

PART II

PRACTICE EXAMS

Practice Exam 1

Answer Sheet

Remove this sheet and use it to mark your answers for the multiple-choice section of Practice Exam 1.

Section I

1 A B C D E	26 A B C D E	51 A B C D E	76 A B C D E
2 A B C D E	27 A B C D E	52 A B C D E	77 A B C D E
3 A B C D E	28 A B C D E	53 A B C D E	78 A B C D E
4 A B C D E	29 A B C D E	54 A B C D E	79 A B C D E
5 A B C D E	30 A B C D E	55 A B C D E	80 A B C D E
6 A B C D E	31 A B C D E	56 A B C D E	81 A B C D E
7 A B C D E	32 A B C D E	57 A B C D E	82 A B C D E
8 A B C D E	33 A B C D E	58 A B C D E	83 A B C D E
9 A B C D E	34 A B C D E	59 A B C D E	84 A B C D E
10 A B C D E	35 A B C D E	60 A B C D E	85 A B C D E
11 A B C D E	36 A B C D E	61 A B C D E	86 A B C D E
12 A B C D E	37 A B C D E	62 A B C D E	87 A B C D E
13 A B C D E	38 A B C D E	63 A B C D E	88 A B C D E
14 A B C D E	39 A B C D E	64 A B C D E	89 A B C D E
15 A B C D E	40 A B C D E	65 A B C D E	90 A B C D E
16 A B C D E	41 A B C D E	66 A B C D E	91 A B C D E
17 A B C D E	42 A B C D E	67 A B C D E	92 A B C D E
18 A B C D E	43 A B C D E	68 A B C D E	93 A B C D E
19 A B C D E	44 A B C D E	69 A B C D E	94 A B C D E
20 A B C D E	45 A B C D E	70 A B C D E	95 A B C D E
21 A B C D E	46 A B C D E	71 A B C D E	96 A B C D E
22 A B C D E	47 A B C D E	72 A B C D E	97 A B C D E
23 A B C D E	48 A B C D E	73 A B C D E	98 A B C D E
24 A B C D E	49 A B C D E	74 A B C D E	99 A B C D E
25 A B C D E	50 A B C D E	75 A B C D E	100 A B C D E

Section I: Multiple-Choice Questions

Time: 90 minutes

100 questions

Directions: Each of the questions or incomplete statements in this section is followed by five answer choices. Select the best answer choice and fill in the corresponding circle on the answer sheet.

Questions 1–3 refer to the following answer choices.

- A. Sulfur
- B. Nitrogen
- C. Carbon
- D. Phosphorus
- E. All four cycles

1. This nutrient is stored mainly in sediment.
2. The release of this element into the atmosphere is due, in large part, to fossil fuel combustion and deforestation.
3. This cycle has been altered dramatically by humans.
4. One issue with the use of freshwater aquifers in otherwise arid regions is:
 - A. Constant flow of water from the aquifer into a surface water source
 - B. Slow recharge of the aquifer
 - C. Intrusion of saltwater from oceans
 - D. Waterlogging of the soil
 - E. Eutrophication
5. Which of the following has shifted the storage of carbon from sediment to the atmosphere?
 - A. Mining of coal
 - B. Combustion of fossil fuels
 - C. Increased occurrence of acid precipitation
 - D. Extraction of crude oil
 - E. Industrial smog
6. The protective ozone layer is located in the:
 - A. Troposphere
 - B. Exosphere
 - C. Lithosphere
 - D. Stratosphere
 - E. Mesosphere
7. If soil has the ability to hold high amounts of water and gases in its pore spaces, it is said to have:
 - A. High soil porosity
 - B. Low soil porosity
 - C. High soil permeability
 - D. Low soil permeability
 - E. Waterlogging
8. Which of the following are naturally occurring indoor air pollutants?
 - A. Radon and asbestos
 - B. Asbestos and tobacco smoke
 - C. Radon and CFCs
 - D. Chloroform and radon
 - E. Formaldehyde and chloroform
9. Atmospheric convective currents are due to the:
 - A. Intensity of hurricanes
 - B. Rising of warm, less dense air, which then cools and becomes more dense at it rises, causing the air to sink back toward the Earth
 - C. Rising of cool, less dense air, which then warms and becomes more dense at it rises, causing the air to sink back toward the Earth
 - D. Rising of cool air
 - E. Increasing velocity of tornadoes
10. If the population is growing at a rate of 1.4 percent annually, the population will double in how many years?
 - A. 20
 - B. 50
 - C. 65
 - D. 100
 - E. 140

