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The Princeton Review AP Environmental

Science Practice Test 1

ENVIRONMENTAL SCIENCE

Three hours are allotted for this examination: 90 minutes for Section I, which consists of multiple-choice questions; and 90 minutes for Section II, which consists of essay questions. Section I is printed in this examination booklet. Section II is printed in a separate booklet.

(NO CALCULATORS MAY BE USED IN THIS SECTION OR IN SECTION II OF THE EXAMINATION.)

SECTION I

Time—One hour and 30 minutes

Number of questions—100

Percent of total grade—60

Section I of this examination contains 100 multiple-choice questions and 9 survey questions. Therefore, please be careful to fill in only the ovals that are preceded by numbers 1 through 100 on your answer sheet. NO CALCULATORS ARE ALLOWED.

General Instructions

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE INSTRUCTED TO DO SO.

INDICATE ALL YOUR ANSWERS TO QUESTIONS IN SECTION I ON THE SEPARATE ANSWER SHEET ENCLOSED. No credit will be given for anything written in this examination booklet, but you may use the booklet for notes or scratch work. After you have decided which of the suggested answers is best, COMPLETELY fill in the corresponding oval on the answer sheet. Give only one answer to each question. If you change an answer, be sure that the previous mark is erased completely.

Example:

Chicago is a
(A) state
(B) city
(C) country
(D) continent
(E) village

Sample Answer

Multiple-choice scores are based only on the number of questions you answer correctly. You will not lose any points for incorrect answers, so you should definitely answer all of the multiple–choice questions. Even if you have no idea what the correct answer is, try to eliminate as many choices as you can and then guess. It can only help you.

Use your time effectively, working as rapidly as you can without losing accuracy. Do not spend too much time on questions that are too difficult. Go on to other questions and come back to the difficult ones later if you have time. It is not expected that everyone will be able to answer all the multiple-choice questions.

ENVIRONMENTAL SCIENCE
Section I
Time—One hour and 30 minutes
Part A

Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select the one lettered choice that best answers each question or best fits each statement and then fill in the corresponding oval on the answer sheet. A choice may be used once, more than once, or not at all in each set.

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 50–85 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

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

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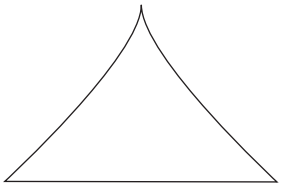
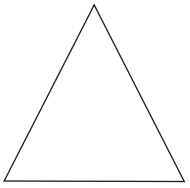
Questions 11-15 refer to the following five age-structure pyramids.

(A)

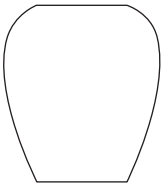


(B)

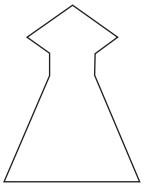


(C)

(D)



(E)



11. A country that is growing slowly

12. A country at zero population growth

13. A country that is losing many of its young adults to diseases like AIDS

14. A rapidly growing population

15. A country showing a population decline

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 disease 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 protozoan carried by mosquitoes

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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 that has a substantial organic layer; fire helps to break down plant material in this layer

22. Soil composed 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

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

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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.

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 PCBs
    (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

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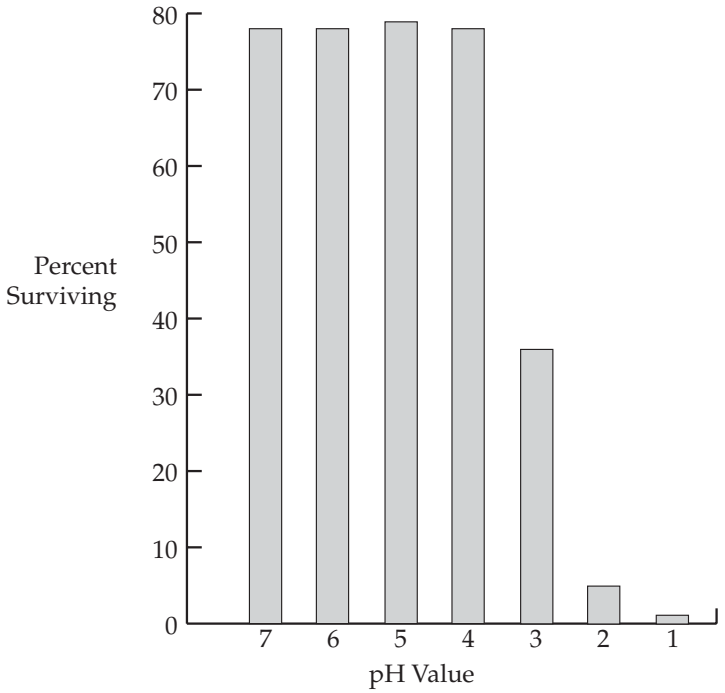
Questions 33-36 refer to the following passage and graph.
A scientist placed 100 fish eggs into each of seven solutions with different pH values. After 96 hours the number of survivors was counted and converted into a percent. The percent surviving is given in the graph below.



