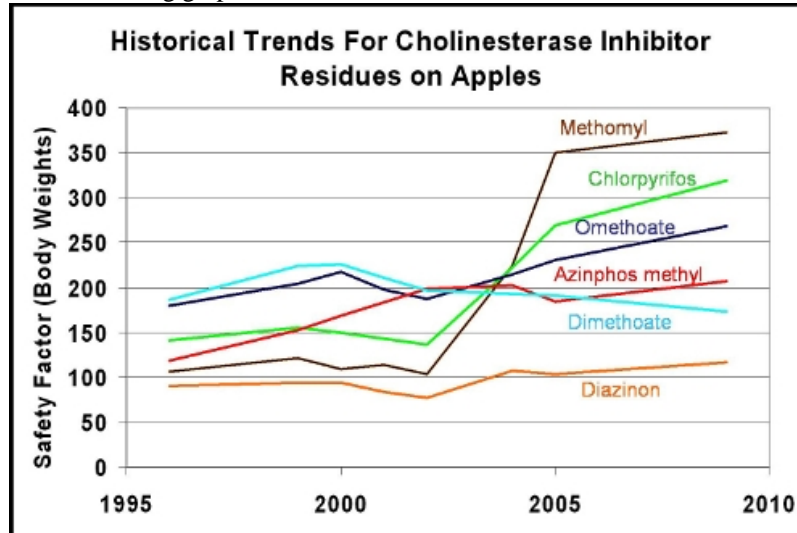


New Jersey Science League
Environmental Science Exam – January 2013

Answer the following questions on the scan-tron provided. Choose the letter that best completes or answers the item. Be certain that erasures are complete. Please PRINT your name, school code, and which test you are taking on the scan-tron as instructed.

For Questions #1 -2 use the following graph:



- Which of the following pesticide(s) has not shifted to a safer residue amount on apples since 1995?
 - Diazinon
 - Methomyl
 - Dimethoate
 - A & C
 - none of the above
- In approximately what year did apples see their biggest shift to less pesticide residues for the pesticides with the highest safety factor :
 - 1995
 - 2000
 - 2002
 - 2004
 - 2009
- It is often said that in any nuclear destruction of the earth cockroaches will survive as they appear today. This suggestion is partially supported by the study of million year old cockroaches that have been found in amber. The study of organisms preserved in amber is of particular interest to the field of:
 - ecology
 - environmental science
 - ethology
 - etymology
 - evolution
- During World War II, the Nazis set up a number of ghettos like the one in Warsaw. In Warsaw, the Nazis packed over 400,000 people into a small area of about 1.3 square miles. They were relying on what type of factors/strategy to control the Jewish population?
 - density independent factors
 - density dependent factors
 - adaptive radiation
 - R-strategy
 - K-strategy

5. Which of the following biomes is correctly paired with the description of its climate?
- tropical forests – nearly constant day length and temperature
 - tundra – long summers, mild winters
 - deserts - long, hot periods with an absence of precipitation
 - savanna – low temperatures, precipitation uniform during the year
 - temperate grasslands – relatively warm winters, most rainfall in summer
6. The book *Silent Spring* helped to spur on the environmental movement. The book was written by _____ and dealt primarily with the threat of _____ to the environment and birds in particular.
- Carson, DDE
 - Carson, DDT
 - Hardin, DDE
 - Hardin, DDT
 - Ehrlich, DDE
7. Terms referring to the hydrologic cycle include all of the following except:
- transpiration
 - percolation
 - evaporation
 - precipitation
 - assimilation
8. The formula for aerosols has changed since 1996 when _____ was/were banned as a “greenhouse gas”.
- nitrous oxides
 - chlorofluorocarbons
 - sulfur dioxide
 - methane
 - methyl chloride
9. Stomata are involved in what nutrient cycle(s):
- | | | | |
|-------------|----------|-------------------|---------------|
| | I. Water | II. Carbon | III. Nitrogen |
| A. I Only | | D. I and II | |
| B. II Only | | E. I, II, and III | |
| C. III only | | | |
10. What is the basis of the statement “We could feed more people if we eat grain instead of feeding it to livestock.” ?
- The First Law of Thermodynamics
 - The Second Law of Thermodynamics
 - Ecocentrism
 - anthropocentrism
 - biocentrism
11. Species diversity is most concentrated in:
- North America & South America
 - Australia, South America & Europe
 - North America, South America & Africa
 - South America, Europe, & Africa
 - South America, Southeastern Asia, & Africa
12. Habitat fragmentation usually leads to a(n):
- decrease in biodiversity
 - increase in biodiversity
 - habitat stability
 - decrease in the number of introduced diversity
 - increase in the number of introduced diversity
13. The population theory held by Thomas Malthus was that the human population would:
- develop a modern utopia.
 - maintain equilibrium with its carrying capacity.
 - learn to share common resources for the good of humanity.
 - outstrip its resources, then suffer starvation and misery.

Use the following terms for questions #14 to #16

A. Parasitism B. Mutualism C. Commensalism D. Predation E. Competition

14. Epiphytes in tropical rainforests.

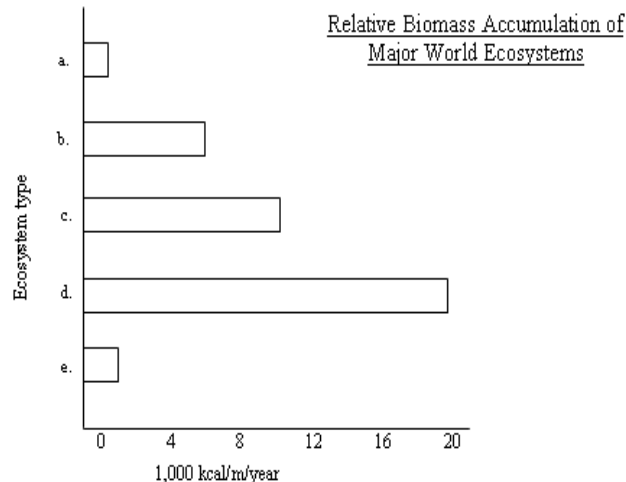
15. Alpha male in wolf pack has pick of the females in the pack.

16. Protozoans found in the gut of termites allow for wood digestion.

17. A study was conducted to study the effect of marine sediment pollution on the survival of amphipods. Results showed the correlation between the mean % amphipod survival and the marine sediment pollution index (MSPI) to be $r = -0.75$. The correlation indicates:

- A. that as mean % survival increases the MSPI increases.
- B. that as mean % survival increases the MSPI decreases.
- C. there are other factors affecting % survival besides the MSPI
- D. A & C
- E. B & C

Use the following graph to answer questions #18 - #19



18. When looking at the relative biomass accumulation of major world ecosystems, ecosystem “a” is probably:

- A. Desert
- B. Savanna
- C. Temperate forest
- D. Taiga
- E. Tropical Rainforest

19. When looking at the relative biomass accumulation of major world ecosystems, ecosystem “c” is probably:

- A. Desert
- B. Savanna
- C. Temperate forest
- D. Taiga
- E. Tropical Rainforest

20. Complexity in an ecological community has to do with the number of:

- A. Species in the population
- B. Species at each trophic level.
- C. Genetic variations within a species
- D. Primary producers available
- E. Primary producers relative to the number of consumers.

21. This biome’s primary plant species is made up of gymnosperms:

- A. Taiga
- B. Temperate deciduous forest
- C. Chaparral
- D. Temperate rain forest
- E. Tundra

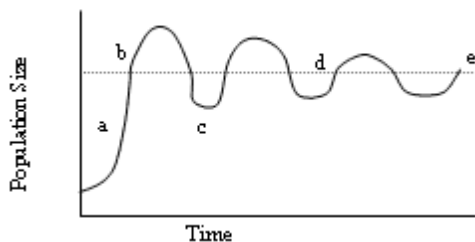
22. Assume that a new volcanic island has appeared approximately 100 miles off the coast of Panama. Of the following organisms, which of them would you expect to make its way to the island first?

- A. aphids that feed on conifers
- D. barklice that feed on lichens

- B. nematodes that feed on the roots of grasses E. gnats that feed on fungi
 C. grasshoppers that feed on shrubs
23. Which of the following can have a positive effect on the growth of a mammalian population?
 I. immigration II. emigration III. increased birthrate IV. decreased birthrate
 A. I & III D. I, II, & III
 B. II & III E. I, II, III, & IV
 C. I & IV
24. Which of the following plants would have an important role in the nitrogen cycle?
 A. potatoes, beans, & alfalfa D. alfalfa, wheat, clover
 B. quinine, alfalfa & clover E. lentils, clover, alfalfa
 C. corn, alfalfa, & lentils
25. The first major burst of human population growth (about 1 million years ago) probably resulted from:
 A. an increase in human fecundity due to better sanitation.
 B. the invention of agriculture.
 C. an increase in human fertility due to climate change.
 D. the discovery of tools and of fire.
 E. the development of cities.
26. Oxygen given off during photosynthesis is produced during the _____ which takes place in the _____ of the chloroplasts.
 A. Dark reactions, stroma D. Light Reactions, thylakoids
 B. Dark Reactions, thylakoids E. None of the above
 C. Light Reactions, stroma
27. In which of the following organisms would one expect to find the greatest concentration of mercury, a metal pollutant?
 A. Plankton B. Minnows C. Sharks D. Seaweed E. Tuna
28. An ecologist studying how the invasive kudzu plant affects the population dynamics of native plants is focusing on the:
 A. population B. community C. ecosystem D. biome E. individuals
29. Which of the following is considered abiotic?
 A. roots of a dandelion D. a human skull
 B. petals of a rose E. none of the above
 C. leaf compost
30. Assume Hurricane Sandy left only 15% of a specific saltwater rodent population intact. This is an example of a:
 A. genetic drift D. punctuated equilibrium
 B. bottleneck effect E. density-dependent factor
 C. founder effect

31. In a non-evolving population, with no immigration or emigration, 16% of the population displays a recessive phenotype. What percent of the population displays the heterozygous condition, assuming the Hardy-Weinberg equation holds for the population:
 A. 84% B. 48% C. 36% D. 24% E. It is not possible to determine
32. Which of the following is an intraspecific interaction?
 A. Mutualism(corrected spelling) D. parasitism
 B. predation E. all the above
 C. territoriality
33. Dimilin is an insecticide that inhibits the formation of chitin in the exoskeleton of insects. It was often sprayed aerially for the control of gypsy moths over wide areas. Therefore dimilin can also cause problems in which of the following organisms:
 A. Mushrooms D. Plants
 B. Bacteria E. All of the above can be negatively effected
 C. Algae
34. In 1900, President McKinley signed an act to regulate interstate traffic in wild birds in order to stop importation of birds where they had become endangered. This was to protect birds, particularly egrets that were being slaughtered on a mass scale to provide elegant plumes for ladies hats. What was the name of the law/act?
 A. Migratory Bird Act D. Wild Bird Conservation Act
 B. Norbeck-Anderson Act E. Endangered Species Act
 C. Lacey Act
35. New Jersey is located in the _____ biome.
 A. taiga D. Chaparral
 B. temperate decidous forest E. temperate grasslands
 C. temperate rain forest

