Exam 1 EVRN/GEOG 148 Name:_____
Fall 2013

*Identify the letter of the choice that **best** completes the statement or answers the question. If you feel that the question is worded in a confusing way - please ask! (Questions are worth 2 pts each, unless otherwise indicated).*

***In order to get full credit, you must put your name on both the answer sheet and this question set, and turn both in together.***

---

1. Paradigm shifts occur when ethical considerations are incorporated into scientific theory.

   A. True
   B. False

2. Approximately one-half of the energy available in an organism is transferred to the consumer that eats it.

   A. True
   B. False

3. An important value of science is that it provides the methodology to prove that a theory is correct.

   A. True
   B. False

4. One of the goals of sustainable development includes the well-thought-out use of natural resources so they are available for future generations, _____

   A. but only for countries that can afford pollution controls.
   B. without hindering economic development.
   C. using only techniques that do not rely on electricity.

5. Deciduous forests

   A. Are not found in the African continent
   B. Are adapted to extremely cold climates
   C. Have trees that bear seeds in cones
   D. Have trees that shed their leaves seasonally
   E. Are not useful commercially

6. The organisms that are classified as primary consumers are the

   A. carnivores.
   B. herbivores.
   C. omnivores.
   D. detritivores.

7. Rock formed from magma extruded to the surface through volcanic vents is classified as

   A. Igneous
   B. Sedimentary
   C. Lava
   D. Weathered rock
   E. Metamorphic

8. A giant sea swell known as a tsunami is caused by

   A. Typhoons
   B. Lunar gravity
   C. Earthquakes
   D. A strong wave during an exceptionally high tide
   E. Unusual tides combined with seasonal storms

9. Which terrestrial biome has the following characteristics: mild, rainy winters and hot summers; vulnerable to fire due to the lack of rain in the summer; and evergreen trees and fire adapted shrubs?

   A. Desert
   B. Temperate Grassland (short-grass prairie)
   C. Boreal Forest
   D. Temperate Shrubland (Chaparral)

10. Most of the energy input in a food chain is

   A. recycled as it reaches the chain's end
   B. degraded to low-quality heat.
   C. converted to biomass.
   D. in the form of heat.

11. The monarch butterfly has developed a chemical defense against predation from birds. This adaptation has led to increased survival from predators overall and therefore is driving _____.

   A. Genetic Drift
   B. Migration
   C. Natural selection
   D. Mutation

12. Experiments in which conditions are deliberately altered and all other variables are held constant are known as _____ experiments.

   A. Natural
   B. Probability
   C. Hypothetical
   D. Double-blind
   E. Manipulative

13. Proof in science is always

   A. Beyond question
   B. Changing very quickly
   C. Firmly established
   D. Open to question or new evidence

14. Identify the example of competition

   A. Sheep and cows grazing in a field
   B. A tick on the ear of a deer
   C. A protozoan in the gut of a termite
   D. A wolf eating a sheep

15. A simple linked feeding series such as grass-rabbit-wolf is known as a(n)

A. Energy cycle
B. Food cycle
C. Food chain
D. Food web
E. Carbon cycle

16. All of the following increase the amount of carbon dioxide in the atmosphere except

A. combustion.
B. photosynthesis.
C. decomposition.
D. respiration.

17. A mineral is composed of

A. A metal and a crystal
B. Organic material
C. Other minerals
D. Noncrystalline elements
E. Inorganic elements

18. When a New England farm is abandoned, its formerly plowed fields first become weedy meadows, then shrubby areas, and finally forest. This sequence of plant communities is an example of

A. evolution.
B. genetic drift.
C. a trophic chain.
D. secondary succession.

19. Boreal forests are generally

A. Warm and humid, with large rivers
B. Cold and dry, with extensive barren areas
C. Dry because water is frozen most of the year
D. Soggy in the summer because of permafrost
E. Slow-growing because of the cold temperatures

20. Nitrogen is an essential component of

A. Amino acids and proteins
B. Sugars, the product of photosynthesis
C. Carbohydrates
D. Organic molecules
E. The hydrologic cycle

21. Which statement can NOT be explained in terms of the second law of thermodynamics?

A. We could feed more people if we would eat grain rather than feeding it to livestock.
B. You can never really throw anything "away" because atoms are continually recycle
C. Fuel use will always include some unavoidable energy waste.
D. Incoming solar radiation is high energy light, while the re-released energy is lower intensity heat.

