

# Ecology Test

Answers must be shaded-in or written on the supplied answer sheet;

1 point multiple choice, 4 points for free response

1. 1. Which type of pyramid shows the amount of living tissue at each trophic level in an ecosystem?
  - A. A number pyramid
  - B. An energy pyramid
  - C. A biomass pyramid
  - D. A food pyramid
  - E. None of the above
2. Energy flow in an ecosystem is not cyclic because energy is:
  - A. Destroyed as it is used
  - B. Evenly spread out over many organisms
  - C. Increased as you go up the energy pyramid
  - D. Constantly regenerated
  - E. Lost as heat or used
3. A feeder fish usually follows behind sharks to pick up food scraps that they leave behind. The fish gets food and the shark is unaffected. This is an example of:
  - A. Mutualism
  - B. Commensalism
  - C. Parasitism
  - D. Existentialism
  - E. Decomposition
4. Which type of energy resource uses heat from radioactive decay deep within Earth to heat water and spin turbines?
  - A. Tidal power
  - B. Geothermal energy
  - C. Biomass
  - D. Magnetic field
  - E. Hydroelectric power
5. The wildfire removes the mature vegetation and decomposers. A rapid development of herbaceous vegetation follows until the shrub dominance is re-established. This is an example of
  - A. Edaphic climax
  - B. Climatic Climax
  - C. Catastrophic climax
  - D. Disclimax
  - E. None of the above
6. Deserts cover approximately \_\_\_\_\_ of the earth's surface.
  - A. 10%
  - B. 20%
  - C. 25%
  - D. 35%
  - E. 50%
7. Which would you NOT expect to see in a Hot and Dry desert?
  - A. Prickly Pear
  - B. Agaves
  - C. Kangaroo rats
  - D. Sidewinders
  - E. Whitetail Deer
8. The formula for Exponential growth is
  - A.  $dN/dt = rN$
  - B.  $dt/dN = rN$
  - C.  $dN/rN = dt$
  - D.  $rN/dN = dt$
  - E.  $dt/rN = dN$

9. The greenhouse effect is:
- A. The result of an excess of carbon dioxide in the atmosphere
  - B. A natural phenomenon that maintains Earth's temperature range
  - C. The result of the differences in the angle of the sun's rays
  - D. An unnatural phenomenon that causes heat energy to be radiated back into the atmosphere
  - E. Result of the earth's tilt
10. Deep below the ocean's surface, the sea floor is exposed to thermal vents that carry heat and sulfurous gases to the surface. While these vents are surely lifeless when they form, certain organisms soon colonize the vents. First, bacteria that convert sulfur to energy are found. On older vents, entire communities containing fish and crustaceans are found. What is this an example of?
- A. Primary ecological succession
  - B. Secondary ecological succession
  - C. Cyclical ecological succession
  - D. Tertiary ecological succession
  - E. None of the above
11. What would happen if nitrogen compounds were not broken down by decomposers and denitrifiers at the end of the nitrogen cycle?
- A. Atmospheric nitrogen levels could drop
  - B. There might be less atmospheric nitrogen available for nitrogen-fixers, slowing down the process of nitrogen fixation
  - C. There might be fewer nitrates in the soil for plants to use, because nitrogen might remain tied up in amino acids within animal cells
  - D. All of the above
  - E. None of the above
12. A population of white, black, and tan mice live in a laboratory. A scientist separates two rats at random out of the population and starts a new rat colony. The two rats he pick are both tan. The new colony, after the two tan rats reproduce, is entirely tan. What is this an example of?
- A. Founder Effect
  - B. Natural Selection
  - C. Population Bottleneck
  - D. Genetic Drift
  - E. Mutualism
13. Which of the following is NOT true of carrying capacity?
- A. An ecosystem's carrying capacity depends on an interplay of many variables, such as weather, soil type, what food species are available, and how quickly they are able to regenerate
  - B. When an organism exceeds the environment's carrying capacity, it is instantly corrected
  - C. Ecosystems are stable over time. Their carrying capacity does not change.
  - D. A and B
  - E. B and C
14. The pattern of dispersal of individuals with in an area is:
- A. Population density
  - B. Limiting factors
  - C. Carrying capacity
  - D. The K factor
  - E. Population distribution
15. Which of the following survivorship curves applies to perennial plants?
- A. Type 0
  - B. Type I
  - C. Type II
  - D. Type III
  - E. Type IV