Use the following graph to answer questions #36 - #37



36. The horizontal line in the graph above represents:
 A. carrying capacity D. fecundity
 B. biotic potential E. exponential growth
 C. predator populations
37. Density –dependent factors would have a greater impact at which point on the graph?
 A. a B. b C. c D. d E. e
38. The American frontier spirit, as seen during the 1800's, was a time where ideology was expressed in the term "manifest destiny". During this era the right of individuals to exploit their land as they saw fit was fostered. This is an example of:
 A. biocentrism D. ecocentrism
 B. egocentrism E. anthropocentrism
 C. bioregionalism

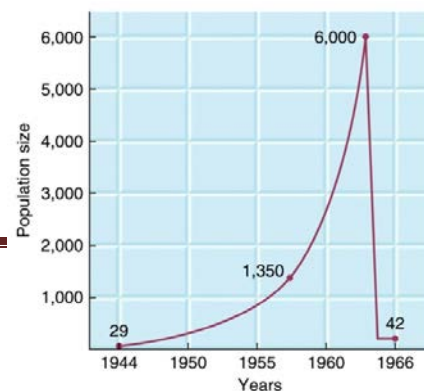
For questions # 39 – 41, use the following choices:

- A. George Marsh B. Aldo Leopold C. Gifford Pinchot D. John Muir E. Ernst Haeckel

39. He is considered the founder of environmental science, having written a book about man and nature and how the earth is affected by human actions.
40. He coined the term ecology.
41. He founded the Sierra Club.
42. The two processes that determine the world's current biodiversity are:
 A. Extinction and speciation rates D. extinction and allopatric speciation
 B. allopatric and sympatric speciation E. endemism and climate change
 C. breeding and speciation rates
43. A keystone predator is predicted to have what effect on a community?
 A. Its presence decreases biodiversity
 B. Its presence has a direct effect on its prey.
 C. Its presence has a direct effect on non-prey species.
 D. It would have no effect on a community, except for prey species.
 E. Its presence has no effect on biodiversity.
44. Which statements correctly describe the food chain below?
flowering plant → insect larvae → snake → hawk
 I. The snake is a primary consumer.
 II. The arrows point in the direction of energy flow.
 III. There are four different trophic levels.
 IV. Flowering plants are producers.
 A. III & IV Only D. II, III, & IV Only
 B. II & III Only E. I, II, III, & IV
 C. I, III, & IV Only
45. Which of the following is/are most likely to become extinct?
 A. An orchid endemic to a species of trees found on an island being logged to make room for crops.
 B. Gypsy moths brought to the US for silk production escape from captivity, but upon escaping find a relatively large habitat with numerous food choices.
 C. A flock of migratory warblers stopping along its winter route to feed and find their choice food replaced by a suburb
 D. A & C
 E. All of the above
46. When does the growth rate of a natural population equal zero?
 A. when N/K is exactly one D. When $N < K$
 B. when N/K equals zero E. When $N > K$
 C. when N nears the carrying capacity of the habitat
47. Which is the best method for preserving the biodiversity of an ecosystem?
 A. creating a preserve in an urban area
 B. building botanical gardens based on the ecosystem
 C. preserving a few very large areas on an ecosystem
 D. preserving many small areas of the ecosystem
 E. creating greenbelts along creeks and roadways in urban areas
48. Natural selection is an evolutionary force that can affect an entire population. One species can evolve into two species when only the extreme forms of the trait are favored and intermediate forms are selected against. This is known as:
 A. Artificial selection D. Stabilizing selection
 B. Directional selection E. Disruptive selection
 C. Targeted selection

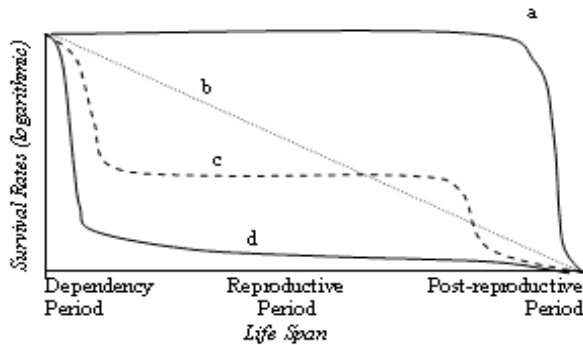
49. Which of the following is not currently a component of the three-factor model to account for environmental degradation and pollution?
- A. population size and distribution
 - B. prices which reflect social and environmental costs
 - C. science and technology
 - D. politics and ethics
 - E. None of the above because they are all components of the model
50. Agricultural societies resulted in all of the following changes to humans except:
- A. growth of villages.
 - B. specialized occupations and long-distance trade.
 - C. increased competition for resources
 - D. equal work distribution among people.
 - E. domesticating of animals.
51. Which of the following helps a prey species avoid being detected by a predator?
- A. Mullerian mimicry
 - B. cryptic coloration
 - C. secondary compounds
 - D. aposematic coloration
 - E. Batesian mimicry
52. The number of species in a community is referred to as the:
- A. keystone species
 - B. ecosystem productivity
 - C. species diversity
 - D. species richness
 - E. spatial heterogeneity
53. All the organisms that occur in the redwood community
- A. have niches that overlap
 - B. use the redwoods for food
 - C. have identical geographic distributions
 - D. have the same evolutionary history
 - E. All of the above
54. Reproductive isolation cannot be tested with _____ populations
- A. Sympatric
 - B. parapatric
 - C. allopatric
 - D. Reproductive isolation can be tested with any of these.
 - E. Reproductive isolation cannot be tested with any of these.
55. Behavioral isolating mechanisms may occur when two species have different:
- A. sized and shaped copulatory organs
 - B. courtship displays
 - C. times of the day that they are sexually active
 - D. habitat ranges
 - E. chemical compatibilities of their gametes

56. Detritivores include:
- algae and photosynthetic bacteria
 - millipedes, soil insects and many ants
 - bacteria and fungi
 - species that can break down cellulose, bones and other durable biopolymers
 - wolves and lions
57. Precipitation:
- that measures pH =4 is twice as acidic as precipitation that measures a pH =5.
 - has become increasingly more basic in the last 100 years.
 - that is acidic has a low concentration of hydrogen ions.
 - that is acidic would have a pH higher than pure water.
 - that is acidic would have a pH lower than pure water.
58. The first major era of environmental policy _____.
- Was driven by the burning of the Cuyahoga River.
 - Addressed public land management and encouraged western expansion.
 - Was driven by the publication of Paul Ehrlich's work, *Population Bomb*.
 - Was a response to address environmental pollution.
 - Was driven by new evidence such as Rachel Carson's *Silent Spring*.
59. Of the following sequences involved in getting new environmental policies or legislation, which best represents the correct order of events?
- Lobbying the government to come investigate, finding the cause of a problem, lobbying the government to find a solution
 - Getting organized, discovering problems, identifying causes, lobbying government for change
 - Identifying a cause of an environmental problem, getting organized, lobbying the government, and envisioning a solution.
 - Raising campaign funds, identifying a cause, envisioning a solution, lobbying
 - Identify a problem, identifying a cause, envisioning a solution, lobbying the government
60. Sustainable development involves:
- Using all resources at maximum rates at maximum efficiency
 - Decreasing consumption, increasing efficiency, and increasing the use of non-renewable resources.
 - Increasing consumption, increasing efficiency, and increasing the use of renewable resources
 - Decreasing consumption, increasing efficiency, and increasing the use of renewable resources
 - Using all resources at the lowest possible rate even if efficiency is decreasing.
61. Which of the following is a biotic renewable resource:
- | | | | |
|----------|---------------------|-----------|----------|
| I. water | II. Christmas Trees | III. Coal | IV. Beef |
|----------|---------------------|-----------|----------|
- IV only
 - I and II only
 - II and IV only
 - I, II, and IV only
 - I, II, III, and IV
62. The first National Park was:
- Yosemite
 - Everglades
 - Mount Rainier
 - Yellowstone
 - Glacier
63. The graph to the right shows the population size of an herbivore species between 1944 to 1966. This graph can best be described as a(n):
- J population curve
 - logistic growth curve



- B. S population curve E. none of the above
 C. Z population curve
64. Using the graph to the right, all of the following would be plausible explanations as to what happened to the herbivore population after 1963 as seen in the graph except:
 A. Rampant disease spread through the herbivore population after 1963.
 B. Heavy predation of the herbivore after 1963.
 C. A wide-spread fungal disease of the primary producer causing a severe decrease in the size of the primary producer population near the herbivore.
 D. An increase in rain that leads to a large increase in the size of the primary producer population near the herbivore.
 E. None of the above
65. The final herbivore population size in 1966 was reduced to what percentage of the maximum population size reached?
 A. 7% B. 0.7% C. 4.8% D. 48% E. 70%
66. C14 is an important radioisotope used in the process of carbon dating of certain fossils. How does C14 differ from C13?
 A. C14 has a greater atomic number than C13.
 B. C14 has more protons than C13.
 C. C14 has more neutrons than C13.
 D. C14 has more electrons than C13.
 E. None of the above
67. In the field, you observe a lion chase, kill, and eat a gazelle. A vulture pecks away at the leftover meat scraps after the lion leaves. Beetles attack the remaining fragments. Finally, bacteria complete the breakdown and recycling of organic material. If you were to apply a general classification to the feeders, what would be the correct sequence?
 A. decomposer→scavenger→detritus feeder→carnivore
 B. carnivore→detritus feeder→scavenger→decomposer
 C. carnivore→scavenger→detritus feeder→decomposer
 D. carnivore→scavenger→decomposer→detritus feeder
 E. omnivore→scavenger→decomposer→detritus feeder
68. Which of the following statements is the most logical way to cope with the problem of limitations imposed by the 3 basic physical laws governing matter?
 A. Use and waste less energy and matter.
 B. Shift to nonpolluting nuclear fusion power
 C. Increase the output of low-quality heat.
 D. Increase the input of high-quality energy.
 E. All of the following
69. Which of the following effects is not an outcome of the human alterations of the nitrogen cycle?
 A. The rate of protein production is increased in plants that tolerate high nitrogen levels.
 B. The total number of plant species is decreasing
 C. Primary and secondary production will fail
 D. The number of individual producers within an ecosystem will increase
 E. Plants that tolerate high nitrogen and acid rain will survive as to those that do not tolerate both conditions.
70. The matter that is contained in living organisms is:
 A. Biosphere D. primary production
 B. Biomass E. the number of individuals in the ecosystem
 C. Bioweight

Use the following graph to answer questions# 71-73.



