

# APES Practice Exam 1

# APES Practice Exam

**Questions 1-5 refer to the structure of the atmosphere.**

- (A) Troposphere
- (B) Stratosphere
- (C) Thermosphere
- (D) Mesosphere
- (E) Stratopause

1. The layer that contains the earth's daily weather
2. Extends from 50-80 km above Earth
3. The earth's ozone layer exists in this layer of the atmosphere
4. The highest layer of the atmosphere (above 80 km)
5. The layer of the atmosphere that's heated by infrared radiation from the earth

[Check Answers](#)

**Questions 6-10 refer to the following soil layers.**

- (A) A horizon
- (B) B horizon
- (C) E horizon
- (D) O horizon
- (E) Bedrock

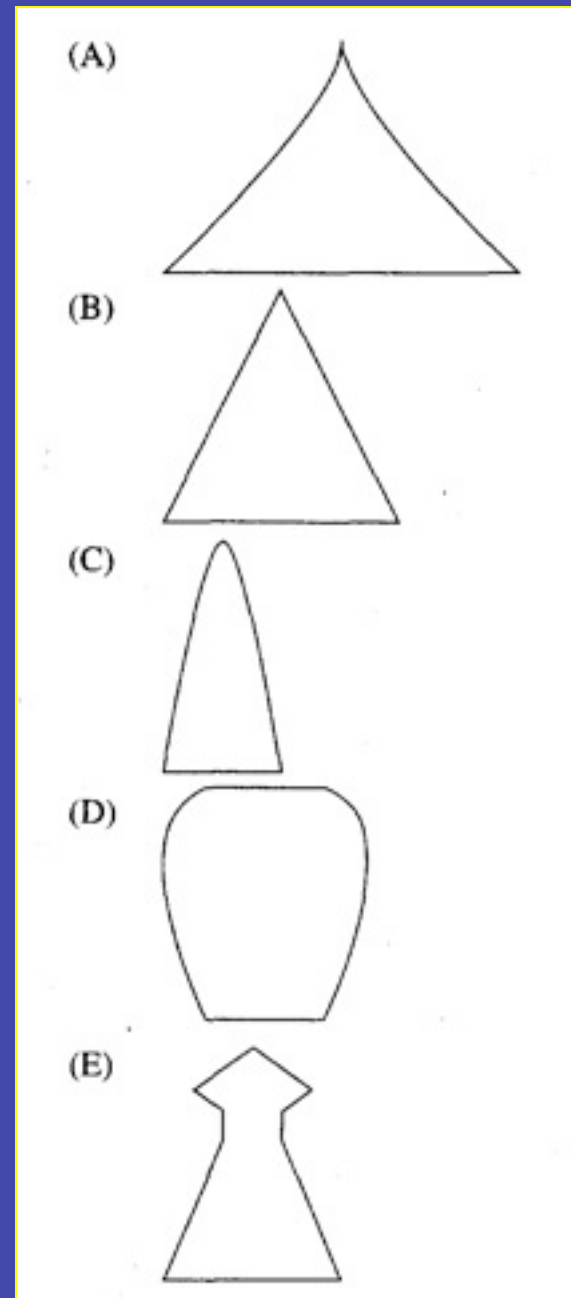
- 6. Silt and sand are concentrated here
- 7. Litter layer, mostly undecayed materials
- 8. The deep, underlying non-soil materials
- 9. The layer where minerals that were leached out of layers above accumulate
- 10. A mixture of soil, loam, and detritus; the topsoil

[Check Answers](#)

**Questions 11-15 refer the following five age-structure pyramids.**

- 11. A country that is growing slowly**
- 12. A country at zero population growth**
- 13. A country that is losing many of its young to diseases like AIDS**
- 14. A rapidly growing population**
- 15. A country showing a population decline**

[Check Answers](#)



**Questions 16-20 refer to the following risks to human health.**

- (A) Radon
- (B) Asbestosis
- (C) Malaria
- (D) Earthquake
- (E) AIDS

- 16. The virus that causes this is transmitted through bodily fluids
- 17. Can cause massive destruction
- 18. Caused by microscopic fibers of a mineral
- 19. Radiation that causes lung cancer
- 20. Caused by a bacteria carried by mosquitoes

[Check Answers](#)

**Questions 21-25 refer to the following soil types.**

- (A) Desert soil
- (B) Grassland soil
- (C) Tropical rain forest soil
- (D) Pine forest soil
- (E) Deciduous forest soil

- 21. Soil has a substantial organic layer, fire helps to break down plant material in this layer
- 22. Soil comprised of litter and humus; this soil is acidic due to the accumulation of needles
- 23. Soil is rocky, very dry, and contains almost no organic matter
- 24. Soil is acidic and contains very little organic matter despite large plant populations
- 25. Soil is rich in humus and partially decayed leaves

[Check Answers](#)

**Questions 26-30 refer to the following atmospheric pollutants.**

- (A) Carbon monoxide
- (B) Nitrogen dioxide
- (C) Sulfur dioxide
- (D) Photochemical oxidant
- (E) Suspended particulate matter

- 26. Is involved in the formation of nitric acid
- 27. Dust or soot
- 28. Ozone
- 29. Is involved in the formation of sulfuric acid
- 30. Health effects include reduced blood oxygen levels

[Check Answers](#)

## Part B

**Directions:** Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case and then fill in the corresponding oval on the answer sheet.