16. Which step of the nitrogen cycle uses both lightning and bacteria to aid the process
- A. Nitrogen fixation
  - B. Assimilation
  - C. Ammonification
  - D. Nitrification
  - E. Denitrification
17. Which human activity is largely responsible for the human impact on the carbon cycle
- A. Deforestation
  - B. Burning fossil fuels
  - C. Calcination of limestone
  - D. Human-caused land use and land cover change
  - E. Agriculture
18. Which is not a step of the sulfur cycle
- A. Mineralization of organic sulfur into inorganic sulfur
  - B. Oxidation of elemental sulfur into sulfate
  - C. Reduction of sulfide into sulfate
  - D. Incorporation of sulfur into organic compounds
  - E. All of the above
19. Where is the largest reservoir of the Earth's oxygen found?
- A. Lithosphere
  - B. Biosphere
  - C. Atmosphere
  - D. Stratosphere
  - E. Hydrosphere
20. Which of these is not a primary consumer in a grassland.
- A. Bison
  - B. Black footed ferret
  - C. Prairie chicken
  - D. Zebra
  - E. Grasshopper
21. Which of the following species interactions does not involve a negative affect
- A. Competition
  - B. Ammensalism
  - C. Antagonism
  - D. Neutralism
  - E. None of the above
22. What native species in the desert experiences exponential growth?
- A. Humans
  - B. Scorpions
  - C. Fungus
  - D. Deer
  - E. Cacti
23. Which of the following describes a type I survivorship curve?
- A. Most individuals die of old age
  - B. Individuals die at a constant rate throughout time
  - C. Many individuals die early in life
  - D. Most individuals die during their reproductive years
  - E. None of the above
24. Which of these is not a grassland bird species?
- A. Bobolink
  - B. Behn's fat finch
  - C. Dickcissel
  - D. Bobwhite Quail
  - E. McCown Longspur
25. Which of these is not a part of the water cycle
- A. Transpiration
  - B. Percolation
  - C. Fixation
  - D. Evaporation
  - E. Infiltration

An ecologist studied the number of organisms in an area over a three-year period and obtained the following results:

Year	Rabbits	Owls	Coyotes
1	220	15	1
2	140	16	0
3	115	14	5

26. What is the best explanation for the decrease in rabbit population from year 1 to year 2?
- A. increase in owl population
  - B. decrease in owl population
  - C. migration of coyotes into area
  - D. emigration of coyotes
  - E. decrease in number of producers in area
27. What is best explanation for decrease in rabbit population from year 2 to year 3?
- A. increase in owl population
  - B. decrease in owl population
  - C. migration of coyotes into area
  - D. emigration of coyotes
  - E. decrease in number of producers in area
28. By what percent did rabbit population decrease from year 1 to year 3?
- A. 20%
  - B. 12%
  - C. 36%
  - D. 8%
  - E. 48%
29. The top layer of soil in a forest or grassland contains decaying plant and animal material called:
- A. Humus
  - B. Litter
  - C. Subsoil
  - D. Regolith
  - E. Bedrock

30. Big bluestem (a prairie grass) grows to a height of 6-8 feet. How deep do its roots reach?
- A. Up to 6 feet
  - B. About 2 feet
  - C. Less than 6 inches
  - D. Up to 4 feet
  - E. More than 10 feet
31. What is the ability of an ecosystem to resist external changes known as?
- A. Inertia
  - B. Sustainability
  - C. Sensitivity
  - D. Ecological resilience
  - E. Adaptation
32. What is the chemical formula of ozone?
- A. O
  - B. O<sub>2</sub>
  - C. CO<sub>2</sub>
  - D. O<sub>3</sub>
  - E. CH<sub>2</sub>O<sub>3</sub>
33. Which of the following are not names for grasslands?
- A. steppes
  - B. pampas
  - C. cerrados
  - D. Prairies
  - E. guruns
34. If a volcano erupts and destroys an ecosystem, but it slowly grows back, it is an example of what?
- A. Primary succession
  - B. Secondary succession
  - C. Tertiary succession
  - D. Ecological resilience
  - E. Climax community