11. K-selected species often are regulated by density-dependent factors. A population of K-selected elephants is experiencing a recent rapid decline in numbers. Which of the following is the most likely cause?
- Declining predator populations
 - Lack of food and water
 - Climate change
 - Increase in vegetation
 - Inbreeding
12. Positive feedback loops
- Keep the environment in dynamic equilibrium
 - Are closed systems
 - Are becoming more common in nature because of human impact on the environment
 - Are open systems
 - Never occur in nature
13. Tropical rain forests are considered to have high net primary productivity because of the:
- Rapid rate at which solar energy is converted to biomass
 - Ability of the soils to hold water
 - Alkaline soils
 - Rapid rate at which biomass decomposes
 - Rapid pace at which organisms reproduce
14. Which of the following greenhouse gases are most abundant?
- Carbon dioxide, water vapor, and methane
 - Carbon monoxide and methane
 - Methane, water vapor, and sulfur dioxide
 - Sulfur dioxide and nitrous oxide
 - Carbon dioxide and sulfur dioxide
15. Which of the following best describes the process of photosynthesis?
- Oxygen, water, and solar energy are used to produce carbon dioxide and sugar.
 - Oxygen, sugar, and solar energy are used to produce carbon dioxide and water.
 - Carbon dioxide, water, and solar energy are used to produce oxygen and sugar.
 - Carbon dioxide and oxygen combine to form water and sugar.
 - Carbon dioxide and water are used to produce oxygen, sugar, and more carbon dioxide.
16. The Monteverde golden toad was in danger of extinction with minimal environmental change because it was _____ to the Monteverde cloud forest.
- indigenous
 - endemic
 - native
 - introduced
 - extirpated
17. Which of the following can be considered a keystone species?
- Garter snake
 - Mosquito
 - Poison oak
 - Barri owl
 - Beaver

Questions 18–20 refer to the following answer choices.

- Tundra
 - Chaparral
 - Boreal forest
 - Desert
 - Temperate grassland
18. Organisms have evolved to survive the environment in this biome through adaptations such as spines for protection and the ability of photosynthesis to take place in stems as opposed to leaves.
19. This biome is dominated by coniferous trees.
20. In this biome, permafrost keeps the soil frozen most of the year.

21. A company has developed a new type of pesticide. Prior to use, the company tests the health effects on humans, wildlife, and ecosystems. Upon completion of the tests, it is determined that the pesticide is safe and harmless. This process is an example of:
- A cause-and-effect relationship
 - A dose-response analysis
 - The innocent-until-proven-guilty approach
 - The precautionary principle
 - Tragedy of the commons
22. A forest community remained stable and unaffected for many decades. In a dramatic turn of events, a volcano erupted, covering the forest with lava and killing all organisms in the area. The first species to appear on the barren lava rock was lichen, which was followed by the growth of small plants and an influx of insects. Eventually, the community contained mature trees and remained stable for a long period of time.
- Which of the following best describes the order in which these events took place?
- Disturbance, pioneer species, secondary succession, climax community
 - Climax community, disturbance, pioneer species, secondary succession
 - Disturbance, primary succession, pioneer species, climax community
 - Secondary succession, disturbance, primary succession, climax community
 - Climax community, disturbance, pioneer species, primary succession
23. One way in which scientists study climate change is through ice core samples. What information does this tell us about the climate?
- The impact of changing sea levels on the climate.
 - The frequency of thermal inversions in the atmosphere.
 - Greenhouse gas concentrations, atmospheric composition, and trends in atmospheric temperature.
 - The rate of the solidification of greenhouse gases in the atmosphere.
 - Nothing. This is not a way to study climate change.
24. Which of the following helps to create the greenhouse effect?
- Solar radiation reflecting off the Earth's surface
 - Greenhouse gases reflecting some solar radiation back to Earth
 - Greenhouse gases emitting heat as a byproduct of chemical reactions
- I only
 - II only
 - III only
 - I and II only
 - I, II, and III
25. Due to the large amount of vegetation in tropical rain forests, the soil is:
- High in nutrient content
 - Prone to erosion
 - Low in nutrients
 - Waterlogged
 - Dry
26. A pollutant has entered a body of water at the concentration of 0.5 ppm. If it dissipates by 20 percent every five days, how much is left after 15 days?
- 0.44 ppm
 - 0.30 ppm
 - 0.26 ppm
 - 0.15 ppm
 - 0 ppm
27. What is the main source of energy for Earth's organisms?
- Wind
 - The sun
 - Fossil fuels
 - Geothermal activity
 - Biomass
28. Which of the following countries has the largest ecological footprint?
- Afghanistan
 - Mexico
 - India
 - Japan
 - The United States