[Check Answer](#)

31. The goal of the second stage of a septic treatment plant is to
- A. remove the large solid material
  - B. aerate the water
  - C. make muddy water clear
  - D. remove chemicals such as DDT or PCB's
  - E. lower the amount of organic material in the water



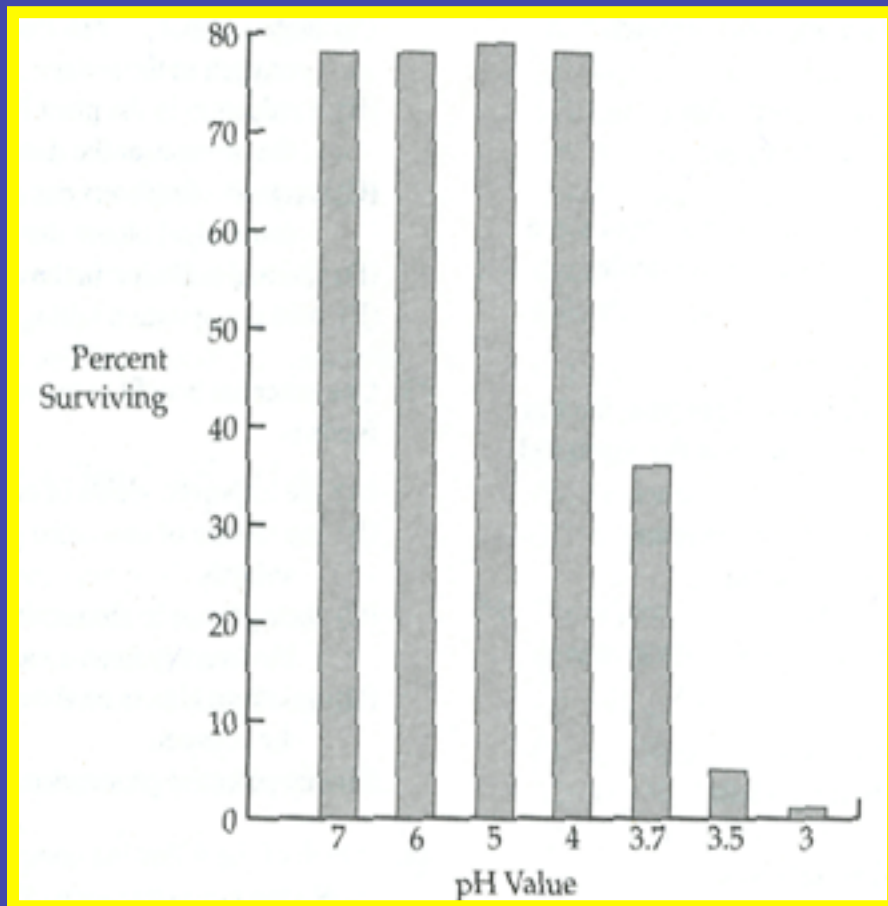
32. Which of the following organisms is the first to be adversely affected by thermal pollution in a stream?

- A. Trees along the bank
- B. Insect larvae in the water
- C. Large fish migrating up stream
- D. Birds drinking the water
- E. Bacteria in the water

[Check Answer](#)

**Questions 33-36 refer to the following passage and graph,**

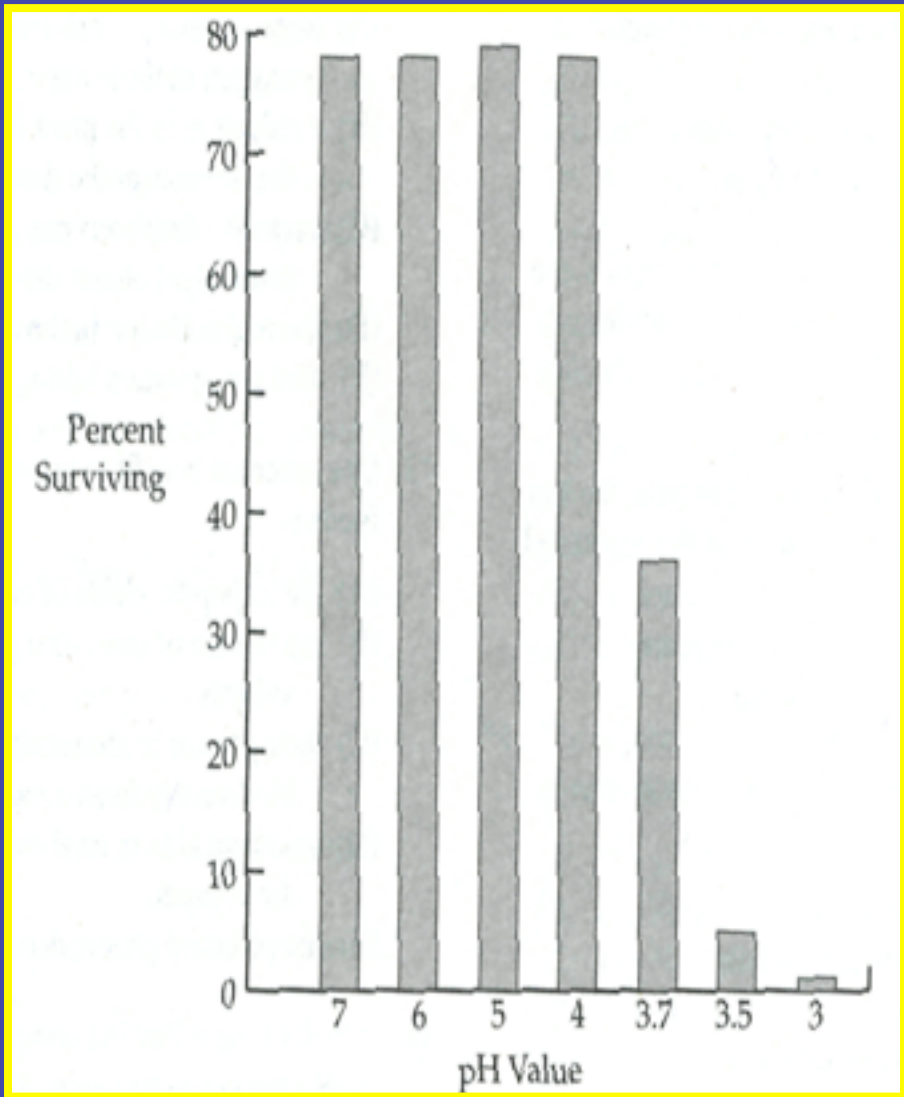
A scientist placed 100 fish eggs into each of seven solutions with different pH values. After 96 hours the number of survivors was counted and converted into a percent. The percent surviving is given in the graph below.