35. Two opposite forces operate in the growth and development of every population. One of them related to the ability to reproduce at a given rate. The force opposite to it is called
- A. Biotic control
  - B. Mortality
  - C. Fecundity
  - D. Death rate
  - E. Environmental resistances
36. The doubling time of a population of plants is 12 years. Assuming that the initial population is 300 and that the rate of increase remains constant, how large will the population be in 36 years?
- A. 1200
  - B. 1800
  - C. 2400
  - D. 3600
  - E. 10800
37. The Atacama Desert of Chile generally has cool winters followed by moderately long, warm summers. This describes what kind of desert?
- A. Coastal
  - B. Semi arid
  - C. Cold
  - D. Hot and Dry
  - E. C and D
38. Which of the following is true about spiny plants?
- A. The spines produce enough shade to reduce transpiration
  - B. Photosynthesis occurs only in the spines
  - C. The spines are the major site for storing moisture
  - D. All spiny plants are leafless
  - E. Spines are meant for protection from grazing
39. The laws of thermodynamics apply to ecology by means of its
- A. Physical state
  - B. Varying temperatures amongst climates of the world
  - C. Effects on global warming
  - D. Gaseous state
  - E. None of the above
40. During a long period when there is no rainfall, a mountain lion may temporarily leave its usual hunting territory to drink from a farm pond. This behavior is probably due to
- A. Its need to find different foods to eat
  - B. The change in an abiotic factor in its environment
  - C. Its need to find a new habitat
  - D. The change in a biotic factor in its environment
  - E. B & D
41. Number of non-related, different kinds of stinging wasps have black-and-yellow striped abdomens and similar behavior. This is an example of
- A. cryptic coloration
  - B. commensalism
  - C. Batesian mimicry
  - D. Mullerian mimicry
  - E. Parallelism
42. During the 20th century, the global population has grown from 1.65 billion to 6 billion. The current world population is 7,579, 594, 600. If the population growth rate is 1.2%, how long will it take for the population to double if the population continues to grow exponentially?
- A. 20 years
  - B. 58 years
  - C. 512 years
  - D. 79 years
  - E. 120 years

43. In which organism in the food chain below would the biological magnification of DDT concentration be most obvious?

Grass → Cricket → Prairie chicken → Coyote → Vulture

- A. grass
- B. vulture
- C. prairie chicken
- D. coyote
- E. cricket

44. What does the burning grasses provide the prairies?

- A. rich soil
- B. more trees
- C. air pollution
- D. complete devastation
- E. none of the above

45. Which of the following best explains why many different species can live together within an ecosystem with limited resources?

- A. Each species lives in a slightly different habitat
- B. Each species occupies a different niche
- C. Each species makes up a different population
- D. Each species functions at a different trophic level
- E. None of the above

46. The country of Algeria has an approximate population of 41,000,000. If the expected number of births in 2017 was 910,000 and the expected number of deaths in 2017 was 176,300. What is Algeria's population growth rate?

- A. 1.8%
- B. 2%
- C. 5%
- D. 18%
- E. 180%

47. In the process of succession, which of the following is true of K-selected plant species?

- A. They keep their carrying capacity at a minimum level
- B. They usually reproduce early in life
- C. They are usually found in climax stages of succession
- D. They are the dominant species in early stages of succession
- E. They become extinct

48. One of the negative effects of air pollution is that it causes ozone depletion. What is/are the chemical(s) that are responsible for this?

- A. Methane
- B. chloro fluoro carbons
- C. Carbon monoxide
- D. Benzene
- E. Ethane

49. Which of the following statements is true?

- A. Habitat loss is the most frequent cause of extinctions today
- B. Exotic species are often introduced into ecosystems by accidental transport
- C. Climate change may cause extinctions but also expand the ranges of the other species
- D. Overexploitation of fisheries could very well lead to a complete collapse of the fishing industry
- E. All of these statements are true

50. Carbon in the atmosphere is most likely found as:

- A. Carbon dioxide
- B. CFCs
- C. Hydrocarbons
- D. Methane
- E. Ozone 2

On the Little Cayman Island, the brown iguana is an endemic species. The population of the iguanas is 60.