71. Which of the following statements best describes the species represented by curve “c” in the graph above?
- Reproductive adult species have the highest rate of survival for this species.
 - The rate of mortality is relatively constant throughout its life span.
 - It is highly susceptible to mortality early in life.
 - Once the individual reaches old age its survivorship decreases dramatically.
 - It is highly susceptible to mortality early in life and late in life.
72. Which of the curves in the graph above represents a species that tend to die more-or-less randomly at any age?
- A
 - b
 - c
 - d
 - None of the above
73. Graph _____ most closely represents elephant survivorship, while graph _____ most closely represents oyster survivorship.
- d, a
 - c, a
 - a, b
 - a, d
 - a, c
74. Complexity in an ecological community has to do with the number of
- species in the population.
 - Species at each trophic level
 - Genetic variations within a species
 - Primary producers available
 - Primary producers relative to the number of consumers
75. In general, abiotic regulatory factors tend to be _____ while biotic factors tend to be _____.
- Interspecific, intraspecific
 - Intraspecific, interspecific
 - Density-dependent, density-independent
 - density-independent, density-dependent
 - interspecific, density-independent
76. Which one of the following term and description is mismatched?
- Ecocentrism – would not approve of human starvation and disease as the ways to control population and preserve ecosystems.
 - Biocentrists – concerned about preserving biodiversity
 - Anthropocentrism – value of ecosystems for tourism
 - Ecocentrism – values forests across the biosphere as helping to regulate global climates as provide needs ecosystem services to the planet
 - Anthropocentrists – disregard for the biodiversity of unharvested forests
77. Lia and Jamison are having a discussion about the scientific method. Lia states that every time she sees people carrying an open umbrella, she sees several small car accidents. This is a(n):
- Theory about car accidents.
 - Example of the scientific method
 - Theory about why umbrellas are open
 - Hypothesis
 - Observation
78. Which of the following are producers:
- plants
 - algae
 - Cyanobacteria
 - Fungi

- A. I only
- B. I and II only
- C. I, II, and III only
- D. I, II, and IV only
- E. I, II, III, and IV

79. Which of the following is a density-independent factor:

- I. Hurricane Sandy on the East Coast October 2012
- II. Tornadoes in the Southern US on Christmas day 2012
- III. Forest fires in the western US during the summer of 2012

- A. I only
- B. II only
- C. II and III only
- D. I, II, and III
- E. None of above

80. This President signed the law establishing the first national park in the US:

- A. Ulysses S. Grant
- B. William McKinley
- C. Theodore Roosevelt
- D. Woodrow Wilson
- E. Franklin Delano Roosevelt

NEW JERSEY SCIENCE LEAGUE
Environmental Science Answer Key

January 2013

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

New Jersey Science League
Environmental Science Exam – February 2013

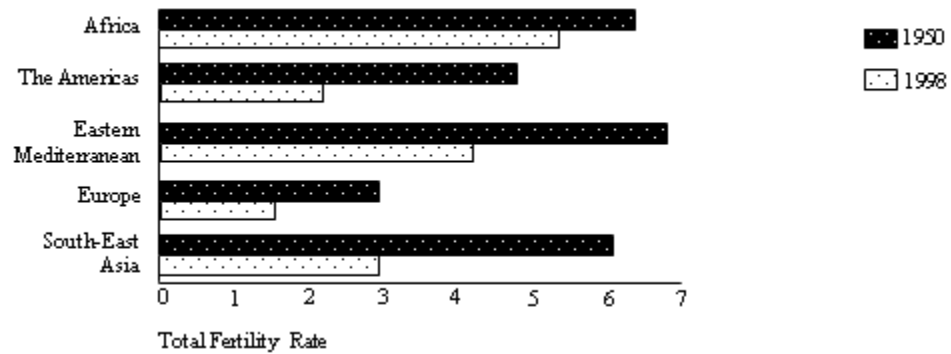
Answer the following questions on the scan-tron provided. Choose the letter that best completes or answers the item. Be certain that erasures are complete. Please PRINT your name, school code, and which test you are taking on the scan-tron as instructed.

- In the transitional phase from Pre-Industrial economies, birth rates _____ while death rates _____.
 - Do not change, drop
 - Increase, remain the same
 - Decrease, decrease
 - decrease, remain the same
 - increase, increase
- All of the following factors are density-independent factors except which one?
 - climate
 - pH level
 - food supply
 - water supply
 - competition
- What is the correct chronological order of a demographic transition in western civilization?
 - Stage 1: birth rate declines, Stage 2: high growth rate, Stage 3: birth rate drops toward the death rate rate, so growth declines
 - Stage 1: growth increase, Stage 2: birth rate drops toward the death rate rate, so growth declines, Stage 3: birth rate declines
 - Stage 1: steady population growth, Stage 2: birth rate increase, Stage 3: birth rate decrease
 - Stage 1: rapid population growth, Stage 2: birth rate dramatically decrease, Stage 3: birth rate decrease
 - None of the above
- The highly developed countries represent how much of the world's population?
 - 20%
 - 30%
 - 50%
 - 70%
 - more than 80%
- Which of the following organisms would be an example of an *r-strategist*?
 - Whale
 - Eagle
 - Alligator
 - cockroach
 - dog
- Which of the following statements is an accurate description of the three principal effects of human populations on the environment?
 - population, adaptation, technology
 - population, affluence, technology, and environment sensitivity
 - population, aggression, technology, and environment sensitivity
 - persistence, affluence, and time
 - population, adaptation, total fertility
- What factors determine whether a population of humans grows, shrinks, or remains stable?
 - Population growth = (birth - emigration) – (death – immigration)
 - Population growth = (birth – immigration) – (death – emigration)
 - Rates of birth, death, immigration, and emigration
 - Affluence and technology
 - Availability of medical procedures
- The country with the lowest reproductive population is _____.
 - Columbia South America
 - the United States because of increased illegal immigration
 - Germany, because of the legal immigration of foreign workers
 - Austria
 - Zimbabwe

9. What does the S term represent in the model used to evaluate the total impact of the human populations on the environment?
- Suitability, to denote the appropriateness of human activity for environmental protection
 - Sex ratio, to denote the number of mating pairs
 - Sensitivity, to denote how sensitive a given population is to population control
 - Sustainability
 - Sensitivity, to denote how sensitive a given environment is to these pressures
10. What expression is used to determine growth rate?
- Crude birth rate – crude death rate
 - (Crude birth rate + emigration) – (crude death rate + immigration rate)
 - (Crude birth rate + emigration rate) + (crude death rate + immigration rate)
 - (crude birth rate + immigration) + (crude death rate + emigration)
 - (crude birth rate + immigration) – (crude death rate + emigration)
11. Marine ecosystems that occur on the ocean floor are termed_____.
- pelagic
 - benthic
 - neritic
 - pycnocline
 - aphotic
12. Plankton is most common in the _____ region of the ocean.
- Benthic
 - Pelagic
 - Neritic
 - intertidal
 - oceanic
13. Arctic ecosystems are considered marine ecosystems because:
- arctic ecosystems contain an enormous amount of frozen sea water.
 - phytoplankton form the basis of arctic food webs
 - arctic ecosystems are inhabited by few organisms and sunlight is limited.
 - A and B
 - A, B, and C
14. Mangrove trees grow:
- Along the coasts of rivers
 - In freshwater wetlands
 - In tropical and subtropical areas
 - B and C
 - A, B, and C
15. Age structure data include all of the following *except*:
- the ratio of males to females
 - the ratio of older people to younger people in a population
 - the amount of population change due to immigration or emigration
 - the number of members of a population who are between 5 and 11 years old
 - None of the above, all are involved in age structure data
16. Recently in the news, information has come out that President Putin of Russia is trying to encourage Russian families to have more children. The reason for this policy is because:
- Russian families are having on average 1.7 children per family and this is too low to sustain the current population size.
 - Russian families are having on average 2.2 children per family and this is too low to sustain the current population size.
 - He fears that Russia will be subject to invasion without these policies.
 - A & C
 - B & C

17. All of the following are reasons that less-developed countries may not follow the same demographic transition that the industrialized world went through except:
- world population is higher now
 - there is more land that has been exploited now
 - industrialization may not be able to go fast enough to keep up with the population
 - energy and natural resources are still abundant
 - all of the above are reasons
18. Compared with people in developing countries, people in industrialized countries are more likely to eat:
- beans
 - rice
 - corn
 - wheat
 - beef
19. Of the following organisms, which occupies the lowest trophic level?
- deer
 - Spider
 - Snake
 - lion
 - hawk
20. Human population pressure in poor areas like sub-Saharan Africa often result in:
- Increased environmental degradation as marginal land is brought into production
 - Decreased political unrest as multinational food producers take over production facilities
 - Increased self-sufficiency as aid agencies respond to urgent need
 - Decreased internal migrations as people lose energy to travel within the country
 - All of the above are typical of poor areas like sub-Saharan Africa
21. Which marine ecosystem has the highest level of nutrients?
- benthic
 - pelagic
 - bog
 - lake
 - estuary
22. Which of the following is not a primary determinant of lake productivity?
- temperature
 - predation
 - depth
 - nutrient level
 - none of the above
23. Pronatalist pressures are influences that lead people to:
- increase fecundity
 - have more children
 - have fewer children
 - prevent infant mortality
 - wait until later in life to have children
24. Birth rates in the United States have _____ during the last hundred years.
- remained fairly constant
 - fallen steadily
 - fallen and risen repeatedly
 - risen steadily
 - decreased dramatically
25. In his recent book (2005), Richard Louv maintains that today's children_____.
- have a better understanding of natural environments than their grandparents
 - should not be exposed to the dangers of natural ecosystems.
 - develop more balanced emotions in urban compared to natural settings
 - suffer psychologically and emotionally from "nature deficit syndrome."
 - none of the above
26. Organisms whose life history adaptation is called semelparity:
- Produce young only late in life
 - Produce a large batch of young and die
 - produce a single offspring near the end of their reproductive life
 - Produce young over most of their life
 - none of the above

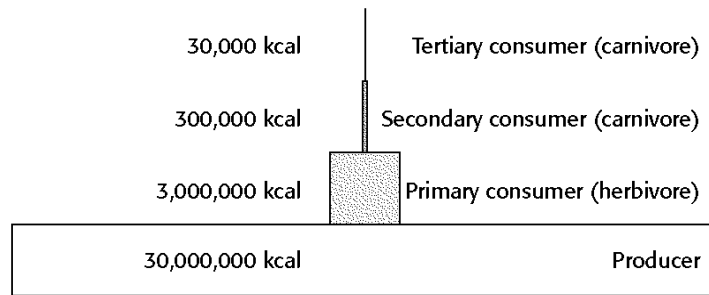
Use the following graph and countries to answer questions # 27 - 29



- A. Africa B. The Americas C. Eastern Mediterranean D. Europe E. South-East Asia

27. According to the graph above, which region had the highest total fertility rate in 1998?
28. According to the graph above, which region had the highest total fertility rate in 1950?
29. According to the graph above, which region had the greatest fertility reduction?
30. Tobacco hornworm caterpillars are attacked by the Braconid wasp, *Cotesia congregata*. The wasp lays eggs in the larvae where they develop. When the wasp is ready to complete its development it burrows out of the hornworm caterpillar killing it. This relationship is best explained by understanding:
- A. Parasites D. Parasitoids
 B. Mutualism E. Symbiosis
 C. Commensalism

Use the graph to answer questions #31-32



31. In the illustration above, at each trophic level, the energy stored in the organisms in that level is:
- A. About 10% of the energy in the level below it.
 B. About 10% of the energy in the level above it.
 C. About 1% of the energy in the level below it.
 D. About 1% of the energy in the level above it.
 E. None of the above
32. In the illustration above, the diagram represents the decrease in:
- A. The number of organisms between lower and higher trophic levels
 B. Available energy between lower and higher trophic levels
 C. Diversity of organisms between lower and higher trophic levels
 D. All of the above
 E. None of the above.