33. Which of the values below best represents the  $LD_{50}$  in this experiment?

- A. 3.0
- B. 3.5
- C. 3.7
- D. 4.0
- E. 5.0

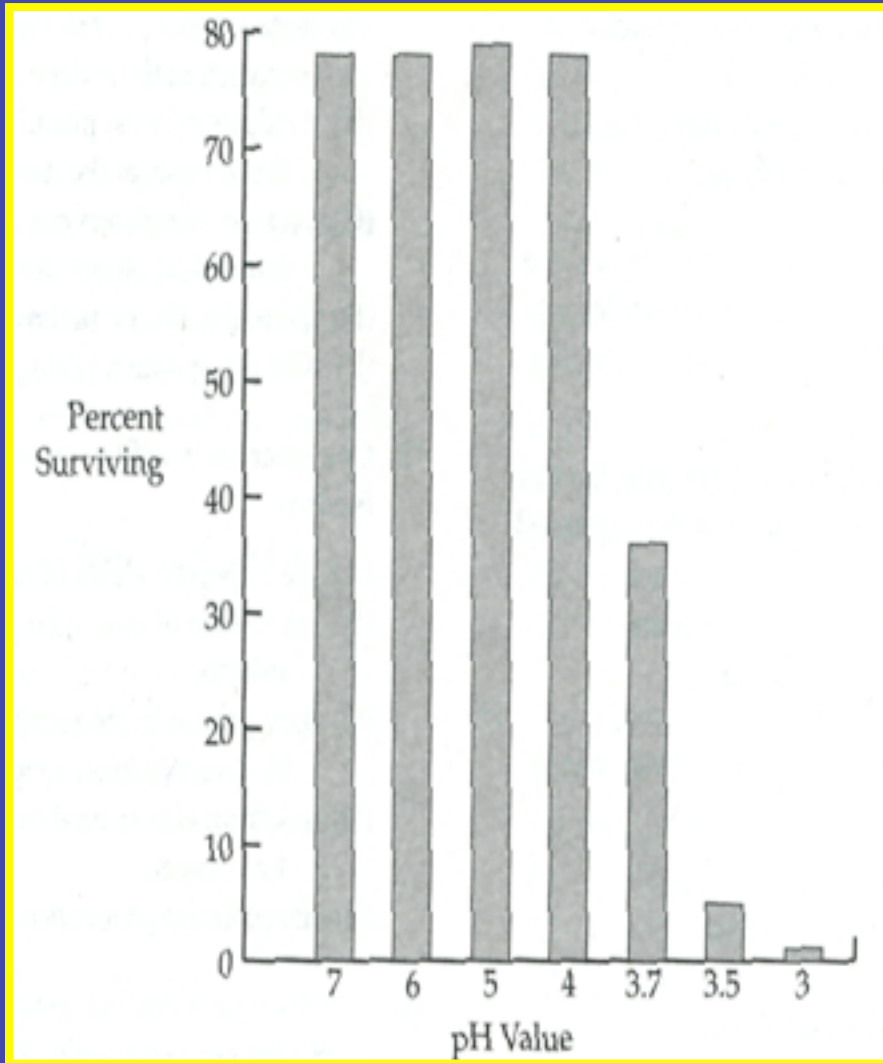
[Check Answer](#)