51. If each year there is one iguana born for every 15 iguanas, what is the birth rate of brown iguana on Little Cayman?

- A. 6.7%
- B. 7%
- C. 6.2%
- D. 25%
- E. 32%

52. If 5 iguanas die every year, what is the death rate of brown iguana on Little Cayman?

- A. 8%
- B. 6.7%
- C. 8.3%
- D. 9%
- E. 11.5%

53. Using the data from birth rate and death rate calculated above what is the current population growth rate of the brown iguana population on Little Cayman?

- A. 1.6%
- B. -1.6%
- C. 3.2%
- D. -3.2%
- E. -0.08%

54. To influence the population of brown iguana on Little Cayman, a captive breeding program was started two years ago. Each year, 5 iguanas have been added to the population. Taking the breeding program into account, what would be the new population growth rate?

- A. 15%
- B. 4.6%
- C. 2%
- D. 8%
- E. 4%

55. The height of grasses changes as you travel from west to east going from short to tall grass respectively. This is mostly because differences in

- A. temperature
- B. altitude
- C. genetics
- D. precipitation
- E. soil matrix

56. The four phases of logistic growth in the correct order are?

- A. Exponential, lag, deceleration, stable equilibrium
- B. Deceleration, lag, stable equilibrium, exponential
- C. Lag, exponential, deceleration, stable equilibrium
- D. Lag, deceleration, exponential, stable equilibrium
- E. Stable equilibrium, deceleration, lag, exponential

57. What is a difference between food chains and food webs?

- A. One shows energy flow, the other does not
- B. One depicts trophic levels, the other does not
- C. One gives insight to the energy transfer within an ecosystem, the other does not
- D. One is just the interconnections of the other
- E. Food web and food chain mean the same

58. What is desertification?

- A. A serious world problem when deserts disappear due to increasing rainfall.
- B. A rapid increase in the number of desert species over a period of 5-10 years.
- C. A rapid decrease in the number of desert species over a period of 5-10 years.
- D. Land is deforested completely for agriculture
- E. A serious world problem when deserts encroach an arable land

59. Which of these chemicals is **NOT** a greenhouse gas?

- A. Water Vapor
- B. Chlorine
- C. Carbon dioxide
- D. Methane
- E. Nitrous oxide

60. Which of these are **NOT** decomposers within deserts?

- A. Bacteria
- B. Vulture
- C. Beetle
- D. Worms
- E. Mushrooms

Explain the differences between R – selected and K – Selected species. Fill in the blanks from the word bank

- a. Unstable
- b. Small
- c. Stable
- d. Many
- e. Large
- f. Shortened
- g. Few
- h. Longer

61. R selected reside in \_\_\_\_\_ environment ; K selected reside in \_\_\_\_\_ environment

62. R selected are \_\_\_\_\_ and produce \_\_\_\_\_ off springs; K selected are \_\_\_\_\_ and \_\_\_\_\_ off springs

63. R selected \_\_\_\_\_ life span; K selected have \_\_\_\_\_ life span

64. Name the four major deserts in the United States

65. Most of the biomass of vegetation of the grasslands is actually found under the soil. Name four reasons for this adaptation:

66. In coastal deserts, amphibians that pass through larval stages have accelerated life cycles. Why do you think this is?

Organisms A, B, C, D, are counted in three different areas, and the results appear below.

Area	Type A	Type B	Type C	Type D
1	17	6	1	2
2	15	8	9	1
3	8	9	15	9
<b>Total</b>	<b>40</b>	<b>23</b>	<b>25</b>	<b>12</b>

67. What percent of organisms in area 2 are Type A?

68. What percent of the total organisms are Type C?

69. Which area has the greatest biodiversity?

In a population of 600 deer, the per capita birth rate in a particular period is 0.06 and per capita death rate is 0.12

70. What is the per capita growth rate of the deer population?

71. What is the actual number of deer that die during this period?

72. What is the actual number of deer that are born during this period?

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