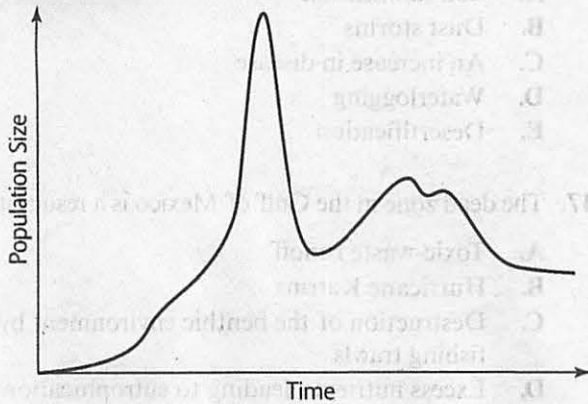
29. In a country with an inverted population pyramid, there is a
- A. Growing population
 - B. High rate of disease affecting the working-age population
 - C. Smaller labor market as well as more stress on social systems to support the elderly
 - D. Strong military and labor market
 - E. High rate of death among older ages in the population
30. A population of mule deer was growing very quickly until starvation reduced the number of individuals. The mule deer passed the condition or point of
- A. Overcrowding
 - B. Exponential growth
 - C. Carrying capacity
 - D. Limited growth
 - E. Extirpation
31. China's one-child policy has been successful in reducing population growth but has had negative consequences as well. All of the following are potential problems with the declining population due to this policy EXCEPT
- A. Increased pressure on social systems such as Social Security and healthcare
 - B. A decrease in the number of individuals in the labor market
 - C. Increased abortion rates of female fetuses
 - D. An uneven sex ratio
 - E. More people entering the military
32. What is the growth rate of this country?
- A. 1.8 percent
 - B. 2.9 percent
 - C. 2.6 percent
 - D. 2.1 percent
 - E. 3.4 percent
33. What do these numbers tell you about the country's population?
- A. It is declining slowly.
 - B. It is stabilizing.
 - C. There are a large number of individuals in the older age groups.
 - D. There are high death rates at young ages.
 - E. The population is still growing.
34. How is wind harnessed for use as energy?
- A. The kinetic energy produced by the wind is converted into electrical energy.
 - B. Solar energy is converted into kinetic energy.
 - C. Kinetic energy is converted into electrical energy through photovoltaic (PV) cells.
 - D. Wind energy is captured and used to heat water, which then produces steam to turn turbines.
 - E. Wind's potential energy turns turbines, which then produce electrical energy.
35. Global fossil fuel use has shifted in recent decades. Which statement accurately reflects this shift?
- A. Coal has overtaken natural gas as the most widely used fossil fuel.
 - B. Oil has overtaken natural gas as the most widely used fossil fuel.
 - C. Coal has overtaken oil as the most widely used fossil fuel.
 - D. Oil has overtaken coal as the most widely used fossil fuel.
 - E. Natural gas has overtaken coal as the most widely used fossil fuel.
36. Acute exposure to a substance means that an organism has been exposed to
- A. High levels over a long period of time
 - B. High levels over a brief period of time
 - C. Low levels over a brief period of time
 - D. Low levels over a long period of time
 - E. Moderate levels over a lifetime

Questions 32–33 refer the following information.

A country has a crude birth rate of $\frac{32}{1,000}$, a crude death rate of $\frac{9}{1,000}$, an immigration rate of $\frac{2}{1,000}$, and an emigration rate of $\frac{4}{1,000}$.

32. What is the growth rate of this country?
- A. 1.8 percent
 - B. 2.9 percent
 - C. 2.6 percent
 - D. 2.1 percent
 - E. 3.4 percent

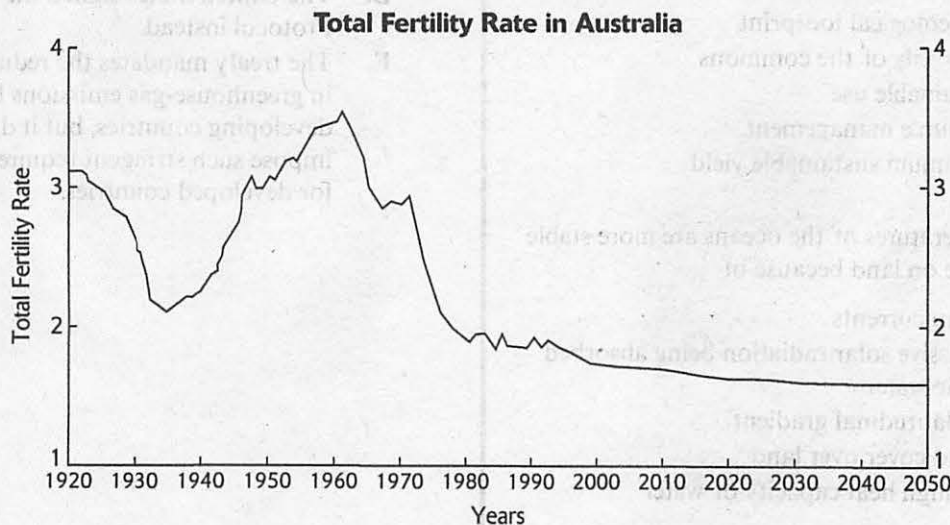
Questions 37–38 refer to the following logistic growth curve.



37. This curve represents a population that

- A. Rises quickly and then stabilizes at carrying capacity
- B. Depicts the theoretical model of logistic growth
- C. Experiences a destabilization of the population
- D. Grows exponentially
- E. Fluctuates and lessens in extremes over time but does not reach carrying capacity

Questions 41–43 refer to the following graph.



Source: Australian Government, The Treasury

38. What could have led to this extreme destabilization?

- A. A natural disaster
- B. Carrying capacity
- C. Disease
- D. Introduced predation
- E. All of the above

39. Which of the following would be included in the risk assessment of a substance accidentally released from a local factory?