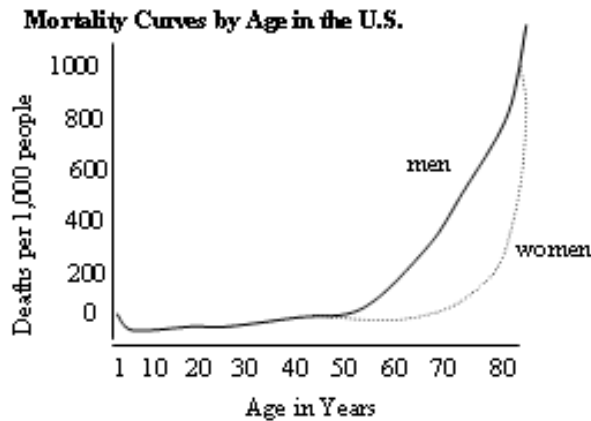
33. The Convention of Biological Diversity has goals _____.
- that includes a set of international laws.
 - that ensures the distribution of biodiversity's benefits to wealthy countries that can pay for them.
 - spelling out future management plans for all biomes,
 - designed to increase biodiversity
 - that require biodiversity be used in a sustainable manner.
34. The eutrophication that has taken place in the Gulf of Mexico and other locations appears to be due to _____.
- Excess nutrients from fertilizer.
 - Global warming from human use of fossil fuels
 - Heavy metals dumped in the sewage
 - Weather alone, because it is only obvious in the summer
 - Pesticide use along the waterways
35. Chemoautotrophs are most likely to be found in this region of the ocean:
- Photic
 - Aphotic
 - Littoral
 - Neritic
 - None of the above
36. In relation to lake stratification, this area is nutrient poor and is deep:
- Eutrophic zone
 - Limnetic zone
 - Oligotrophic zone
 - mesotrophic zone
 - littoral zone
37. Photic freshwater biomes include _____ and _____.
- littoral and oligotrophic
 - neritic and pelagic
 - littoral and limnetic
 - limnetic and mesotrophic
 - none of the above
38. Area where freshwater merges with ocean creating areas for harbors:
- Wetland
 - Mangrove swamp
 - Delta
 - estuary
 - none of the above
39. This biome is found at mid-latitudes along the coast. The plants here are often spiny evergreens and fires are common during the summer.
- desert
 - taiga
 - grasslands
 - savanna
 - chaparral
40. Decreased death rates and the accelerated growth of human population are related to:
- Improved sanitation and health
 - Increased food supply
 - Control of disease-spreading organisms
- I only
 - II only
 - III only
 - I and II Only
 - I, II, and III
41. The "demographic transition" leads to:
- an increase in population growth rate
 - a decline in population growth rate
 - an increase in the birth rate
 - a decline in the death rate
 - all of the above, it's a four stage pattern of population growth

42. The algae and photosynthetic bacteria living in hot springs feed on the:
- A. first trophic level
 - B. second trophic level
 - C. third trophic level
 - D. fourth trophic level
 - E. fifth trophic level
43. Which of the following parameter(s) is/are necessary to describe exponential population growth:
- A. Carrying capacity
 - B. Population size
 - C. Juvenile death rate
 - D. time lag
 - E. all of the above are necessary
44. The current population of Demographic Island is 10 million inhabitants, and the population is doubling every 10 years. Current agriculture on the island could feed 20 million people, and technological advancements are increasing this capacity by a million a year. Given only this information, when will there be a food shortage on the island?
- A. never
 - B. in 10 years
 - C. in 15 years
 - D. in 20 years
 - E. in 25 years
45. The swamplands of extreme southern Louisiana which contain elements of both forests and coastal marshes, could be called a/an:
- A. abiotic system
 - B. superbioime
 - C. ecotone
 - D. dead zone
 - E. closed ecosystem
46. The physical, abiotic components of our planet can be divided into the _____.
- A. Geosphere and atmosphere
 - B. Lithosphere, biosphere, and atmosphere
 - C. Lithosphere, biosphere, atmosphere, and hydrosphere
 - D. Centrosphere, geosphere, biosphere, and atmosphere
 - E. Lithosphere, hydrosphere, and atmosphere
47. The biosphere consists of the _____.
- A. Water, saltwater, and freshwater in surface bodies and the atmosphere
 - B. Solid earth beneath your feet
 - C. Sum of all the planet's living organisms and the abiotic portions of the environment
 - D. Air surrounding our planet
 - E. Abiotic portions of the environment
48. A small section of prairie grasses, over a year, produces enough biomass to feed insects, mice, rabbits, birds, deer, antelopes and a host of decomposers. The amount of food potentially available to the herbivores is the _____.
- A. Gross primary productivity
 - B. Ecosystem productivity
 - C. Secondary production
 - D. net density
 - E. net primary productivity
49. By damming rivers and using methods such as flood irrigation, we are:
- A. increasing evaporation
 - B. decreasing evaporation
 - C. increasing transpiration
 - D. decreasing the water table
 - E. increasing the water table
50. Which biome is characterized by plants whose leaves drop off in the wintertime?
- A. coniferous forest
 - B. temperate deciduous forest
 - C. tropical rain forest
 - D. tundra
 - E. none of the above

51. What type of survivorship curve do humans have?
- Type I
 - Type II
 - Type III
 - Type IV
 - None of the above
52. To obtain optimal yield, populations should be harvested at what part to the sigmoid growth curve?
- At the very beginning
 - Where it levels off
 - At the steep part
 - populations should never be harvested
 - it doesn't make any difference
53. An example of an organism fitting a Type I survivorship curve is:
- human
 - hydra
 - lizard
 - oyster
 - none of the above
54. Which of the following statements is true?
- Oligotrophic lakes contain more nutrients than eutrophic lakes.
 - Xerarch succession is primary succession that occurs in salt-water environments
 - Most ecologists believe that most communities achieve a stable, unchanging climax vegetation.
 - A mature ecosystem has greater species richness, greater biomass, and less net productivity than a younger stage of succession.
 - Tolerance, facilitation and inhibition occur only in the very earliest of successional stages and are associated with R-selected species.
55. Gause's principle of exclusion is, essentially
- the more abundant species will exclude the less abundant species through competition
 - competition for the same resources excludes species having different life styles
 - no two species can occupy the same niche indefinitely when resources are limited
 - larger organisms exclude smaller ones through competition as in the case of large trees controlling underbrush
 - None of the above
56. Fighting over shared resources is called
- character displacement
 - interference competition
 - exploitative competition
 - exploitative competition
 - predation
57. In a stratified lake, the warmer water is separated from the colder water by the
- photic zone
 - thermocline
 - hypolimnion
 - epilimnion
 - none of the above
58. The deep-water areas of the open ocean are called the
- Intertidal zone
 - Hypolimnion
 - neritic zone
 - profundal zone
 - abyssal zone
59. Compared with terrestrial habitats, the oceans have _____ species and _____ phyla.
- fewer, more
 - more, more
 - fewer, fewer
 - more, fewer
 - the same, the same
60. What is the name of the event that results in unusual warming of the waters off the coast of Peru and has adverse climatic consequences on a global scale?
- the Humboldt Current
 - El Nina
 - El Niño
 - the Gulf Stream
 - the doldrums

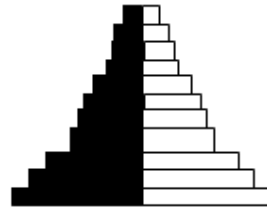
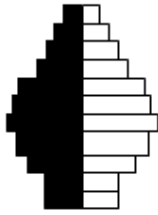
61. Approximately what percentage of the earth's surface is covered by inland lakes?
 A. 0.3% B. 1.8% C. 15% D. 23% E. 50%
62. The greatest variety of organisms in the oceans occurs in the:
 A. Shallow water D. A & C
 B. Open sea surface E. none of the above
 C. Deep sea water
63. Which of the following countries has the smallest proportion of its population under 15 years of age?
 A. Mexico D. United States
 B. China E. None of the above
 C. India
64. The Dust Bowl of the 1930s was the result of destruction of
 A. Desert D. tallgrass prairie
 B. Chaparral E. temperate deciduous forest
 C. shortgrass prairie

Use the following graph to answer questions # 65 - 66



65. The Mortality Curve graph above shows that fewer American women than men die:
 A. Between the ages of 40 and 80 D. before the age of 40
 B. Between the ages of 10 and 30 E. at all ages
 C. After the age of 40
66. Based on the graph above, the average _____ of people in the united States is around 80 years.
 A. survivorship D. mortality
 B. fecundity E. life expectancy
 C. life span
67. Island biogeography explains the phenomenon of _____ terrestrial species on islands small and far from the mainland when compared to larger islands that are closer to the mainland and have _____ terrestrial species.
 A. More, fewer D. smaller, larger
 B. Fewer, more E. about the same, about the same
 C. Larger, smaller

Use this picture to answer questions #68 - 69



68. The population represented by the age class histogram on the right above will:
- have a population of old people soon.
 - not grow much in the coming years.
 - soon begin to decline
 - grow substantially in the future.
 - grow slowly in the future.
69. The histogram on the left above represents a population whose birth rates:
- have not changed for many years.
 - have recently decreased
 - are gradually increasing
 - are sharply increasing
 - None of these – birth rates cannot be determined by the age class histogram.
70. Thomas Malthus advocated that human population will:
- be reduced mainly because of the imminent implementations of one child policies in most of the countries around the world.
 - will increase exponentially for approximately 35 years and then reach a plateau.
 - be reduced by our own vices, such as wars, epidemics, and famines.
 - will increase at rates that would allow humans to keep enjoying current standards of living
 - none of the above
71. Sea otters feed on sea urchins. Sea urchins then feed on kelp. If there are fewer sea otters, there will be _____ kelp.
- More
 - Less
 - The same amount
 - There is not enough information to determine
 - None of the above
72. In nature, most populations are
- Slightly increasing most of the time
 - Stable most of the time
 - Increasing most of the time
 - always undergoing fluctuations
 - in a dynamic state of equilibrium
73. Who of the following is a transcendentalists meaning they reject materialism and turn to nature for guidance:
- Pinchot
 - Muir
 - Leopold
 - Emerson
 - none of the above
74. The text that expanded the community to include "soils, waters, plants, and animals or collectively: the land" was _____.
- The Land Ethic*
 - Silent Spring*
 - On Walden's Pond*
 - A Sand Country Almanac*
 - Our Stolen Future*