34. At what pH value do the fewest fish hatch?

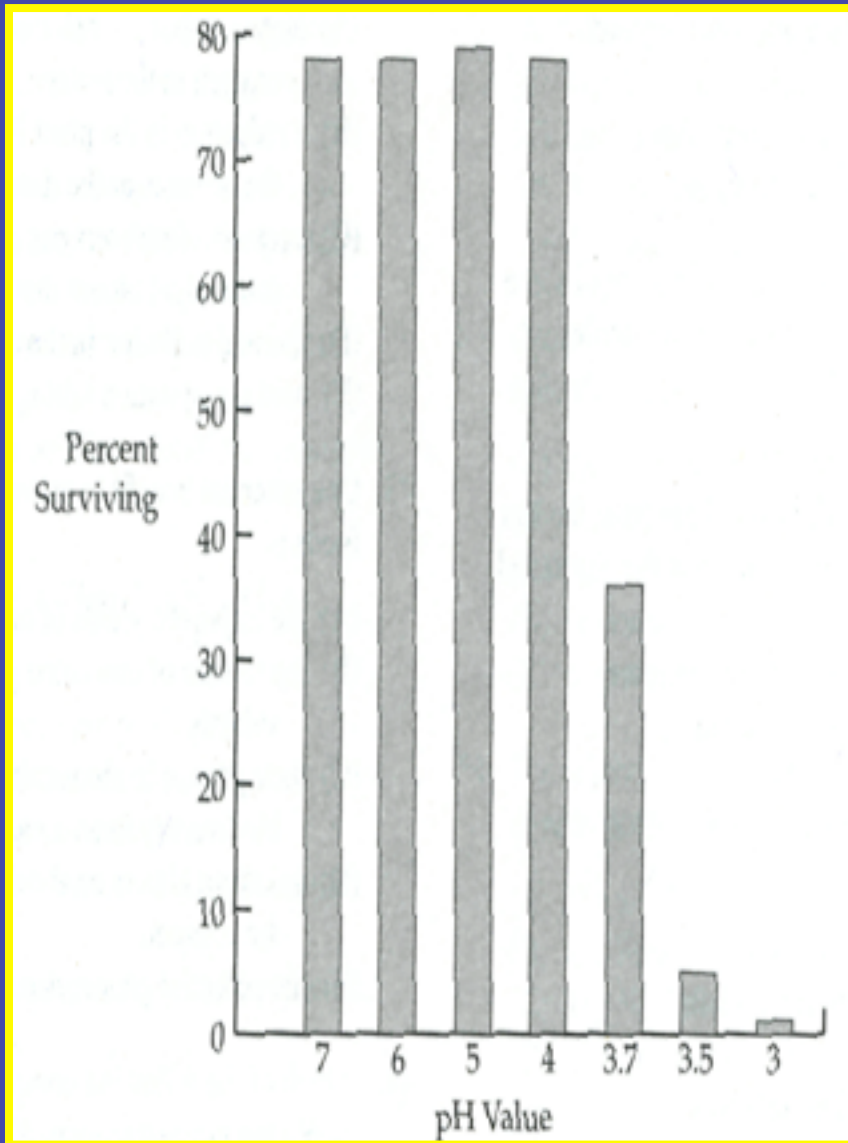
- A. 7.0
- B. 4.0
- C. 3.7
- D. 3.5
- E. 3.0

[Check Answers](#)



35. Which of the following best describes the goal of the above experiment?
- A. To test the hypothesis that the bigger the fish, the smaller the pH tolerance range.
  - B. To observe how many fish would hatch at different pH values.
  - C. To find out how many fish live in streams with different pH values.
  - D. To understand how acid rain affects life in streams.
  - E. To see what chemical is best at changing the pH of water.

[Check Answer](#)



36. The pH value is a measure of the

- A. amount of heavy metals in the water
- B. BOD of the water
- C. concentration of oxygen in the water
- D. concentration of hydrogen ions in the water
- E. depth the scientist can see under the water

[Check Answers](#)

37. The National Priorities and brownfields sites are described in which of the following laws?

- A. "Superfund" program
- B. Resource Conservation and Recovery Act
- C. Clean Air Act
- D. Federal Water Pollution Control Act
- E. National Environmental Policy Act

38. Later fall frosts and the northward migration of some tree and plant species may indicate which of the following global changes?

- A. Increased global temperatures
- B. The effects of more ultraviolet light from the sun
- C. A reduction in the volume of ice at the North and South Poles
- D. Changes in global precipitation patterns
- E. Flooding of areas near the ocean

[Check Answers](#)

39. High infant mortality rates are likely to occur in countries that have

- A. a strong and stable economy
- B. high levels of education for adults
- C. a stable food supply
- D. high levels of infectious diseases
- E. safe drinking water

40. Composting is a process that produces

- A. useful plastic products
- B. a nutrient-rich soil conditioner
- C. manure
- D. lower-grade paper products
- E. materials used in construction

[Check Answers](#)

41. All of the following statements are true EXCEPT

- A. energy can be converted from one form to another
- B. energy input always equals energy output
- C. energy and matter can generally be converted into each other
- D. the laws of thermodynamics can be applied to living systems
- E. at each step of an energy transformation, some energy is lost to heat

42. Oxygen-depleted zones of the oceans, such as the one at the mouth of the Mississippi River, are most likely caused by

- A. large numbers of fish that are using up all the oxygen in the water
- B. a reduction in the plant life in rivers that empty into the ocean near the dead zone
- C. excessive fertilizers carried into the ocean, which cause algal bloom that lowers the oxygen levels
- D. thermal pollution in the ocean
- E. acid precipitation falling on the ocean