- A. Conducting a dose-response analysis
- B. Determining who is at fault in the factory
- C. Determining who will pay for the remediation of the substance
- D. Assessing the cost of the lost chemical as well as the cost of the remediation
- E. Conducting an analysis of local flora and fauna

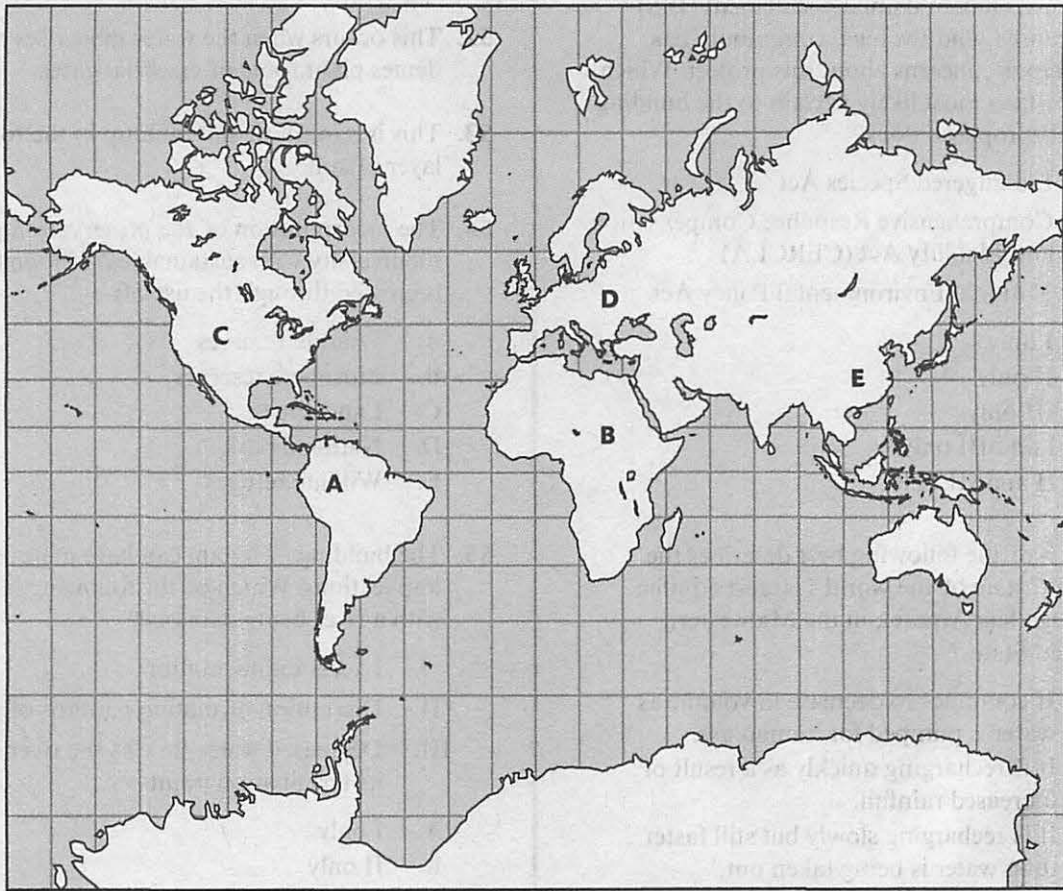
40. Succession in an aquatic environment can occur

- A. As a result of eutrophication
- B. Only in areas of excessive erosion
- C. In the absence of life
- D. In the open ocean
- E. Only during summer months

41. What led to the decline in total fertility rate in Australia in the 1920s and 1930s?
- A. War
 - B. Economic depression
 - C. Widespread disease
 - D. An increase in the use of contraception
 - E. An aging population
42. What contributed to the increase in total fertility rate in Australia in the 1940s and 1950s?
- A. Immigration
 - B. Economic growth
 - C. High infant mortality rates
 - D. Lack of contraception
 - E. Lack of female empowerment
43. If the total fertility rate continues to decrease and stabilize in the future as projected, what could be a social and/or economic repercussion?
- A. An increase in productivity and an economic boom
 - B. An uneven sex ratio
 - C. A decrease in the labor market and slower economic growth
 - D. Decreased female empowerment
 - E. None of the above
44. The overfishing of the world's ocean fisheries is considered an example of
- A. An ecological footprint
 - B. A tragedy of the commons
 - C. Sustainable use
 - D. Resource management
 - E. Maximum sustainable yield
45. The temperatures of the oceans are more stable than those on land because of
- A. Ocean currents
 - B. Excessive solar radiation being absorbed by the water
 - C. The latitudinal gradient
 - D. Cloud cover over land
 - E. The high heat capacity of water
46. Overworking and overuse of land can lead to all of the following issues EXCEPT
- A. Soil salinization
 - B. Dust storms
 - C. An increase in disease
 - D. Waterlogging
 - E. Desertification
47. The dead zone in the Gulf of Mexico is a result of:
- A. Toxic-waste runoff
 - B. Hurricane Katrina
 - C. Destruction of the benthic environment by fishing trawls
 - D. Excess nutrients, leading to eutrophication and eventually hypoxia
 - E. The *Deepwater Horizon* oil spill
48. Why did the United States not ratify the Kyoto Protocol?
- A. U.S. emissions are lower than that of other countries.
 - B. The treaty mandates the reduction in greenhouse-gas emissions for developed countries, but it does not impose such stringent requirements for developing countries.
 - C. Each state in the United States has set emission standards, so there was no need to sign an international treaty.
 - D. The United States signed the Montreal Protocol instead.
 - E. The treaty mandates the reduction in greenhouse-gas emissions for developing countries, but it does not impose such stringent requirements for developed countries.