75. The first major era of environmental policy _____.
- A. addressed public land management and encouraged western expansion
 - B. was driven by new evidence such as Rachel Carson's *Silent Spring*
 - C. was driven by the burning of the Cuyahoga River
 - D. was driven by publication of Paul Ehrlich's work *Population Bomb*
 - E. was a response to address environmental pollution
76. The dropping of the atomic bomb during World War II is an example:
- I. Density-independent factor
 - II. density-dependent factor
 - III. An action that can cause cancer in surviving organisms
- A. I Only
 - B. II Only
 - C. I and III only
 - D. II and III Only
 - E. I, II, and III
77. Which of the following is most likely to result from the destruction of wetlands surrounding a river?
- A. a decreased sediment load
 - B. an increased level of oxygen in the river
 - C. a decreased level of pollutants such as nitrates in the river
 - D. an increased frequency of flooding of the river valley
 - E. none of the above
78. Reasons that human populations historically have settled floodplains include which of the following?
- I. The soil of the floodplains is usually fertile
 - II. The terrain of the floodplains tends to be flat
 - III. Floodplains are close to rivers for transportation
- A. I Only
 - B. II Only
 - C. I and II Only
 - D. II and III only
 - E. I, II, and III
79. In an estuary, when fresh water meets salt water, currents form and cause:
- I. Limestone to fall to the bottom
 - II. Nutrients to fall to the bottom
 - III. Harbors to be created
- A. I Only
 - B. II Only
 - C. I and III Only
 - D. II and III only
 - E. I, II, and III
80. Forests found along the northwest coast of North America are in what biome?
- A. Taiga
 - B. Savanna
 - C. Temperate rain forest
 - D. Deciduous forest
 - E. chaparral

NEW JERSEY SCIENCE LEAGUE
Environmental Science Answer Key

February 2013

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

New Jersey Science League
Environmental Science Exam –March 2013

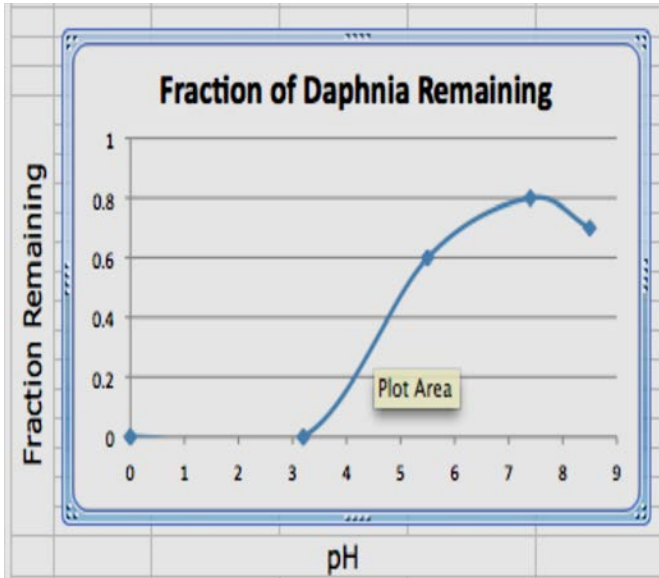
Answer the following questions on the scan-tron provided. Choose the letter that best completes or answers the item. Be certain that erasures are complete. Please PRINT your name, school code, and which test you are taking on the scan-tron as instructed.

- Weather patterns are largely determined in the _____.
 - Stratosphere
 - Troposphere
 - Biosphere
 - mesosphere
 - lithosphere
- Radon _____.
 - is caused by the breakdown of the ozone layer.
 - binds with hemoglobin, preventing binding with oxygen.
 - contributes to the breakdown of the ozone layer.
 - in the atmosphere limits the availability of sunlight for plants.
 - may cause damage to respiratory tissues when inhaled.
- The huge dust storms that took place in the US in the 1930s _____.
 - were the result of ozone depletion?
 - were the result of polar cells.
 - were triggered by tornados, worsened by global climate change
 - were the result of poor farming techniques
 - were the result of prairie fires.
- From an environmental viewpoint, the best approach to reducing flood risks is”
 - Flood control dams
 - Floodplain management
 - Artificial levees
 - Channelization
 - All of the above are equal in their effect
- Which is the most efficient irrigation technique?
 - Surge valves
 - Gravity flow through ditches
 - Drip irrigation systems
 - Center pivot sprinkler systems
 - None of the above
- Which of the following supplies most of the world's food?
 - Ocean fisheries
 - Croplands
 - Freshwater fisheries
 - Rangelands
 - All of the above are equal
- Which of the following is/are **not** a method of maintaining the availability of fish and seafood?
 - Increasing allowable bycatch levels
 - Decreasing the use of drift nets
 - Harvesting at sustainable yield
 - All of the Above
 - None of the above
- Green manure is
 - Animal manure that is fresh
 - Organic matter such as leaves, food wastes, and paper that are broken down by microorganisms
 - Inorganic fertilizer
 - Organic material sitting in a compost pile
 - Freshly cut or growing green vegetation plowed into the soil
- Where does ozone appear in the greatest quantities?
 - Stratosphere
 - Mesosphere
 - Troposphere
 - Lithosphere.

10. What type of radiation does **not** need to be present for smog to form?
 I. Ultraviolet II. X-Ray III. Infrared
- A. I Only D. II and III only
 B. II Only E. I, II, and III
 C. I and II Only
11. The thinning of the ozone layer is believed to have begun in which decade?
 A. 1920s D. 1980s
 B. 1960s E. 1990s
 C. 1970s
12. How many crop species are responsible for providing over 50% of all human energy requirements:
 A. 1 D. 30
 B. 3 E. 50
 C. 10
13. Which of the following is **not** likely to happen as a result of the rising levels of CO₂ in our atmosphere?
 A. rise in sea levels
 B. Changes in climatic patterns
 C. Shifts in the locations of deserts and fertile regions
 D. Increased incidence of skin cancer
 E. none of the above is likely to happen
14. DDT and chlordane are agricultural chemicals that were once used widely but have now been banned in the United States. They belong to a class of compounds called:
 A. Organophosphates D. Carbamates
 B. Chlorinated hydrocarbons E. Pyrethroids
 C. Chlorofluorocarbons
15. Near the equator, the patterns of convection currents are called _____.
 A. Coriolis cells D. Low-pressure cells
 B. Hadley cells E. El Nino events
 C. High-pressure cells
16. Tropospheric ozone _____.
 A. is a primary pollutant.
 B. is caused by poor farming techniques.
 C. protects Earth from most of the harmful radiation.
 D. binds with hemoglobin, preventing binding with oxygen in red blood cells.
 E. is produced through the interaction of heat and UV light, with nitrogen oxides and carbon-containing compounds.
17. The EPA has set national ambient air quality standards (NAAQS) for:
 A. lead D. mercury
 B. radon E. carbon dioxide
 C. carbon monoxide
18. Monsoons are characteristic of:
 A. the coast of Peru D. all of the above
 B. Hawaii E. none of the above
 C. India and southeastern Asia

19. Approximately what percentage of the earth's surface is covered by inland lakes?
- A. Less than 1%
 - B. about 2%
 - C. approximately 9%
 - D. more than 15%
 - E. none of the above
20. The timber industry classifies forestlands into three categories called:
- A. Softwoods, hardwoods, and mixed woods
 - B. Pine forests, redwood forests, and mixed forests
 - C. Virgin forests, native forests, and tree farms
 - D. Evergreen forests, deciduous forests, and mixed forests
 - E. Tree farms, softwood forests, and hardwood forests.
21. The lack of high levels of fecal coliform bacteria in a water source indicates that the water:
- I. Is safe to swim in
 - II. Is unsafe to swim in
 - III. Has been contaminated by untreated human or animal waste
- A. I only
 - B. II only
 - C. I and III only
 - D. II and III only
 - E. I, II, and III
22. Elements that cycle in the environment and that also have a gaseous compound or gaseous element at some point in their cycle include which of the following:
- I. Carbon
 - II. Phosphorus
 - III. Nitrogen
- A. I only
 - B. III only
 - C. I and II only
 - D. I and III only
 - E. I, II, and III
23. Of the following, which is the best example of a point source of water pollution?
- A. Factory effluent
 - B. Acid precipitation
 - C. Agricultural runoff
 - D. storm water
 - E. residential pesticide runoff
24. The amount of open space between soil particles is called:
- A. aridity
 - B. crystallization
 - C. lithification
 - D. saturation
 - E. porosity
25. What part of the world's population lives within 100km (about 62 miles) of a coastline?
- A. 15%
 - B. 30%
 - C. 50%
 - D. 65%
 - E. 75%
26. Which atmospheric layer contains the largest amount of water vapor?
- A. mesosphere
 - B. thermosphere
 - C. stratosphere
 - D. lithosphere
 - E. troposphere
27. Which atmospheric layer has the lowest pressure?
- A. troposphere
 - B. thermosphere
 - C. mesosphere
 - D. exosphere
 - E. stratosphere

28. Which of the following elements is most likely to limit primary production in freshwater lakes?
- A. oxygen
 - B. phosphorus
 - C. iron
 - D. calcium
 - E. carbon



DAPHNIA TOXICITY EXPERIMENT		
pH	Daphnia Remaining After Two Hours	Fraction of Daphnia Remaining
0	0	0
3.2	0	0
5.5	24	0.6
7.4	32	0.8
8.5	28	0.7

Use the graph and table above for the next 3 questions #29-31

29. The data shown were collected in a laboratory experiment in which the effect of pH on the survival of water fleas (*Daphnia pulex*) was examined. In each trial, 40 live water fleas were added to a solution with the pH as indicated. After 2 hours, observations were made to determine the number of fleas remaining alive in the sample. Results are shown in the graph and table above.

The pH at which 50% of the *Daphnia* survive after 2 hours can be predicted from the data. This pH is closest to:

- A. 2.5
 - B. 3.5
 - C. 4.5
 - D. 7.5
 - E. 8.5
30. How would including a control group be useful in this experiment?
- A. It would provide a reference for the effects of random environmental factors.
 - B. It would provide a number against which percentages can be computed.
 - C. It would provide a value for which the standard pH can be measured.
 - D. It would provide a standard number to test for statistical uncertainty.
 - E. It would provide an end data point for graphical analysis.
31. On the basis of the data, the best prediction of the pH of the water in which *Daphnia* are normally found in the wild is:
- A. 1
 - B. 3
 - C. 5
 - D. 7
 - E. 9
32. Which of the following is part of a positive feedback mechanism associated with global climate change?
- A. Increased gas mileage in cars
 - B. Increased cloudiness caused by more moisture in the atmosphere
 - C. Increased acidity of seawater
 - D. Increased growth of carbon dioxide –absorbing trees and grasses
 - E. Melting of Arctic sea ice