[Check Answers](#)



43. One potential benefit to using genetically modified foods is

- A. the improved yields of crops
- B. the release of unwanted genes to other plants or animals
- C. their growth in monoculture will reduce biodiversity in an area
- D. unknown effects on the ecosystem into which they are released
- E. the potential greater need for fertilizers

44. Which of the following compounds would probably supply the greatest amount of useful energy to humans?

- A. The exhaust from a car
- B. Unrefined aluminum ore
- C. A glass bottle
- D. Heat used to warm a home
- E. A liter of gasoline

[Check Answers](#)

45. Which of the following choices gives the geologic eras in the correct sequence, from the oldest to the most recent?

- A. Cenozoic—Mesozoic—Paleozoic—Precambrian
- B. Precambrian—Paleozoic—Mesozoic—Cenozoic
- C. Paleozoic—Precambrian—Cenozoic—Mesozoic
- D. Paleozoic—Cenozoic—Precambrian—Mesozoic
- E. Mesozoic—Paleozoic—Precambrian—Cenozoic

[Check Answer](#)

46. Which of the following figures most accurately gives the percent of the world's solid waste produced by the United States?

- A. 50 percent
- B. 40 percent
- C. 33 percent
- D. 10 percent
- E. 5 percent

47. Which of the following correctly describes conservation easement?

- A. It is a process that conserves soil from erosion
- B. This is a binding agreement that preserves land from further development in exchange for tax write-offs
- C. This agreement allows a developer to add new land to a housing project with little input from neighbors
- D. This practice prevents the breakdown of stream banks
- E. This is a method of building a landfill to minimize runoff

[Check Answers](#)

48. The highest priority of the Clean Water Act is to provide
- A. funds to increase recycling participation
  - B. guidance to refer to toxic chemicals
  - C. funds to reclaim old strip mines
  - D. policies to lessen the amount of oil spills in the ocean
  - E. policies to attain fishable and swimmable waters in the United States

49. Which of the following best describes changes in the genetic composition of a population over many generations?

- A. Evolution
- B. Mutation
- C. Natural selection
- D. Emigration
- E. Biomagnification

[Check Answers](#)

50. Women have fewer and healthier children when all of the following are true EXCEPT

- A. they have little education
- B. they live where their rights are not suppressed
- C. they have access to medicine and health care
- D. the cost of a child's education is high
- E. they have access to birth control

51. The maximum number of a species that can be sustained in an ecosystem." This sentence best defines

- A. the carrying capacity
- B. an ecotone
- C. the upward curve of a population graph
- D. natural selection
- E. a community

[Check Answers](#)

52. An increase in the amount of UV light striking the earth as a result of ozone loss will cause which of the following?
- A. Global climate change
  - B. Increased skin cancer rates in humans
  - C. Lowering of ocean water levels
  - D. An increase in CO<sub>2</sub> in the atmosphere
  - E. A change in the North Atlantic Current

53. Ozone in the troposphere can result in all of the following EXCEPT
- A. eye irritation
  - B. lung cancer
  - C. bronchitis
  - D. headache
  - E. emphysema

[Check Answers](#)

54. The number of species that can live in a habitat is directly determined by which of the following?

- A. The amount of solar energy in a biome
- B. The First Law of Thermodynamics
- C. The Net Primary Productivity (NPP) of an area
- D. The Second Law of Thermodynamics
- E. The number of steps in the food web

55. The second law of thermodynamics relates to living organisms because it explains why

- A. matter is never destroyed but it can change shape
- B. living cells come from other living things
- C. plants need sunlight in order to survive
- D. all living things must have a constant supply of energy in the form of food
- E. the amount of energy flowing into an ecosystem is the same as the amount flowing out of that system

[Check Answers](#)

56. Acid deposition most severely affects amphibian species because amphibians

- A. do not care for their young
- B. are not mammals
- C. need to live in both terrestrial and aquatic habitats
- D. seldom reproduce
- E. eat only small insects

57. All of the following are internal costs of an automobile EXCEPT

- A. car insurance
- B. fuel
- C. pollution and health care costs
- D. raw materials and labor
- E. new tires

[Check Answers](#)



58. Scrubbers are devices installed in smoke stacks to

- A. reduce the amount of materials such as  $\text{SO}_2$  in the smoke they discharge
- B. clean out the stack so smoke can move rapidly upwards
- C. reduce the amount of sulfur in coal before it is burned
- D. clean out the boilers for more efficient operation
- E. reduce the amount of

59. After ore is mined, the unusable part that remains is called

- A. overburden
- B. seam waste
- C. leechate
- D. tailings
- E. reclamation

[Check Answers](#)

60. All of the following are economic goods EXCEPT

- A. a swing set
- B. computer repair service
- C. food
- D. a walk in the woods
- E. a ticket to a game

61. Which fuel contains the greatest amount of sulfur?

- A. Wood
- B. Natural gas
- C. Oil
- D. Nuclear reactor fuel rods
- E. Coal

[Check Answers](#)

62. Which of the following sets includes the others?

- A. Renewable resources
- B. Natural resources
- C. Economic resources
- D. Manufactured capital
- E. Labor