49. A proposed dock that would be built over a wetland into a portion of a bay is controversial. An environmental impact statement (EIS) is required, and the local community has numerous concerns about this project. Which law or laws most likely pertain to the building of this proposed dock?
- Endangered Species Act
 - Comprehensive Response Compensation and Liability Act (CERCLA)
 - National Environmental Policy Act
- I only
 - II only
 - III only
 - I and III only
 - II and III only
50. Which of the following best describes the current state of the world's largest aquifer, the Ogallala Aquifer, in the Midwestern United States?
- It continues to decrease in volume as water is pumped for human use.
 - It is recharging quickly as a result of increased rainfall.
 - It is recharging slowly but still faster than water is being taken out.
 - It is experiencing saltwater intrusion.
 - It is completely dried as a result of overpumping.
- Questions 51–53 refer to the following answer choices.*
- Soil salinization
 - Desertification
 - Waterlogging
 - Saltwater intrusion
 - Eutrophication
51. This results from the over pumping of an aquifer in coastal areas.
52. This occurs when the water table rises and denies plant roots of essential gases.
53. This is a result of salt buildup in the top layer of soil.
54. The incorporation of the preservation of biodiversity with sustainable development is created through the use of:
- Wildlife reserves
 - Biosphere reserves
 - Land trusts
 - National parks
 - Wildlife refuges
55. The building of a dam can have many ecological implications. Which of the following is an issue with a river being dammed?
- Excess sedimentation
 - Disruption of mating patterns of fish
 - Decreased water flow as the river reaches its termination point
- I only
 - II only
 - I and III only
 - I, II, and III
 - None of the above
56. Habitat islands can occur as a result of
- A decrease in permafrost
 - The development of roadways
 - A decreasing sea level
 - The creation of national parks
 - Industrial smog

Questions 57–58 refer to the following map.



57. Which regions represent the highest rate of deforestation?

- A. A and B
- B. B and C
- C. C and D
- D. D and E
- E. None of the noted regions

58. Which regions are seeing an increase in forested area due to conservation efforts?

- A. A and B
- B. B and C
- C. C and D
- D. D and E
- E. None of the noted regions

59. Photovoltaic cells produce energy by

- A. Converting solar energy into electrical energy, which creates an electrical current as a result of the movement of electrons
- B. Converting light energy into electrical energy, which creates an electrical current as a result of the movement of protons
- C. Using mechanical energy from wind to create an electric current
- D. Absorbing sunlight and heating water, which then produces steam to turn a turbine
- E. Splitting water molecules and converting the hydrogen into electrical energy

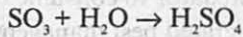
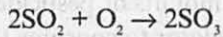
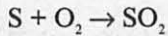
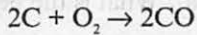
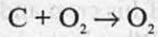
60. Which of the following is an example of a mutualistic relationship?
- A tapeworm living in an organism's stomach
 - A duck eating algae
 - A dolphin searching for a mate
 - Algae living in coral
 - A frog consuming an insect
61. There are many arguments in support of the development of wind farms as a source of energy, but there are also many arguments against it. Which of the following is a common argument against the development of wind farms?
- Wind energy does not produce a high output of energy.
 - Wind can be inconsistent, varying daily, seasonally, and in different locations.
 - It is necessary to have multiple turbines in order to generate any energy from wind.
 - Wind farms cannot be placed in the high salinity of the oceans.
 - The technology is not yet fully developed.
62. Which of the following nations have the largest oil reserves?
- Saudi Arabia, Iran, and the United States
 - Saudi Arabia, Iran, and Iraq
 - Russia, Iran, and Qatar
 - The United States, Russia, and China
 - Iran, Iraq, and Russia
63. Biomass is a renewable fuel and burns cleaner than fossil fuels, but one of the downsides of using biomass is the
- Addition of ethanol
 - Large amounts of carbon emission from biodiesels
 - Unequal distribution globally
 - Expense of producing it
 - Creation of a monoculture on crop land that could be used for food production.
64. What is a wet, moderately compressed organic matter?
65. What has the highest energy content per unit volume?
66. What is formed under minimal heat and pressure and is moderately wet?
67. In which ways can natural gas be produced?
- Anaerobic decomposition
 - Aerobic decomposition
 - Extreme heat and pressure
- I only
 - II only
 - III only
 - I and III
 - I, II, and III
68. In developing countries (as compared to developed countries), the largest use of energy is for?
- Transportation
 - Manufacturing
 - Preparing food
 - Technology
 - Recreational activities
69. How does carbon monoxide lethally act upon an organism?
- Carbon monoxide binds to hemoglobin and blocks carbon dioxide from binding, preventing carbon dioxide from circulating in the blood.
 - Carbon monoxide binds to hemoglobin and blocks oxygen from binding, preventing oxygen from circulating in the blood.
 - Carbon monoxide acts as a neurotoxin.
 - Carbon monoxide mutates cells and causes cancer.
 - Carbon monoxide binds with the endocrine receptor sites on cells and blocks hormones and oxygen from entering cells.

Questions 64–66 refer to the following answer choices.