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

(A) 6.0
(B) 4.0
(C) 3.5
(D) 3.0
(E) 2.5

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

(A) 7.0
(B) 6.0
(C) 3.5
(D) 2.0
(E) 1.0

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.

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

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37. Which of the following laws created the Superfund program?

(A) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
(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

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

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 blooms that lower the oxygen levels
(D) thermal pollution in the ocean
(E) acid precipitation falling on the ocean

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

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

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

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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.

48. The highest priority of the Clean Water Act is to provide

(A) funds to increase recycling participation
(B) guidance in toxic chemical disposal
(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

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 phrase best defines

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

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_2 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

54. Which of the following describes the amount of energy that plants pass on to herbivores?

(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

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

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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

58. Scrubbers are devices installed in smoke stacks to

(A) reduce the amount of materials such as 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 toxic ash produced

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

(A) overburden
(B) seam waste
(C) leachate
(D) tailings
(E) reclamation

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

62. Which of the following items 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

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) Percolation
(B) Bioremediation
(C) Precipitation
(D) Condensation
(E) Evaporation

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.

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68. During a society's postindustrial state, the population will exhibit

(A) rapid growth with a low birth rate and high death rate
(B) slow rate of growth with slowing birth rate and a low death rate
(C) a rapid growth rate with high birth rate and low death rate
(D) a zero growth rate with a low birth rate and a low death rate
(E) a slow rate of growth with a high birth rate and a high death rate

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.

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

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

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

75. A nation's gross domestic product describes

(A) the amount of public transportation
(B) the ability to provide health care
(C) the amount of goods it imports
(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) Shaft sinking

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

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

(A) leaching 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

79. The distinct building blocks of matter are called

(A) mixtures
(B) isotopes
(C) atoms
(D) electrons
(E) compounds

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

(A) phosphoric acid
(B) carbon disulfide
(C) bicarbonate ions
(D) methane gas
(E) glucose

81. 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

82. 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)

83. 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

84. Which processes do scientists use to estimate environmental risks to humans?

I. Animal studies
II. Epidemiological studies
III. Statistical Probabilities

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

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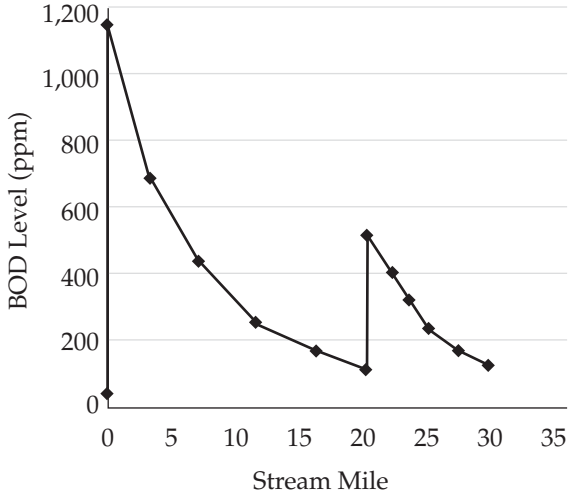
Questions 85-88 refer to the following graph



A group of students did a biological oxygen demand study along a 30-mile section of a stream. The data they obtained is given in the graph above.

85. Which of the following best describes the type of pollution at mile 0?

(A) Point source
(B) Thermal inversion
(C) Acid deposition
(D) Secondary pollutant
(E) Deep well

86. The BOD at mile 12 is approximately

(A) 700 ppm
(B) 220 ppm
(C) 200 ppm
(D) 175 ppm
(E) 50 ppm

87. The BOD test is designed to directly measure

(A) how much light can pass to the bottom of the stream
(B) the amount of nitrates in the water
(C) how rapidly the water is moving
(D) the amounts of coliform bacteria
(E) the rate at which oxygen is being consumed by microorganisms

88. Anaerobic bacteria, sludge worms, and fungi are most likely to be found in which part of this stream?

(A) 0 to 5 miles
(B) 10 to 15 miles
(C) 25 to 30 miles
(D) 10 to 20 miles
(E) 15 to 20 miles

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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
(E) the origins of rivers

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.