22. Location of specific biomes can be predicted based on

A. The Coriolis Effect
B. Large landforms in the area
C. Precipitation and temperature
D. Seasonal variations in sunspots
E. The 2nd Law of Thermodynamics

23. _____ is the study of the environment and our place in it.

A. Geology
B. Landscape architecture
C. Biology
D. Environmental science

24. Earthquakes are sudden movements that occur along _____, which are planes of weakness between two rock masses.

A. Epicenters
B. Faults
C. Intrusions

25. In contrast with the _____, the soil of the _____ is more nutrient-rich and this type of biome has fewer insects, parasites and fungal diseases. Therefore, in many places, these areas are highly endangered.

A. Tropical seasonal forest; tropical rainforest
B. Grasslands; boreal forests
C. Tropical rainforest; tropical seasonal forest
D. Temperate grasslands; tropical seasonal forest
E. Boreal forests; tundra

26. Human activities such as the _____ release large quantities of sulfur.

A. Use of synthetic fertilizers
B. Burning of wood
C. Burning of fossil fuels
D. Use of detergents
E. Cultivation of sulfur-fixing crops

27. All members of a species that live in the same area at the same time make up a(an)

A. Biome
B. Species
C. Ecosystem
D. Population
E. Community

28. Proponents of sustainable development argue that

A. The environment is less important than development
B. Development can proceed with minimal costs to the environment
C. Development does not cause environmental damage
D. Development is less important than the environment
E. All development has environmental costs

29. What is the difference in the adaptation of a sled dog's (such as a Husky) thick coat of hair to help it withstand the cold temperatures of Arctic winters and a dog that adapts to cold temperatures in the fall by growing a thickened coat? The adaptation of the sled dog best describes adaptation at the _____ level while the dog exposed to seasonal colder temperatures has _____.

A. Population; physiological modifications at the individual level
B. Individual; physiological modifications at the population level
C. Regional; natural selection at the individual level
D. Species; natural selection at the population level
E. Ecosystem; physiological modifications at the individual level

30. One way to decrease the size of our ecological footprint is to

A. Decrease consumption rates
B. Increase consumption rates
C. Increase the development in the region
D. Reduce the size of a biologically productive area in the region
E. None of these, it is not possible to change the size of an ecological footprint

31. Predators have many adaptations that make them more efficient at catching prey. In response, prey evolve many adaptations to help them escape from predators. When species exert this type of selective pressure on each other, we call it:

A. autoevolution
B. coevolution
C. sympatric evolution
D. allopatric evolution

32. Humid tropical forests have extraordinary biological diversity

A. because of the very fertile tropical soils.
B. despite the poor, weathered soils.
C. despite a complete absence of nutrients in the environment.

33. The damage to an ecosystem caused by a hurricane or flood can be referred to as

A. An emergent property
B. Equilibrium in nature
C. An open system
D. Negative feedback loop
E. A disturbance

34. Productivity in an ecosystem has to do with

A. Its longevity
B. The combined metabolic rate of the biological communities
C. The efficiency of its primary producers
D. Its rate of producing biomass
E. The number of different species living in the ecosystem

35. Most environmental problems result from

A. Complex, interrelated problems
B. Technological development problems
C. Global warming
D. Political differences
E. Urban degradation

36. Which of the following statements regarding tectonics is true?

A. Because of tectonic movements, California is slowly increasing in size
B. When oceanic plates collide with continental plates, the oceanic plate usually rides up over the continental plate
C. When oceanic plates collide with continental plates, the continent usually rides up over the seafloor
D. Because of tectonic movements, Europe and Africa are drifting slowly toward the Americas
E. When continental plates collide with continental plates, both plates usually subside

37. The process of photosynthesis and cellular respiration are similar in that they both

A. Occur in all living organisms
B. Capture energy from the sun
C. Capture energy in the form of sugar
D. Store energy in ATP, an energy currency for the cell