- Lignite
- Sub-bituminous
- Bituminous
- Peat
- Anthracite

70. How is crude oil separated into its various components?
- A. Through a filtration system
 - B. In separation tanks as it is pumped from the ground and collected
 - C. Through boiling and distillation
 - D. Through a series of steps, including heating, cooling, and filtration
 - E. None of the above
71. Nuclear energy is produced through the process of
- A. Fusion
 - B. Fission
 - C. Splitting of hydrocarbons
 - D. Combustion
 - E. Steam generation
72. When organisms within an ecosystem consume others that contain mercury in their tissues, the toxin can build up over time within the organism. This is considered
- A. Endocrine disruption
 - B. Dose-response
 - C. Bioaccumulation
 - D. LD₅₀
 - E. Biomagnification
73. Thermal inversions occur when
- A. Cool air is trapped beneath a layer of warm air, trapping pollutants as well.
 - B. Warm air is trapped beneath a layer of cool air, trapping pollutants as well.
 - C. Ocean surface waters are heated.
 - D. Tornadoes form.
 - E. Cool air is trapped beneath a layer of warm air, but pollutants are allowed to escape.
74. Which criteria pollutants contribute to acid precipitation?
- I. Nitrogen dioxide
 - II. Ozone
 - III. Sulfur dioxide
- A. I only
 - B. II only
 - C. III only
 - D. I and III only
 - E. I, II, and III
75. Endocrine disruptors interfere with the endocrine system by
- A. Causing cells to mutate
 - B. Mimicking hormones and binding to the hormone receptor sites on cells
 - C. Becoming a carcinogen
 - D. Mimicking glucose molecules and binding to receptor sites on cells
 - E. Impeding the absorption of nutrients by an organism
76. The main contributor to ozone depletion prior to the signing of the Montreal Protocol was
- A. Sulfur dioxides
 - B. Nitric oxides
 - C. CFCs
 - D. Particulate matter
 - E. Carbon-dioxide emissions
77. Salvage logging can harm an ecosystem through all of the following EXCEPT
- A. Taking nutrients out of an ecosystem
 - B. Accelerating soil erosion
 - C. Loss of habitat
 - D. Increasing the risk of large-scale fires
 - E. Decreasing biodiversity
78. Noise pollution can become a serious nuisance in areas where the following situations occur EXCEPT where there is
- A. High vehicle traffic
 - B. Poor urban planning
 - C. Frequent construction
 - D. Congestion of sailboats
 - E. A loud nightclub
79. Cultural eutrophication is a result of
- A. A mixing of multiple cultures in one area
 - B. Excess nutrients entering aquatic environments from sources such as sewage and fertilizers
 - C. Excess nutrients entering aquatic environments from weathering rocks
 - D. Genetic pollution
 - E. Increasing vehicle traffic

80. The following chemical reactions describe the process of the formation of _____.

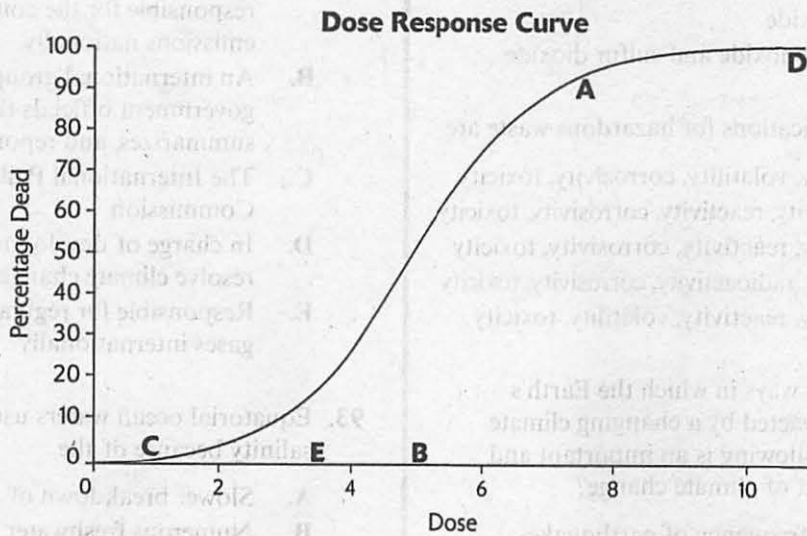


- A. Photochemical smog
 B. Industrial smog
 C. Acid precipitation
 D. Ozone
 E. Peroxyacetyl nitrate
81. When water is used in factory processes, it cycles through and absorbs heat as it cycles. The water is then discharged into a local water source. This can lead to
- A. Acidic water
 B. Basic water
 C. Toxic pollution
 D. Thermal pollution
 E. Nutrient pollution

82. During which step in the sewage treatment process is oxygen added to start aerobic decomposition?

- A. Pretreatment
 B. Primary treatment
 C. Secondary treatment
 D. Tertiary treatment
 E. Final treatment

Questions 83–84 refer to the following dose-response curve.