63. Biological reserves are areas that allow countries to

- A. concentrate agricultural production in one area
- B. set aside critical habitats to ensure the survival of species
- C. control the flow of rivers and storm waters
- D. provide grazing land in order to ensure economic growth
- E. obtain needed minerals from underground mines

[Check Answers](#)

64. Which of the following countries has the largest population?

- A. Japan
- B. United States
- C. Canada
- D. China
- E. Australia

65. Which of the following phases of the hydrologic cycle requires the input of solar energy?

- A. Precipitation
- B. Bioremediation
- C. Precipitation
- D. Condensation
- E. Evaporation

[Check Answers](#)

66. Full cost pricing of a refrigerator would include

- A. adding the cost of employee salaries to the total cost
- B. the refrigerator's total impact on the environment
- C. the cost of transporting the refrigerator to the retail store
- D. the value of the refrigerator if it was donated to a nonprofit group
- E. changing the color of the refrigerator at a later date

67. A certain chemical has a concentration of 10 ppm in water. Which statement most accurately describes its concentration?

- A. There are 10 molecules of the chemical in one million molecules of water.
- B. There are 10 million molecules of the chemical in the sample.
- C. There are 10 million molecules of the chemical in a 1-liter beaker.
- D. There are 10 molecules of water in one million molecules of the chemical.
- E. There are 10 molecules of the chemical in 10 million molecules of water.

[Check Answers](#)

68. Which of the following types of birth control is predominately a chemical control?

- Birth control pill
- Diaphragm
- Abstinence
- Male sterilization
- Condom

69. Which of the following is NOT a disadvantage of old-style landfills?

- A. They generate gases that can be recovered and used as fuel
- B. Bad odors come from these landfills
- C. Toxic wastes leach into ground water
- D. Subsidence of the land after the landfill is filled
- E. They create an eyesore in the neighborhood

[Check Answers](#)

70. The international treaty concerning endangered species (CITES) has tried to protect endangered species by which of the following steps?
- A. Making more countries keep these species in zoos
  - B. Paying the debts of member countries in order to relieve the pressure to sell endangered species
  - C. Developing a list of endangered species and prohibiting trade in those species
  - D. Providing member countries with a police force to uphold the CITES treaty
  - E. Restoring endangered habitats

[Check Answer](#)

71. Country A had a birth rate of 12 per 1,000 in 2000 and a death rate of 9 per 1,000 in the same year. Which of the following is the correct rate of growth for the year 2000?

- A. 36.0 percent
- B. 27.0 percent
- C. 4.0 percent
- D. 3.0 percent
- E. 0.3 percent

72. Salt intrusion into freshwater aquifers; beach erosion; and the disruption of costal fisheries are all possible results of which of the following?

- A. Rising ocean levels as a result of global warming
- B. More solar ultraviolet radiation on the earth
- C. More chlorofluorocarbons in the atmosphere
- D. Reduced rates of photosynthesis
- E. Use of the oceans as waste disposal area

[Check Answers](#)



73. The chemical actions that produce compost would best be described as

- A. photosynthesis
- B. augmentation
- C. respiration
- D. decomposition
- E. nitrification

74. Which of the sources below would produce non-point source pollution?

- A. The smoke stack of a factory
- B. A volcano
- C. A pipe leading into a river from a sewage treatment plant
- D. A car's exhaust pipe
- E. A large area of farmland near a river

[Check Answer](#)

75. A nation's gross domestic product describes
- A. the amount of public transportation
  - B. the ability to provide health care
  - C. its recycling policies
  - D. the amount of its economic development
  - E. the quality of its environment

76. Which of the following mining operations requires people and machinery to operate underground?

- A. Mountain top removal
- B. Contour stripping
- C. Dredging
- D. Area stripping
- E. Shafting

[Check Answers](#)

77. A country's total fertility rate (TFR) best expresses which of the following?
- A. The life expectancy of women in the country
  - B. The average number of babies born to women between the ages of 14 and 45
  - C. The total economic value of all foreign and domestic services
  - D. The number of babies under one year of age who die per 1,000
  - E. The total use of contraceptives in the country

78. The wastes stored in Love Canal contaminated the surrounding area by all of the following methods EXCEPT

- A. leeching into the ground water
- B. fumes from burning the wastes
- C. flowing in the sewers
- D. runoff into a nearby stream
- E. spilled drums of waste

[Check Answers](#)

79. The distinct building blocks of matter are called

- A. mixtures
- B. isotopes
- C. atoms
- D. electrons
- E. compounds

80. All of the following factors lead to the depletion of rangeland EXCEPT

- A. when there are too many animals on an given area
- B. prolonged dry periods
- C. when animals are allowed to feed for too long a time
- D. rotating animals from one area to another
- E. erosion from wind and water

[Check Answers](#)

81. In sea water, carbon is mostly found in the form of

- A. phosphoric acid
- B. carbon monoxide
- C. bicarbonate ions
- D. methane gas
- E. glucose

82. Acid rain and snow harm some areas more than other areas because certain areas

- A. have more bacteria in the soil than others
- B. have less of an ability to neutralize the acids
- C. are at a higher elevation than the unaffected areas
- D. are closer to lakes than the unaffected areas
- E. have more complex food webs than the unaffected areas

[Check Answers](#)

83. Which of the following best describe how tropical rain forest plants adapt to low light levels on the forest floor?

- A. They have large spines to protect their stems.
- B. They have very large leaves.
- C. They have deep root systems.
- D. Individual plants grow very close to each other.
- E. The stems are no more than a few centimeters tall.