33. The following are gases found in the atmosphere: oxygen, nitrogen, water vapor. Rank these gases from highest to lowest in terms of their mass in the atmosphere. Assume the water vapor is saturated at 20°C.
- A. Nitrogen > oxygen > water vapor
 - B. Oxygen > nitrogen > water vapor
 - C. Water vapor > nitrogen > oxygen
 - D. Nitrogen > water vapor > oxygen
 - E. Oxygen > water vapor > nitrogen
34. The atmospheric concentration of carbon dioxide increased from 278 ppm in 1790 to 383 ppm in 2007. What is the approximate percent increase in carbon dioxide concentration from 1790 to 2007?
- A. 38%
 - B. 50%
 - C. 92%
 - D. 105%
 - E. 138%
35. Which of the following practices would have the biggest impact on achieving global sustainability?
- A. Recycling aluminum cans
 - B. Using fuel-efficient vehicles
 - C. Replanting deforested areas
 - D. Reducing human population size
 - E. Developing ecotourism venues
36. Which of the following is true of farm-raised salmon?
- A. They are more genetically diverse than their wild counterparts.
 - B. They are often infected with parasites and sea lice.
 - C. They seldom escape from their containment areas.
 - D. They have no impact on the quality of the water in which they are raised.
 - E. They are maintained at lower population densities than are the wild salmon.
37. Which of the following have nearly zero or zero topsoil?
- A. virgin prairies
 - B. deserts
 - C. tropical rainforests
 - D. tundra
 - E. all of these have topsoil
38. The water-holding capacity of soil is LEAST likely to be affected by the addition of which of the following?
- A. clay
 - B. manure
 - C. pesticides
 - D. humus
 - E. sand
39. Country with the largest boreal forests?
- A. United States of America
 - B. Brazil
 - C. Australia
 - D. China
 - E. Russia
40. Which of the following is an effective alternative to chlorine for disinfecting wastewater in a municipal treatment plant?
- A. ozone
 - B. alcohol
 - C. ammonia
 - D. freon
 - E. phosphate
41. Pumping large amounts of water from an aquifer may cause which of the following?
- A. Water table to rise
 - B. percolation of ground water to stop.
 - C. Recharge zone to shrink
 - D. Wells in the area to run dry

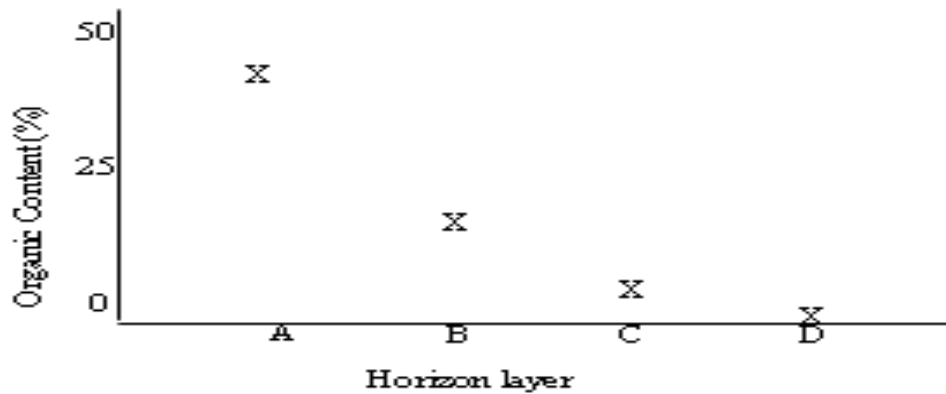
42. Ozone in the atmosphere is most important to life at the Earth's surface because it absorbs:
- A. Gamma rays
 - B. Microwaves
 - C. Ultraviolet light
 - D. X-rays
 - E. All of the above are true
43. Many scientists maintain that a rise in sea level has occurred in the last 100 years due to global warming. If this is true, which of the following factors best explains the rise?
- A. Increased participation
 - B. Increased cloud cover
 - C. Increased evapotranspiration
 - D. Thermal expansion of the oceans
 - E. Melting of the permafrost
44. The drop in stratospheric ozone levels in the Southern Hemisphere (ozone hole) is most evident during which season?
- A. Antarctic autumn (April)
 - B. Antarctic spring (October)
 - C. Both Antarctic summer and winter (January and July)
 - D. Antarctic winter only (July)
 - E. Antarctic summer only (January)
45. When compared to sand and gravel, small particles like clay and silt have _____ pore space.
- A. More
 - B. About the same
 - C. Less
 - D. Significantly more
 - E. It depends on the other particles present
46. Which of the following processes is NOT used in a conventional method of water treatment?
- A. filtration
 - B. coagulation
 - C. aeration
 - D. percolation
47. To obtain optimal yield, populations should be harvested at what part of the sigmoid growth curve?
- A. the very beginning
 - B. the steep part
 - C. where it levels off
 - D. it doesn't make any difference
 - E. populations should never be harvested
48. Which is the best cropping method for reducing erosion?
- A. Rotating corn, wheat, and clover
 - B. growing corn continuously
 - C. growing wheat continuously
 - D. Growing clover continuously
 - E. None of these is more effective than another
49. Which of the following pollutants causes artificial eutrophication?
- A. heavy metals from unlined landfills.
 - B. toxic chemicals from factories
 - C. organic plant nutrients from wastewater and fertilizer runoff
 - D. radioactive waste from nuclear power plants.
 - E. none of the above
50. Which of the following numbers on the pH scale indicates an acid solution?
- A. 5
 - B. 7
 - C. 9
 - D. 10
51. In 1969, this river caught on fire and burned for several days:
- A. Hudson River
 - B. Ohio River
 - C. Cuyahoga River
 - D. Merrimack River
 - E. Mississippi River

52. The majority of sulfur dioxide produced by industry comes from:
- A. Oil refineries
 - B. Coal-burning power plants
 - C. Chemical plants
 - D. Dry cleaners
 - E. All of the above are equal in their production
53. The average global temperature increased by approximately how many Celsius degrees during the 20th century?
- A. 0.4 degrees
 - B. 0.6 degrees
 - C. 0.8 degrees
 - D. 1.0 degrees
 - E. 1.2 degrees
54. Which of the following countries decided not ratify the Kyoto Protocol?
- A. United States
 - B. Canada
 - C. Australia
 - D. Russia
 - E. None of the above, they all ratified it
55. What is the main source of sulfur dioxide produced by industry?
- A. oil refineries
 - B. dry cleaners
 - C. chemical plants
 - D. home heating
 - E. coal-burning power plants
56. Building a mass transit system is likely to have which of the following effects?
- A. Increasing air pollution
 - B. Traffic congestion
 - C. Increasing the temperature of the urban heat island
 - D. All of the above
 - E. None of the above
57. This layer of soil is primarily made up of large rock particles with organic matter and inorganic compounds:
- A. Bedrock
 - B. Subsoil
 - C. Zone of leaching
 - D. surface litter
 - E. topsoil
58. Given a plot of land can produce more food when used to grow plants than when used to raise animals because:
- A. 1 Cal animal protein requires 10 Cal from plants
 - B. One-tenth of a plant's mass can be used as food
 - C. Plants provide more nutrients per gram
 - D. A and B
 - E. All of the above
59. Approximately _____ animal species have been domesticated:
- A. 25
 - B. 50
 - C. 80
 - D. 100
 - E. 130
60. Salinization may be caused by:
- I. Crop rotation
 - II. Long-term irrigation
 - III. High rainfall
 - A. I only
 - B. II only
 - C. I and III only
 - D. II and III only
 - E. I, II, and III only

61. Which of the following best describes soils in many tropical rain forests?
- I. They lack soil horizons
 - II. They are quickly depleted of nutrients when the forest is removed.
 - III. They are not deep or well drained
- A. I only
 - B. II only
 - C. I and III only
 - D. II and III only
 - E. I, II, and III only
62. Most volcanism in the world is associated with:
- A. Plate boundaries
 - B. Faulting
 - C. Desertification
 - D. Midcontinental hot spots.
 - E. Aquifer depletion
63. Which of the following is most likely to be the direct result of lack of genetic diversity in a food crop such as corn?
- A. Decreased potential yield.
 - B. Decreased dependence on chemical fertilizers.
 - C. Increased susceptibility to plant disease
 - D. Decreased kernel size
 - E. Increased resistance to pests
64. The IUCN's Red List is _____.
- A. A list of unidentified species
 - B. An identification list of known species
 - C. A list of ecologically damaged ecosystems
 - D. An updated list of species facing a high risk of extinction
 - E. A scorecard of international failures at conservation.
65. Paleontologists and ecologists agree that _____.
- A. As expected, an expedition to the remote Foja Mountains of New Guinea is turning up no new species.
 - B. Extinction is tied exclusively to human activities.
 - C. 99% of all species that have ever existed are now extinct.
 - D. Biodiversity is evenly spread over the Earth's biomes.
 - E. More than 70% of all species alive today have been discovered and described.
66. Bullfrog tadpoles are often sold as fish bait, even in areas where they do not occur naturally. When people buy 10 of them and don't use them all, they often dump the remainder into the lake or river. This is an example of _____.
- A. habitat destruction.
 - B. introduced species.
 - C. extirpation
 - D. overharvesting of species from the wild
 - E. inbreeding
67. What causes the change of the seasons?
- A. the flow of the ocean currents
 - B. the change in the distance from the Earth to the Sun.
 - C. the distribution of precipitation influence by topography
 - D. the tilt of the Earth's axis as the Earth orbits the Sun.
 - E. the longitudinal distance from the equator.

68. Growing rice results in the release of _____ into the atmosphere.
- A. ozone
 - B. nitric oxide
 - C. carbon dioxide
 - D. sulfate oxides
 - E. methane
69. Approximately _____ % of U.S. citizens live in coastal counties, thus vulnerable to rises in sea level.
- A. 10%
 - B. 25%
 - C. 40%
 - D. 50%
 - E. 65%
70. The most recent analyses of polar ice cores have given us the ability to profile global climate change back as far as _____ years.
- A. 10,000
 - B. 150,000
 - C. 400,000
 - D. 800,000
 - E. 10,000,000
71. Regular lawn mowing selects for short-headed rather than tall-headed dandelions because:
- A. Tall flowers spread their seeds farther.
 - B. Tall flowers cannot reproduce.
 - C. Short flowers can reproduce.
 - D. Short flowers spread their seeds farther.
 - E. Short flowers have less competition when the lawn is mowed often
72. The biomagnifications of DDT demonstrates that:
- A. Higher trophic level organisms can concentrate toxins in a type of “inverse biological pyramid.”
 - B. Birds should not depend on fish for food.
 - C. DDT is easily metabolized and excreted by most organisms.
 - D. DDT is an extremely water-soluble material.
 - E. Water-soluble toxins are widespread.