83. Which point represents the LD_{50} ?

- A. A
 B. B
 C. C
 D. D
 E. E

84. Which point represents the threshold?

- A. A
 B. B
 C. C
 D. D
 E. E

85. Which of the following affects how solar radiation hits the Earth's surface?
- A. El Niño and La Niña
 - B. Perihelion
 - C. Aphelion
 - D. The vernal equinox
 - E. Milankovitch cycles
86. A species of insect develops resistance to a pesticide. This occurs
- A. Within one generation, through the process of natural selection
 - B. Through acute exposure
 - C. Through chronic exposure
 - D. Gradually over time, through the process of natural selection
 - E. Never in nature
87. In developing countries, the indoor burning of fuel wood as a source of energy is very common and is a cause of many health problems and deaths in these countries. The issues arise from the combustion of wood, which produces
- A. Carbon monoxide and particulate matter
 - B. Nitrogen dioxide
 - C. Carbon dioxide and carbon monoxide
 - D. Sulfur dioxide
 - E. Carbon monoxide and sulfur dioxide
88. The four classifications for hazardous waste are
- A. Ignitability, volatility, corrosivity, toxicity
 - B. Radioactivity, reactivity, corrosivity, toxicity
 - C. Ignitability, reactivity, corrosivity, toxicity
 - D. Ignitability, radioactivity, corrosivity, toxicity
 - E. Ignitability, reactivity, volatility, toxicity
89. There are many ways in which the Earth's systems are impacted by a changing climate. Which of the following is an important and prominent effect of climate change?
- A. Increased frequency of earthquakes
 - B. Extreme freeze of permafrost
 - C. More gases released during volcanic activity
 - D. Increasing occurrence of the bleaching of coral reefs
 - E. Rapid development of mountaintop glaciers
90. A farmer has experienced large crop loss due to insects this growing season. If this is not dealt with, he will lose most of his crop and most of his income for the year. What is the best solution to this issue?
- A. Apply large amounts of pesticides.
 - B. Bring in a predator to consume the insects.
 - C. Use the integrated pest management (IPM) approach.
 - D. Change crops.
 - E. Create mixed crops throughout his land.
91. A potential threat of climate change on human health could be
- A. Increased heart disease
 - B. Faster transmission of AIDS in Africa
 - C. Higher threat of frostbite throughout the globe
 - D. Reduced sun exposure due to an increase in the number of overcast days
 - E. An increase in the range of tropical diseases such as malaria due to a larger range of warmer temperatures
92. The IPCC is
- A. An organization in the United States responsible for the control of emissions nationally
 - B. An international group of scientists and government officials that assesses, summarizes, and reports on climate change
 - C. The International Pollution Control Commission
 - D. In charge of developing solutions to resolve climate change
 - E. Responsible for regulating greenhouse gases internationally
93. Equatorial ocean waters usually have lower salinity because of the
- A. Slower breakdown of sediment
 - B. Numerous freshwater rivers that empty into the ocean in these regions
 - C. High amount of dissolved gases
 - D. High level of precipitation in the region
 - E. None of the above

Questions 94–96 refer to the following table.

Per Capita Energy Consumption (Kilograms of Oil Equivalent [kgoe] per Person)					
Developed	2005	1990	Developing	2005	1990
Australia	5,898	5,106	Bangladesh	171	123
Austria	4,135	3,263	Brazil	1124	897
Bulgaria	2,592	3,306	Cambodia	354	0
Canada	8,473	7,564	China	1,316	760
Finland	6,555	5,758	Cuba	905	1,597
France	4,397	3,913	Egypt	828	573
Germany	4,187	4,481	Ethiopia	304	296
Hungary	2,757	2,755	Haiti	293	231
Iceland	12,209	8,476	India	491	377
Ireland	3,656	2,943	Iran	2,381	1,264
Israel	2,816	2,599	Iraq	1,067	1,029
Italy	3,169	2,611	Kuwait	11,102	3,985
Japan	4,135	3,595	Mexico	1,701	1,514
Lithuania	2,515	4,377	Mongolia	916	1,525
Russia	4,519	5,923	North Korea	943	1,670
Spain	3,340	2,338	Philippines	538	428
Switzerland	3,599	3,650	Qatar	19,466	13,554
United Kingdom	3,895	3,709	Senegal	261	281
United States	7,886	7,700	South Korea	4,415	2,178

Source: Data from <http://earthtrends.wri.org>

94. Which of the following could be a valid explanation for the increase in per capita energy consumption in many developing countries between 1990 and 2005?
- The increased number of females in the labor market
 - An increase in imports
 - National economic growth
 - Advancements in medical care
 - An increase in population
95. In some developing and developed countries, per capita energy consumption is declining. Which of the following could explain this?
- Fewer people
 - Incorrect data
 - Inefficiencies of energy-generating facilities
 - Increasing energy efficiency
 - Access to cheaper oil
96. Explain the overall difference in per capita energy consumption between developed and developing countries.
- Developed nations consume more energy due to affluence and access to energy.
 - Developed nations consume less energy due to poverty.
 - Developing nations consume less energy due to increasing wealth.
 - Developing nations consume more energy due to increasing affluence and access to energy.
 - Developing and developed nations consume about the same amount of energy.

