasis  (D) seroconversion
(B) biomagnification  (E) bioaccumulation
(C) thrombosis

41. An LD_{25} dose is one that

(A) has some effect upon 25% of the population
(B) has an acceptable risk level of 25%
(C) has an acceptable risk level of 75%
(D) kills a quarter of the study group
(E) is administered to 25% of the population

42. Which of the following acts established a Federal Superfund?

(A) The Estuary Protection Act
(B) The Nuclear Waste Policy Act
(C) The Food Quality Protection Act
(D) The Resource Conservation and Recovery Act
(E) The Comprehensive Environmental Response, Compensation and Liability Act

43. Which of the following is NOT a way in which oil spills are commonly cleaned up?

(A) Using coagulating agents to cause floating oil to clump together for easier pickup
(B) Burning the oil
(C) Pumping oil into water processing plants along the shore
(D) Using dispersing agents to break up oil slicks
(E) Using absorbent pads or large mesh pillows to soak up oil

44. Artificial eutrophication might be caused by

(A) fertilizer runoff
(B) the dumping of radioactive waste
(C) artificial food dyes
(D) pesticide use
(E) none of the above

45. Sediment is one of the greatest polluters of water. Why does it have such a significant impact when it is a natural component of Earth?

(A) volume-reduction and settling
(B) the incomplete degradation of wastes
(C) it lowers the water level in some areas, and raises it in other areas.
(D) It fills and clogs lakes, harbors, streams and reservoirs.
(E) It enters the drinking water supply.

46. The most serious and imminent problem associated with sanitary landfills is

(A) volume-reduction and settling
(B) the incomplete degradation of wastes
(C) the generation of carbon dioxide gas
(D) the release of disease organisms
(E) the contamination of groundwater
47. An oligotrophic lake might contain

I. algal blooms  
II. pike and whitefish  
III. catfish and carp

(A) I only  
(B) II only  
(C) III only  
(D) I and III  
(E) II and III

48. Runoff from a power plant is discharging pollution into a stream. Which of the following graphs accurately represents the distance from the discharge verses dissolved oxygen concentration?

(A) ![Graph A]  
(B) ![Graph B]  
(C) ![Graph C]  
(D) ![Graph D]  
(E) ![Graph E]

49. As of 2003, high-level radioactive wastes in the United States are stored

(A) in facilities in forty-three states  
(B) in an abandoned mine at the Los Alamos National Laboratory  
(C) underneath Rigley Field in Chicago, Illinois  
(D) in the Pentagon in Washington, D.C.  
(E) in the Yucca Mountain Site seventy miles outside of Las Vegas

50. An agricultural community decided to spray its farms with a pesticide over a period of 2 months to target a particular pest destroying many crops. Biologists sampled random farms for pest population size, which is represented in the graph below.

![Graph of Pest Population Size]

Which portion of the graph most likely represents the effects of natural selection?

(A) I  
(B) II  
(C) III  
(D) IV  
(E) V
1. D
2. C
3. B
4. C
5. A
6. B
7. C
8. B
9. E
10. D
11. A
12. D
13. A
14. B
15. D
16. A
17. A
18. B
19. A
20. C
21. B
22. E
23. C
24. B
25. C
26. D
27. E
28. E
29. B
30. A
31. D
32. C
33. B
34. B
35. E
36. A
37. C
38. A
39. B
40. B
41. D
42. E
43. C
44. A
45. D
46. E
47. B
48. E
49. A
50. B