84. In the demographic transition model, when a population moves from the industrial to the post-industrial stage, the birth rate is expected to

- A. increase rapidly
- B. increase slowly
- C. be equal to the death rate
- D. stay the same, as in the industrial stage
- E. continue a downward trend

[Check Answers](#)

85. The one area that does NOT store a lot of phosphorus is

- A. rocks
- B. water
- C. atmosphere
- D. living organisms
- E. guano (bird droppings)

86. The addition of oxygen to the early earth's atmosphere most likely occurred through the process of

- A. volcanic outgassing
- B. photosynthesis
- C. meteorite impact
- D. respiration by animals
- E. bubbling geysers

[Check Answers](#)

87. The shrinking of the Aral Sea and the ecological disaster that followed was mainly caused by

- A. the diversion of the sea's two feeder rivers for agricultural use
- B. withdrawing groundwater from the area
- C. a major earthquake that hit the region
- D. the loss of swamplands in the area
- E. the massive use of pesticides

88. The decay of buildings and statues from acid precipitation occurs mostly through the action of airborne

- A. carbon dioxide
- B. methane
- C. ozone
- D. sulfuric acid
- E. chlorofluorocarbons

[Check Answers](#)



89. Riparian zones are important parts of lands because they are

- A. the area where most cattle feed when they graze
- B. an area of diverse habitats along the banks of rivers
- C. important buffers against wind
- D. areas where varying amounts of light cause different layers of plant growth

90. Which of the following is a disadvantage of fish farming?

- A. It can produce large volumes of fish for food.
- B. It can allow for genetic engineering, which leads to bigger yields.
- C. It is very profitable.
- D. It can lead to large die-offs due to disease.
- E. It can reduce the pressure to harvest wild species.

[Check Answers](#)

91. Which of the following philosophies would be advocated by someone with the "environmental wisdom" point of view?

- A. As the planet's dominant species, we are most important.
- B. All economic growth is good.
- C. Society can use resources at an uncontrolled pace.
- D. We will do best when humans manage the planet.
- E. All species are important and we are not in charge.

92. The form of nitrogen that plants can use directly is

- A. nitrates
- B. nitrites
- C. ammonia
- D.  $N_2$  gas
- E. methane

[Check Answers](#)

93. Which of the following best describes the effects of a thermal inversion?
- A. Cold ocean water moves to the surface and warm water sinks.
  - B. Warm, polluted air rises and mixes with cool upper air, and pollutants escape.
  - C. Warm river water cools when it enters the ocean.
  - D. Warm, polluted air cannot rise because it is blocked by warm air high in the atmosphere.
  - E. Cool air descends onto a city and lowers nighttime temperatures.

94. Shifting taxes to tax pollution and waste rather than taxing the cost of products will allow people to
- A. maximize profit
  - B. increase the tax base in a city
  - C. hold industry more accountable for pollution
  - D. shift to a pattern of more sustainable development
  - E. keep the cost of collecting taxes down

[Check Answers](#)

95. Which of the following molecules is most damaging to stratospheric ozone?

- A.  $H_2O$
- B.  $CO_2$
- C. Chlorofluorocarbons
- D.  $N_2O$
- E.  $SO_2$

96. Which of the following series of numbers demonstrates exponential growth?

- A. 200, 199, 198, 197, 196...
- B. 1, 3, 5, 7, 9...
- C. 2, 4, 8, 16, 32...
- D. 1, 3, 9, 27, 81...
- E. 2, 4, 6, 8, 10...

[Check Answers](#)

97. Samples of atmospheric gases from past eras can most easily be obtained from which of the following sources?

- A. Methane gas trapped in oil reserves
- B. Different types of sedimentary rock
- C. Gases trapped in polar ice caps
- D. Tree ring measurements
- E. Mud samples from eutrophic lakes

98. Acid deposition on soil kills beneficial decomposers; this often leads to problems in which of the following?

- A. Sulfur cycling
- B. Phosphorus cycling
- C. Hydrologic cycling
- D. Nitrogen cycling
- E. Temperature cycling

[Check Answers](#)

99. Which of the following is a trace element necessary for plant growth?

- A. Carbon
- B. Nitrogen
- C. Phosphorous
- D. Magnesium
- E. Potassium

100. Concerns that people of color and poor people are unevenly exposed to environmental pollution are most likely to be addressed by people who believe in the

- A. earth stewardship view
- B. planetary manager view
- C. ecofeminist point of view
- D. the environmental justice movement
- E. sustainability point of view

[Check Answers](#)

## SECTION II Free response

- 1 . According to the United States Energy Information Administration, the consumption of natural gas by the United States increases at 8 percent per year. It receives its supplies from a variety of international and domestic locations. Natural gas is used in the home, industry, and in the generation of power.
  - a. Calculate the approximate number of years it would take to double the consumption of natural gas in the United States. Show all work.
  - b. Describe one method by which natural gas is recovered and transported.
  - c. Describe two benefits to the environment that would occur if the United States switched from coal to natural gas-fired electric power generation.
  - d. Some people advocate increasing the use of coal versus natural gas for the production of electricity. Explain one argument that the proponents of coal might use to justify their position.