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) guano
(D) N_2 gas
(E) methane

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) Polluted air at the surface cannot rise because it is blocked by warm air above it.
(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

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

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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…

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; which of the following cycles would be most affected by the loss of decomposers?

(A) Sulfur cycling
(B) Phosphorus cycling
(C) Hydrologic cycling
(D) Nitrogen cycling
(E) Temperature cycling

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

END OF SECTION I

ENVIRONMENTAL SCIENCE
SECTION II
Time—One Hour and 30 minutes
Number of Questions—4
Percent of total grade—40

Suggested writing time per question—approximately 22 minutes

Because each question will be weighted equally, you are advised to divide your time equally among them without spending too much time on any one question. You are expected to answer all four questions in this section. The parts within the question may not have equal weight. Suggested times will not be announced; you may proceed freely from one question to the next.

Each answer should be organized, well balanced, and as comprehensive as time permits. Answers must be in organized, well-written prose form; outline form is NOT acceptable. Do not spend time restating the questions. If a specific number of examples are called for, no credit will be given for additional examples. For instance, if a question calls for two examples, you will receive credit only for the first two examples you provide.

The questions in the green insert are duplicates of those in this booklet. Use the green inserts to organize your answers and for scratchwork, but write your answers in the pink booklet. NO CREDIT WILL BE GIVEN FOR ANYTHING WRITTEN IN THE GREEN INSERT.

You are to write your answers with pen only, preferably in black or dark blue ink. Be sure to write CLEARLY and LEGIBLY. If you make an error, you may save time by crossing it out rather than trying to erase it.

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ENVIRONMENTAL SCIENCE

SECTION II

Time—One Hour and 30 minutes

4 Questions

Directions: Answer all four questions, which are weighted equally; the suggested time is about 22 minutes for answering each question. Write all your answers on the pages following the questions in the pink booklet. Where calculations are required, clearly show how you arrived at your answer. Where explanation or discussion is required, support your answers with relevant information and/or specific examples.

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.

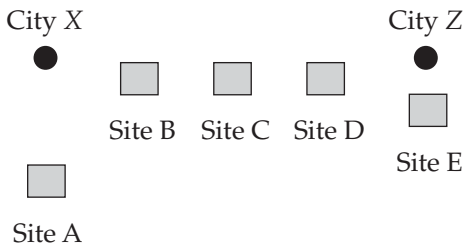
   (a) Calculate the approximate number of years it would take to double the consumption of natural gas in the United States. Show all work.

   (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.

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

   (a) 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.

   (b) 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.

   (c) Describe one possible method to reduce the air pollutants that are causing the pH change.

   (d) Describe one provision of the Clean Air Act of 1990 that could be used to control and reduce the emissions.

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

Hilltop Express

New Pests Invade Farm

A new species of corn-infesting insect has recently been discovered in a local farmer's field. Bill Jones stated: "Last week a section of my corn field was covered in small black beetles. They can fly from plant to plant, and they eat large holes in the leaves. I called the county extension agent Sarah Smith and she came out and identified them. I'm going to start spraying tomorrow morning." In a telephone interview with Sarah, she stated that this species was new to the county and has the potential for causing real damage to the corn crop. She stated that the adults do most of the damage to growing leaves.

The grubs live near the base of the plant and feed on bacteria and other organisms living in the soil. She added that the beetle was resistant to the most common pesticide, NOGrub. NOGrub, she commented, had been tried in another county and was not found to be effective. The editors of the Hilltop Express realize the potential dangers to the county's most important cash crop. We urge the county agents to recommend a series of new pesticide treatments to control this new menace to our livelihood.

(a) Describe how the beetle might have become resistant to NOGrub. Assume that NOGrub had been applied to a population of beetles in another county.

(b) Discuss two negative impacts of using chemical pesticides on the surrounding ecosystem.

(c) Describe two other methods of controlling the beetles without resorting to human-made chemical pesticides.

(d) Explain one benefit and one difficulty in using Integrated Pest Management to control this outbreak.

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.

STOP

END OF EXAM