Use the following graph to answer Questions #73-75



73. The letters A, B, C, and D on the graph above represent different horizons in a soil. The letters represent, in order:
- Topsoil; parent material; bedrock; subsoil.
 - Subsoil; parent material; bedrock; topsoil.
 - Parent material; topsoil; subsoil; bedrock.
 - Topsoil; subsoil; parent material; bedrock.
 - Bedrock; subsoil; parent material; topsoil.
74. In which horizon layer of the graph above would you find the most plant roots?
- A
 - B
 - C
 - D
 - Impossible to tell from data
75. Which horizon layer of the graph above would be impenetrable?
- A
 - B
 - C
 - D
 - Impossible to tell from data
76. Contour plowing and strip farming are methods designed to:
- prevent weed spreading
 - improve harvesting efficiency.
 - prevents water and soil loss.
 - improve plowing efficiency
 - none of the above
77. The critical organic component of soil that gives it its structure:
- clay
 - parent material
 - heavy soil
 - bedrock
 - humus
78. Soil leaching involves:
- rainwater seeping through soil and dissolving nutrients.
 - the elimination of pore space in soil.
 - the accumulation of organic matter in the uppermost soil layers.
 - the microorganisms and their movements through the soil to aerate it.
 - all of the above
79. Salinization is a common agricultural problem in what type of region?
- humid
 - arid
 - tropical
 - cold
 - windy
80. Tolerance limits are _____ that limit a species' survival.
- Just temperature changes.
 - any environmental conditions
 - population sizes
 - narrow salinity levels
 - undesirable toxin concentrations

NEW JERSEY SCIENCE LEAGUE **GREEN TEST**

Environmental Science Answer Key

March 14, 2013

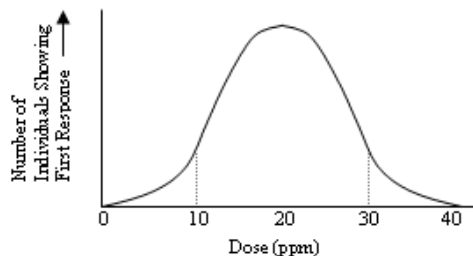
1	B	17	A	33	A	49	C	65	C
2	E	18	C	34	A	50	A	66	B
3	D	19	B	35	D	51	C	67	D
4	B	20	C	36	B	52	B	68	E
5	C	21	A	37	B	53	B	69	B
6	B	22	D	38	C	54	A	70	D
7	A	23	A	39	E	55	E	71	B
8	E	24	E	40	A	56	E	72	A
9	A	25	C	41	D	57	B	73	D
10	D	26	E	42	C	58	A	74	A
11	C	27	D	43	D	59	C	75	D
12	B	28	B	44	B	60	B	76	C
13	D	29	C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

New Jersey Science League
Environmental Science Exam –April 2013

Answer the following questions on the scan-tron provided. Choose the letter that best completes or answers the item. Be certain that erasures are complete. Please PRINT your name, school code, and which test you are taking on the scan-tron as instructed.

1. EPA stands for
 - A. Environmental Protection Association
 - B. Ecosystem Protection Agency
 - C. Environmental Protection Agency
 - D. Environmental Processing Agency
 - E. none of the above

Use the following Graph for Questions 2-4



2. The dose/response curve above shows that:
 - A. Some exposure is necessary before most individuals respond.
 - B. Any exposure causes immediate response.
 - C. Response levels off as dosage increases.
 - D. The dose decreases as response increases.
 - E. All of these are represented by the dose/response curve.
3. Individuals represented by the right end of the dose/response curve above (responding to doses between 30 and 40 ppm) are _____ to the chemical.
 - A. Very sensitive
 - B. Very insensitive
 - C. About average in sensitivity
 - D. relatively insensitive
 - E. relatively sensitive
4. Referring to the dose/response curve above, the greatest number of individuals respond to this toxin at a dosage of _____ ppm.
 - A. 5
 - B. 10
 - C. 20
 - D. 40
 - E. It is impossible to answer the question with the data provided
5. Which of the following is an effective alternative to chlorine for disinfecting wastewater in a municipal treatment plant?
 - A. Freon
 - B. Phosphate
 - C. Ammonia
 - D. Alcohol
 - E. Ozone
6. Which of the following forms of energy has short-term availability?
 - A. Solar
 - B. Synthetic oil from coal
 - C. Nuclear Energy
 - D. Coal
 - E. Petroleum

7. The acid most commonly found in mine drainage is::
 - A. carbonic
 - B. sulfuric
 - C. hydrochloric
 - D. citric
 - E. hydrobromic

8. Which of the following countries has the largest coal reserves?
 - A. Saudi Arabia
 - B. India
 - C. Japan
 - D. China
 - E. France

9. In the United States, the largest component of municipal solid waste is:
 - A. Glass
 - B. Paper
 - C. Wood and other construction debris
 - D. Plastic
 - E. food scraps

10. The method used to bring up underwater mineral deposits is known as:
 - A. dredging
 - B. dive mining
 - C. deep mining
 - D. open pit mining
 - E. drag net

11. Incineration is a particularly effective method to destroy _____.
 - A. glass
 - B. Heavy metals
 - C. Coal ash
 - D. Radioactive wastes
 - E. PCBs

12. Responsibility for disposing of or reusing a product after it becomes obsolete is known as:
 - A. Incineration
 - B. Composting
 - C. Recycling
 - D. Cradle-to-cradle accounting
 - E. None of the above

13. A materials recovery facility (MRF) is responsible for which of the following?
 - A. Tracking trash
 - B. Recycling waste
 - C. Preventing materials from entering the waste stream
 - D. setting up composting sites
 - E. reducing the amount of solid waste

14. Which elements make up the majority of the earth's core?
 - I. Iron
 - II. Nickel
 - III. Aluminum
 - A. I Only
 - B. III Only
 - C. I and II only
 - D. II and III only
 - E. I, II, and III

15. Of our total trash/waste which one of the following is recycled the MOST?
 - A. Paper
 - B. Plastic
 - C. glass
 - D. metals
 - E. Car batteries

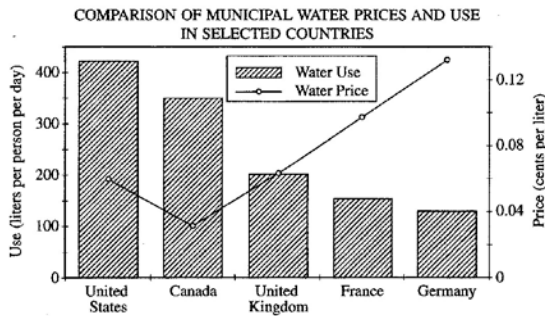
16. Which of the following devices use electrochemical reactions to produce an electrical current?
 - A. Solar photovoltaic
 - B. Fuel Cell
 - C. Fuel Rods
 - D. Synfuel
 - E. Solar Panels

17. Which type of alternative energy source has the potential for visual and noise pollution?
 - A. Wind power
 - B. Hydroelectric energy
 - C. Geothermal energy
 - D. Tidal Power
 - E. None of the above

18. Which is the most feasible solution for storing high-level radioactive waste?
- Burying it under the ice sheets in Antarctica
 - Dumping it into a subduction zone
 - Altering the radioactive elements
 - Burying it deep underground
 - None of the above, they are all prohibited by international law
19. Which of the following is provision of the Surface Mining Control and Reclamation Act of 1977?
- All deep shaft mines must be filled in when they are shut down.
 - Mining companies must replant vegetation on land that was stripped-mined.
 - Strip mining is not allowed on public lands.
 - Mining companies must replant vegetation on land that was deep-mined.
 - Mining companies must clean up the water supply on the land that was striped-mined.
20. Which of the following correctly orders the methods of solid-waste management?
- Reuse-Recycle-Reduce
 - Recycle-reduce-Reuse
 - Reduce-Reuse-Recycle
 - Reduce-Recycle-Reuse
 - E.
21. A thermometer measures what type of energy?
- Nuclear
 - Potential
 - Electrical
 - Kinetic
 - Solar
22. A fuel cell would be an essential part of which of the following alternative energy sources?
- Hydrogen power
 - Geothermal Power
 - Hydroelectric power
 - Horse Power
 - Wind power
23. Which of the following devices would be used for aquaculture?
- Purse-seine
 - Trawl Bag
 - Lines
 - Drift net
 - Cage
24. An even disappearance of topsoil is a sign of which type of erosion?
- Wind
 - Gully
 - Sheet
 - Rill
 - Subsidence
25. Peroxyacyl nitrates are produced from the reaction of hydrocarbons, oxygen, and nitrogen oxides. Peroxyacyl nitrates are examples of:
- Points source pollutants
 - Nonpoint source pollutants
 - Primary pollutants
 - Secondary pollutants
 - Inorganic pollutants
26. The process of extracting and separating gold in remote regions often results in environmental contamination with which of the following?
- Ozone
 - Cyanide
 - Selenium
 - CFCs
 - Asbestos
27. The majority of atmospheric mercury is produced by:
- Medical waste incinerators
 - Volatilization of lead-based paint
 - Coal-burning power plants
 - Municipal waste incinerators
 - Runoff from thermometer factories

28. The country of Sudan has an estimated annual growth rate of 2 percent. At this rate of growth, approximately how many years will it take for the population of Sudan to double?
- A. 30 years
 B. 35 years
 C. 50 years
 D. 80 years
 E. 140 years

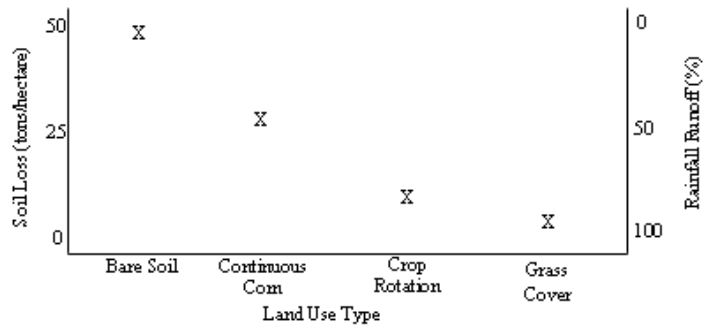
Use the following for question #29



29. The chart above compares the daily water use per person to the price of water in selected countries. Which of the following conclusions can be correctly drawn using only the data in the chart?
- A. Water use and water price are directly proportional
 B. Increased water use causes prices to decline
 C. Increased prices cause water use to decline
 D. Increased water use is generally correlated with lower water prices.
 E. Water is more plentiful in the United States and Canada than in the other countries.
30. Of the following sources, which supplies the most commercial energy in the world today?
- A. Oil
 B. Solar
 C. Biomass
 D. Hydroelectric
 E. Nuclear
31. The most obvious cause of industrial smog is _____.
- A. Burning trash
 B. Indoor air pollution
 C. Generation of nuclear power
 D. Fires for heating food
 E. Burning of fossil fuels
32. If solubility is an important characteristic in toxic material movement in the environment and body, which of the following statements is true:
- A. Water-soluble compounds require carriers to enter cells.
 B. Oil-soluble compounds readily damage kidneys
 C. Water-soluble compounds move slowly in the environment.
 D. Oil-soluble compounds accumulate in the body.
33. Fragmenting one large park or preserve into many small parks with human habitation in between is most likely to lead to:
- A. Stabilization of microclimates
 B. Reduction in species diversity
 C. Increase in gene flow within populations
 D. increase in population size of predators
 E. None of these
34. The area in the United States that had the distinction of being the first ever declared a national emergency area because of toxic waste is:
- A. Hanford, WA
 B. Love Canal, NY
 C. Three Mile Island, PA
 D. Times Beach, MO
 E. None of the Above

35. What act states that no one may manufacture a new chemical substance or process a chemical substance without obtaining clearance from the US Environmental Protection Agency?
- A. The Safe Water Drinking Act
 B. Superfund
 C. The U.S. Toxic Substances Control Act
 D. FIFRA
 E. None of the above
36. Shrimp farms threaten the existence of:
- A. Old growth forests
 B. Coral Reefs
 C. Estuaries
 D. Sand Bars
 E. Mangrove Forests

Use the following graph to answer questions 37 – 38.