[Check Answers](#)

2. The map below shows two cities: City X and City Z, separated by several kilometers. Students from a high school in between the two cities studied soil pH values at the sites labeled A through E on the map. The results of the pH study are given in the following table:

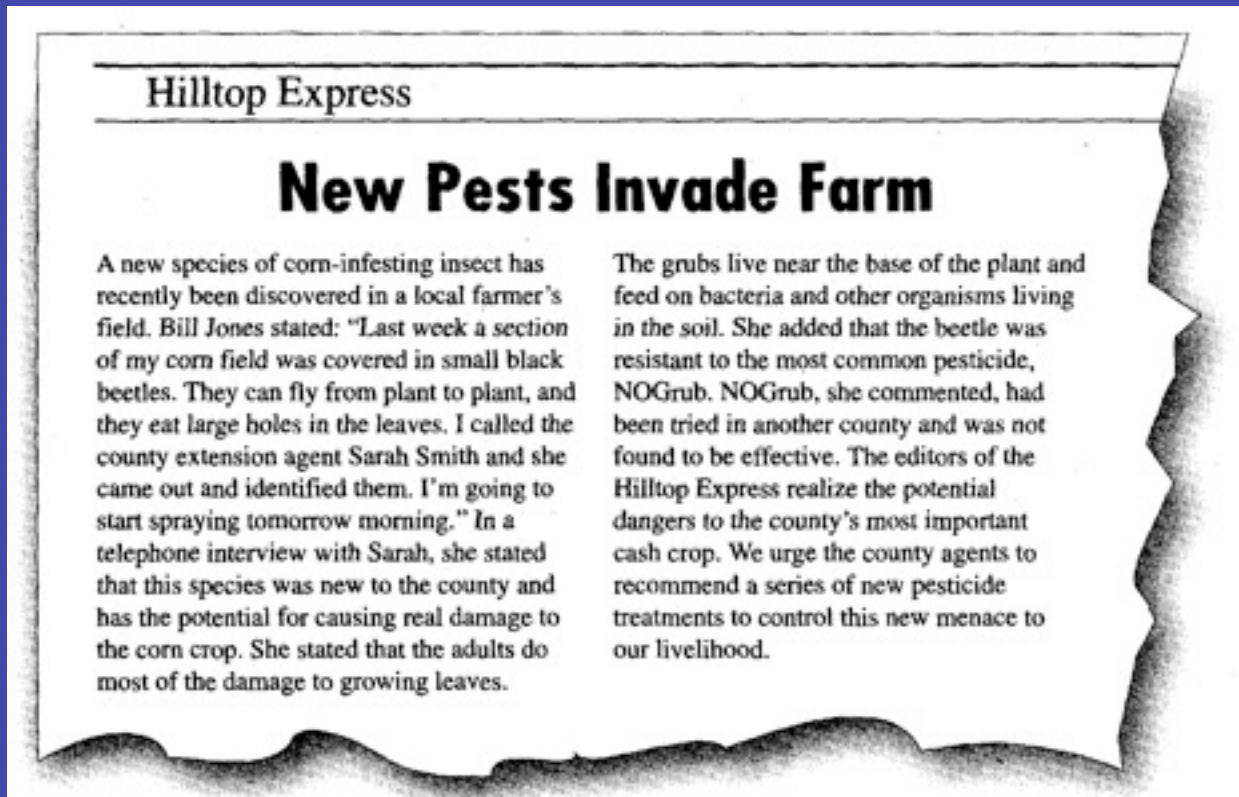
Site	pH value
A	6.2
B	5.6
C	5.0
D	4.5
E	4.3

- Describe one point source for the pollution that caused the change in the soil's pH as shown. Include in the description a fuel that could create the pollution.
- Identify one primary and one secondary pollutant that can cause the change in the soil's pH. Describe the process that causes the change in the pH.
- Describe one possible method to reduce the air pollutants that are causing the pH change.
- Describe one provision of the Clean Air Act of 1990 that could be used to control and reduce the emissions

[Check Answers](#)



3. The following editorial is excerpted from a recent edition of the *Hilltop Express*:



- Describe how the beetle might have become resistant to NOGrub. Assume that NOGrub had been applied to a population of beetles in another county.
- Discuss two impacts of using chemical pesticides on the surrounding ecosystem.
- Describe two other methods of controlling the beetles without resorting to human-made chemical pesticides.
- Explain one benefit and one difficulty in using Integrated Pest Management to control this outbreak.

[Check Answers](#)

4. Many endangered species live in areas where biodiversity has been degraded by human activities. Species such as the West Virginia spring salamander or the California condor live in areas where the impact of human activities has made these and other organisms very rare.

(a) Discuss two human activities that cause species to become endangered.

(b) Describe two reproductive strategy characteristics that make a species prone to extinction.

(c) Describe one economic and one legislative action that attempt to save endangered species.

[Check Answers](#)