38. Evolution by natural selection occurs as a result of

A. A population's physiological modification
B. Environmental change that forces modification in a resident species
C. An individual's physiological modification
D. Better survival or reproduction rates by individuals with a particular characteristic
E. The discovery of a desirable characteristic in a population

39. Subduction is the process of a tectonic plate

A. Falling freely into the mantle
B. Melting without moving
C. Being sucked into the outer core
D. Sliding alongside another plate
E. Being forced below another plate

40. Which of the following biogeochemical cycles does not have an atmospheric phase?

A. Phosphorous cycle
B. Hydrologic cycle
C. Sulfur cycle
D. Carbon cycle
E. Nitrogen cycle

41. Most substances shrink when they freeze. What would happen if water shrank when it froze?

A. Plant cells would freeze solid, and most would not survive winter.
B. Lakes and seas would freeze solid
C. Nothing different, water does shrink when it freezes.

42. The sum total of a population's use of the biotic and abiotic resources of its habitat constitutes its

A. range.
B. distribution.
C. niche.
D. environment.

43. The term "toxic colonialism" has been used in describing

A. Rulings that toxins must not be exported to wealthy nations
B. The high level of toxic waste production by wealthy nations
C. Lax environmental regulations for toxic wastes
D. The high level of toxic pesticide use by wealthy nations
E. The exportation of toxic wastes to poor communities

44. A community with drought-tolerant forest species, hot temperatures year-round, and low precipitation for most of the year except for periodic rain to support tree growth describes the _____ biome

A. Tropical Seasonal
B. Cloud Forest
C. Desert
D. Tundra

45. What version of the exam are you taking (the version letter is printed at the bottom of each page).

A. Version A
B. Version B
C. Version C
D. Version D
E. Version E
F. Version F: If you have Version F, please fill in the all the circles (A-E) for this question.

46. Phosphorus cycles through the Earth's ecosystems

A. Extremely quickly
B. Only when activated by human activity
C. Very rarely
D. Quickly when humans burn large amounts of fossil fuels
E. Very slowly

47. Tundra biomes occur

A. Only at high latitudes
B. Almost exclusively on Antarctica
C. At high latitudes and altitudes, where the growing season is short
D. Where rainfall is too great for tree growth
E. At high latitudes, where temperatures are low

48. Rocks are _____ in the process called the rock cycle.

A. Broken down and re-formed
B. Cycled through the crust and core
C. Incorporated into living organisms
D. Moved from place to place
E. Cycled through the core and mantle

49. Which of the following does not cycle repeatedly through the Earth's ecosystems?

A. Energy
B. Carbon
C. Nitrogen
D. Water
E. Matter

50. Having needle-shaped leaves benefits plants because needles

A. Are less resistant to strong winds
B. Evaporate water more efficiently
C. Do not rot in the excessive rainfall that characterizes coniferous forests
D. Are more efficient at photosynthesis because they are dark green
E. Reduce water loss and endure cold winters

51. The deflection of wind currents by the rotation of the earth results from the:

A. topography
B. Coriolis Effect
C. upwellings
D. Rain Shadow Effect

52. Intraspecific competition is competition among _____ for resources.

A. Members of different species
B. Both plants and animals
C. Producers, consumers and detritivores
D. Predators and prey
E. Members of a single species

53. In a commensal relationship,

A. Two species live together and both benefit
B. One species benefits while the other neither suffers nor benefits
C. Two species live together and neither benefits nor suffers
D. Two species live together and both suffer
E. One species benefits while the other suffers

54. Resource partitioning could lead species to

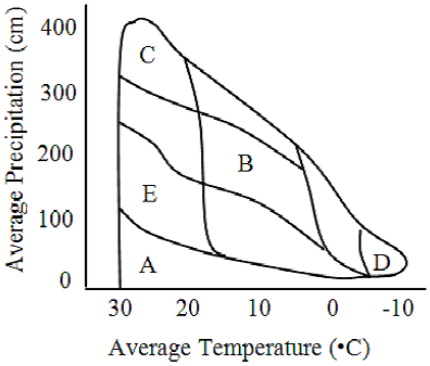
A. Feed at different times
B. Utilize slightly different prey
C. Develop different physiological adaptations
D. Live in slightly different regions
E. All of these could be a result of resource partitioning