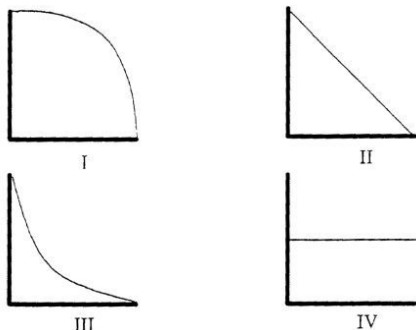


37. The figure above shows that:
- A. Runoff and soil loss increases simultaneously
 B. Runoff decreases as soil loss rises
 C. Runoff and soil loss change in opposite ways as land uses change.
 D. Soil loss causes increased runoff.
 E. It is impossible to tell with the provided data.
38. According to the graph above, which of the land use types is most sustainable?
- A. Bare soil
 B. Continuous corn cropping
 C. Crop rotation
 D. Maintaining grass cover
 E. It is impossible to tell from the data
39. Which of the following would reduce threats posed by exotic species to native species?
- I. Increasing inspections of goods coming into a country
 II. Mandating that bilge water from vessels be emptied in ports instead of in the open ocean
 III. Enforcing legislation that restricts imported materials such as untreated wooden packing crates
- A. I Only
 B. II Only
 C. III Only
 D. I and III only
 E. I, II, and III
40. Minerals that contain valuable substances are known as:
- A. Gangue minerals
 B. alloys
 C. Ore minerals
 D. Aft minerals
 E. None of the above

41. Hydroelectric power generation _____.
- I. Is an alternative to fossil fuels
 - II. Produces less greenhouse gases
 - III. Has no undesirable environmental effects
- A. I Only
 - B. II Only
 - C. I and II only
 - D. I and III only
 - E. I, II, and III
42. The ecological footprint of a large city is _____ than/ as the surrounding rural area.
- A. Much higher
 - B. Much Lower
 - C. Slightly higher
 - D. Slightly lower
 - E. Approximately the same
43. A 2003 study reported that _____ % of large-bodied fish and sharks were lost during the first decade of industrialized fishing.
- A. 15
 - B. 30
 - C. 45
 - D. 65
 - E. 90
44. _____ will hopefully reduce the amount of solid waste garbage in the oceans.
- A. Establishment of marine protected areas
 - B. Marine Debris Research, Prevention and Reduction Act
 - C. The Mangrove Protection Act
 - D. The FAO
 - E. All of the above
45. The term “New renewable” applies to:
- A. Hydro, biomass
 - B. Coal, natural gas
 - C. Wind, wood and alcohol
 - D. Solar, wind, and geothermal
 - E. Fusion, fission
46. Which of the following methods can be called **passive solar energy** collection?
- A. Using heat-absorbing construction materials
 - B. Rooftop solar panels
 - C. OTEC
 - D. Photovoltaic cells
47. Prior to 1950, the main use of windmills in the United States was for _____.
- A. Energy production
 - B. Pumping drinking water for cattle
 - C. Grinding grain for bread
 - D. Draining wetlands
 - E. Pumping water for irrigating crops
48. Jamison is looking wind and solar as alternative energy sources for his home in the country. He needs to consider:
- I. Amount of sunshine
 - II. Wind speeds
 - III. Amount of precipitation
- A. I Only
 - B. II Only.
 - C. I and II Only
 - D. I and III only
 - E. I, II, and III
49. Which of the following countries has the highest amount of electricity generated from nuclear power plants
- A. US
 - B. France
 - C. Canada
 - D. Sweden
 - E. Russia

50. Which of the following represents the proper ranking of the world's total primary energy supply from the greatest to the least?
- Fossil fuels, nuclear, new renewable, biomass
 - New renewable, biomass, hydroelectric, fossil fuels
 - Fossil fuels, biomass, hydroelectric, new renewable
 - Fossil fuels, nuclear, biomass, hydroelectric
 - Fossil fuels, nuclear, biomass, new renewable
51. Which of the following is not a unit of energy?
I. Joule II. British Thermal Unit (BTU) III. Kilowatts IV. Horsepower.
- I only
 - I and II only
 - III only
 - III and IV.
 - II and III
52. Reducing the amount of waste entering the waste stream is known as:
- recycling
 - source reduction
 - composting
 - exporting
 - none of these
53. Bacterial and fungal spores can be included as _____.
- Contributors to indoor pollutants
 - VOC's and POPs
 - Sources of radon in the home
 - Problems in degrading the ozone layer
 - The cause of high pesticide use in the home
54. Environmental groups oppose the mining of Antarctic mineral resources because
- Territorial claims to Antarctica are unresolved
 - The existence of valuable mineral deposits in the Antarctic environment is unlikely
 - The Antarctic environment is fragile and extremely vulnerable to the disturbance that would accompany development
 - Currently known world reserves of important metals and oil are considered inexhaustible
 - The demand for minerals is expected to decline as the world's nations become more industrialized
55. Ozone an air pollutant, has reduced crop production by 5% to 10% of which crop:
- Corn
 - Soybeans
 - Wheat
 - Alfalfa
 - Rice
56. The effectiveness of the pollution prevention approach is best illustrated by the sharp drop in atmospheric:
- Radon
 - Carbon Dioxide
 - Sulfur Dioxide
 - Ozone
 - Lead
57. All of the following are considered **toxic metal pollutants** EXCEPT:
- Carbon
 - Chromium
 - Mercury
 - Cadium
 - Lead
58. Lignite and bituminous coal are _____ rocks.
- Metamorphic
 - Tectonic
 - Sedimentary
 - Igneous
 - None of the above

59. The survivorship of a K-strategist could be presented by :



- A. Type I Only
 B. Type II Only
 C. Type III only
 D. I and II Only
 E. I, II,, and IV

60. Recycling aluminum beverage cans and scrap aluminum produces ____% less energy than mining and processing aluminum ore.

- A. 20%
 B. 45%
 C. 60%
 D. 75%
 E. 95%

61. Radioactive _____ is a product of uranium decay and is an air pollutant.

- A. Lead
 B. Radium
 C. Radon
 D. Plutonium
 E. Lead

62. The people less susceptible to air pollution are:

- A. Infants
 B. Adult males
 C. Pregnant females
 D. The elderly
 E. All are equally susceptible

63. All of the following are VOCs (volatile organic compounds) except:

- A. Methane
 B. Chlorofluorocarbon
 C. Benzene
 D. Carbon monoxide
 E. None of the above

64. _____ destroys bottom habitats:

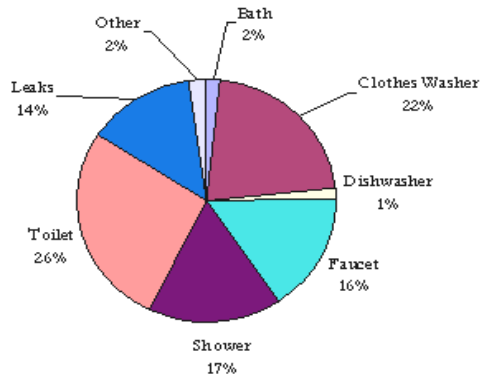
- A. Gill net fishing
 B. Bycatch
 C. Trawling
 D. Overfishing
 E. Line

65. A field is abandoned, and an invasive plant that can live in nutrient-poor soil moves into the field. If the land is later cleared of this invasive species and it is discovered that the soil has an abundance of nitrogen compounds, what conclusion can best be made?

- A. Bacteria in soil and in root nodules converted free nitrogen into nitrogen compounds.
 B. The plants used up all of the phosphorus and potassium and left the nitrogen behind.
 C. Primary succession always produces an abundance of nitrogen
 D. The plants were able to produce nitrogen in their leaves
 E. More rock was weathered and broken down to release nitrogen compounds.

66. Some toxic compounds are ingested and retained in the tissues. These pollutants pose special risks to humans and other organisms high on the food chain because of which process?
- A. Synergism
 - B. Compound contamination
 - C. Biomagnification
 - D. Threshold effect
 - E. Eutrophication
67. Defining characteristics of a wetland involve which of the following?
- I. Hydrology
 - II. Soil Type
 - III. Species composition
- A. I only
 - B. II only
 - C. I and II only
 - D. II and III only
 - E. I, II, and III
68. Which of the following is true of sewage treatment plants in the United States?
- A. They release wastewater before solids are removed from the sewage.
 - B. They are not designed to remove pharmaceutical chemicals from wastewater.
 - C. They use storm water runoff to assist in the treatment process.
 - D. They have largely eliminated cultural eutrophication in Chesapeake Bay.
 - E. They release wastewater that is not regulated by the Clean Water Act.
69. Which of the following is the best illustration of the pesticide treadmill?
- A. Sequence of several pesticides used by farmers to maximize effectiveness.
 - B. Increased use of pesticides to eradicate genetically resistant pests.
 - C. Biomagnification of pesticides in the fatty tissues of primary consumers.
 - D. Movement of pesticides following their percolation into the groundwater.
 - E. Process that is used to manufacture pesticides.
70. As a country goes through the demographic transition, the greatest rate of population growth takes place during which phase?
- A. The preindustrial
 - B. The pretransitional
 - C. The transitional
 - D. The Industrial
 - E. The postindustrial
71. Which of the following elements is most likely to limit primary production in freshwater lakes?
- A. Oxygen
 - B. Calcium
 - C. Iron
 - D. Phosphorus
 - E. Carbon
72. Which is the one form of energy that does not originate from radiation emitted by the sun?
- A. Tidal hydropower
 - B. Fossil fuels
 - C. Geothermal
 - D. Wind
 - E. Biomass
73. The benefits of using offshore sites for collecting wind power **do not include** _____.
- A. No birds are killed by the blades of the wind generators
 - B. Turbulence near the surface is reduced.
 - C. Surface winds flow faster over water than land.
 - D. Reducing the “not in my backyard” complaint.
 - E. None of the above
74. The best solution to the solid waste problem:
- A. Incineration
 - B. Composting
 - C. More landfills
 - D. Shredders
 - E. None of the above

75. In the 1980's, a solid waste crisis similar to that in the Philippines (Manila) was brewing. How was it averted?
- By increased incineration of waste
 - By improved composting of organic waste
 - By improved design of sanitary landfills
 - By recovery of more materials for recycling and reuse
 - By increasing the number of landfills
76. A substance that contributes to atmospheric cooling is _____.
- Nitrogen oxides
 - Methane from livestock
 - Ozone
 - Carbon dioxide
 - Aerosols and dusts
77. Which fuel contains the greatest amount of sulfur?
- wood
 - coal
 - oil.
 - Natural gas
 - Alcohol
78. The property that does not determine the rate of toxicant degradation is _____.
- Temperature
 - Dilution in ground water
 - Chemistry of toxicant
 - Sun exposure
 - Moisture
79. Which of the following gases involved in global climate change is increasing at the fastest rate?
- Carbon dioxide, CO₂.
 - Methane, CH₄.
 - Chlorofluorocarbons
 - Oxygen, O₂.
 - Nitric Oxide, NO
80. The graph below shows home water usage in the United States. What % is used by the toilet?
- 14%
 - 17%
 - 16%
 - 22%
 - 26%



NEW JERSEY SCIENCE LEAGUE
Environmental Science Answer Key

April 2013

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