97. Nitrogen fixation is a necessary part of the nitrogen cycle because
- A. Atmospheric nitrogen cannot be used directly by organisms.
 - B. There is not enough nitrogen in the atmosphere.
 - C. Nitrogen needs to be combined with phosphorus.
 - D. Bacteria needs to be created to help with plant growth.
 - E. Nitrogen in the soil needs to be fixed to go back to the atmosphere.
98. When referring to energy, Earth is considered to be
- A. A closed system
 - B. An open system
 - C. A positive feedback loop
 - D. In homeostasis
 - E. Unbalanced
99. A newly developed wind farm is working at full capacity. One wind turbine generates 2000 kW of power per day. If there are 50,000 turbines, how many megawatts of energy could be produced in one day?
- A. 1×10^4
 - B. 1×10^6
 - C. 1×10^8
 - D. 2.5×10^6
 - E. 2.5×10^8
100. Geothermal energy is considered to be renewable, but why is it not truly a sustainable supply of energy?
- A. Geothermal energy relies on the sun's energy.
 - B. Geothermal energy can be harnessed only from geysers.
 - C. Geothermal energy provides less power than solar, wind, and biomass energy.
 - D. Geothermal activity shifts naturally, so the location of the heat produced may not always be the same.
 - E. Geothermal energy produces more emissions than fossil fuels.

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT WORK ON ANY OTHER SECTION IN THE TEST.



Section II: Free-Response Questions

Time: 90 minutes

4 questions

Directions: Each question is equally weighted. Plan to budget your time and allow yourself approximately 20 minutes per question. Write clearly to show any calculations when computations are necessary. Calculators are not allowed. Where an explanation or discussion is required, support your answers with relevant information, facts, and/or specific examples.

Question 1 refers to the following article by Martha Baskin of Green Acre Radio (Seattle, Washington).

An Urban Superfund Site, an Urban River, and the South Park Community

Ten years ago, the Duwamish was declared a Superfund site. The Superfund law was enacted to clean up hazardous substances that endanger public health and the environment. So far, “help” for the Duwamish has involved lengthy study and negotiations with the principal parties responsible for cleanup: the city, King County, the port, and Boeing. Cleanup of two hot spots is underway. They contain the river’s most persistent toxins: PCBs, PAHs or polynuclear aromatic hydrocarbons, arsenic, and dioxin. But the EPA won’t decide about action for the rest of the waterway until 2013. The EPA’s Tristan Gardner uses LEGOs to demonstrate options on the table: dredging, removal, containment, and natural recovery. “We’re using the blue LEGOs to represent the Duwamish, the gray to represent mud and the sediments, and the red to represent the pollution.” Containment involves putting 10 to 20 feet of sand, clay, and other materials on top of the pollution. “Now this doesn’t remove the contamination, but it prevents it from being taken up by fish or disturbed by human activity. So, when the clean water from upstream is coming down, it’s not going to pick up the contamination and deposit it somewhere else.”

1. Answer the following questions:
 - A. Explain what it means when a site is listed as a Superfund site.
 - B. Name and explain the law that is also called the “Superfund.”
 - C. Describe three likely consequences to the Duwamish River ecosystem as a result of the contamination.
 - D. Select one of the listed contaminants and cite a possible source and its potential health effects on humans.
 - E. Cite and explain at least two possible issues associated with the proposed method of pollution containment.

2. A house is located in Southern California in an inland chaparral valley. The house is 2,000 square feet and is cooled by a 5-ton central air-conditioning system. (A 1-ton air-conditioning unit subtracts 12,000 BTUs, the amount needed to melt 1 ton of ice in one day.) One kWh of electricity costs \$0.10, and the air conditioner uses an average of 25 kWh per day from June 1 through September 30.
 - A. Calculate the following, showing all the steps of your calculations.
 - a. The number of kWh of electricity used to cool the house for the summer.
 - b. The cost of cooling the house for the summer.
 - B. Identify and describe two actions the owner of the house could take to conserve electrical energy, aside from replacing the air-conditioning unit with a more energy-efficient model.
 - C. The owner has been considering replacing the air-conditioning unit because it is more than 25 years old. Discuss one environmental cost and one environmental benefit of replacing the air-conditioning unit, and one economic cost and one economic benefit of replacing the unit.

3. A type of bacterium called fire blight is destroying partial and full trees in a large portion of a pear orchard. Fire blight is spread via insects, pruning tools, and water splash. As always, the orchard owner uses a fungicide spray that has been effective at controlling the blight in previous seasons. Recent applications, though, have not been as successful, with each application killing a lower and lower percentage of the bacterium. It is apparent that the blight has become resistant to the used fungicide.
- A. Explain how bacteria could develop resistance to a fungicide.
 - B. Give two examples of how bacterial resistance to fungicide can economically impact orchard owners.
 - C. Explain one alternative to fungicide that may help the orchardist manage the spread of fire blight.
 - D. Describe an example of how the development of bacterial resistance can affect human health.
4. A forest ecosystem is destroyed by a volcanic eruption. There are many steps involved in the process of regrowth.
- A. Discuss which type of succession would follow this disturbance.
 - B. Explain the role of a pioneer species in succession. What is an example of a pioneer species? Why are some organisms successful as pioneer species?
 - C. Discuss a climax community.
 - D. Explain the concept of resilience.
 - E. Discuss how humans have impacted the cycle of succession.

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