55. Which of the following statements is true?

A. In a commensalistic relationship both partners benefit equally
B. In a mutualistic relationship both partners benefit from the relationship
C. In a parasitic relationship both partners are adversely affected
D. In a mutualistic relationship one partner benefits and the other is neither harmed nor helped
E. In a commensalistic relationship one partner benefits and the other is adversely affected

56. Resource partitioning tends to lead to a high degree of _____ in species.

A. Convergent evolution
B. Divergent evolution
C. Evolution
D. Generalization
E. Specialization




57. In the graph of precipitation and temperature, desert biomes would fall in the area marked by the letter

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

58. In the graph of precipitation and temperature, Tropical Rainforest biomes would fall in the area marked by the letter

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

59. If a scientist talks about a scientific hypothesis, how sure is she about her explanation?

A. She's very certain; a hypothesis describes something that always acts predictably
B. She's really just guessing.
C. She's pretty sure; a hypothesis is widely accepted
D. She's hoping she's right; a hypothesis is a tentative, testable explanation.

60. Isotopes differ from each other by their number of

A. atoms.
B. ions.
C. protons.
D. neutrons.

61. What is the fundamental difference between covalent and ionic bonding?

A. In a covalent bond, the atoms share a pair of electrons; in an ionic bond, atoms with a positive charge attract atoms with a negative charge
B. Covalent bonds form between atoms of the same element; ionic bonds form between atoms of different elements.
C. Covalent bonding involves only the outermost electron shell; ionic bonding also involves the next electron shell inside the outermost shell.
D. In covalent bonding, both partners end up with filled outer electron shells; in ionic bonding, one partner does and the other does not.

62. According to the second law of thermodynamics, the energy "lost" by a system is

A. converted to lower-quality energy.
B. equal to the energy the system creates.
C. converted into an equal amount of matter.
D. returned to the system as carbohydrates.

63. The motion of water flowing over a dam is known as _____ energy.

A. mechanical
B. kinetic
C. potential
D. chemical

64. Photosynthesis is the process of converting _____ into _____ energy.

A. solar electrical energy; heat
B. chemical bond energy; kinetic
C. sunlight; chemical bond
D. solar energy; kinetic

65. Excess nitrogen in rivers and lakes can lead to which of the following processes?

A. leaching
B. denitrification
C. eutrophication
D. weathering

66. A change in the genetic composition of a population over successive generations is called

A. natural selection.
B. emigration.
C. evolution.
D. mutation.

Match the terms with their descriptions. (1/2 point each)

| | |
|---|---|
| 67. Hypothesis | A. This variable is affected by the other variable in an experiment; it is the one measured by the scientist. |
| 68. Dependent variable | B. This is manipulated by the scientist to test its effect on another variable |
| 69. Independent variable | C. This statement attempts to explain a relationship between variables. |

Match the species abundance with the corresponding environmental gradient. (1/2 point each)

| | |
|---|---|
| 70. Species abundant | A. Zone of physiological stress |
| 71. Species absent | B. Zone of intolerance |
| 72. Species infrequent | C. Optimal range |

Match each type of energy to an example. (1/2 point each)

| | |
|---|---|
| 73. chemical | A. energy stored in molecular bonds |
| 74. potential | B. stored energy, as in a rock poised on top of a hill |
| 75. kinetic | C. energy in moving objects |
| 76. heat | D. energy stored as kinetic energy of molecules; can be transferred between objects of different temperatures |

Match the system science terms to their correct definitions. (1/2 point each)

| | |
|---|---|
| 77. state shift | A. An event that changes a system |
| 78. resilience | B. A large-scale change to a system due to multiple disturbances |
| 79. disturbance | C. The ability of a system to recover from a change |
| 80. homeostasis | D. Tendency for a system to remain stable |

81. Which of the following characteristics are shared by both cloud forests and tropical rainforests? **(Select all that apply)**

A. They have high species diversity.
B. Temperatures are warm to hot year-round.
C. They have low elevations.
D. Vegetation is kept wet year round.

***In order to get full credit, you must put your name on both the answer sheet and this question set, and turn both in together.***