APES Review Questions #1

___1. What kind of feedback loop is demonstrated by predator-prey population growth?
a. negative b. positive

___2. What kind of feedback loop is demonstrated by human population growth?
a. negative b. positive

___3. Which of the following does not contain a form of potential energy?
a. water held behind a dam
b. sugar and starch in a potato
c. a gallon of gasoline
d. ultraviolet light
e. a piece of coal

___4. Which of the following processes does not use energy that originated in the sun
a. radioactive decay
b. hydroelectric energy
c. biomass energy
d. wind energy
e. heat derived from burning fossil fuels

____5. Which process takes place in a nuclear power reactor?
a. fusion of hydrogen nuclei to form helium
b. U-235 nucleus absorbing a neutron and splitting into two smaller nuclei
c. C-14 decaying into N-14
d. U-235 and U-239 fusing into plutonium

___ 6. What form of energy is produced during every energy conversion
a. none b. solar c. radiant d. kinetic e. thermal

___7. Which of the following is an example of low quality energy?
a. radiant b. kinetic (mechanical) c. heat d. chemical potential
e. all of the above are low quality

___8. Which of the following is an example of high quality matter?
a. bauxite (aluminum ore) b. recycled steel c. sugar dissolved in water
d. CO_2 and H_2O from gasoline emissions e. copper dissolved in the ocean

___9. What law explains why there is no "away"?
a. first law of conservation of energy
b. second law of conservation of energy
c. law of gravity
d. Boyle's law
e. law of conservation of matter

___10. What process is responsible for turning solar radiation into chemical potential energy?
a. cellular respiration b. transpiration c. decomposition d. photosynthesis

___11. Which of the following concepts includes all of the rest?
a. ecosystem b. habitat c. community d. population e. species

___12. Which is likely to have the most biodiversity?
a. a terrestrial biome b. a marine biome c. a shoreline biome

___13. What kind of pyramid cannot have a smaller base (producers) than a top (tertiary consumers)
a. energy pyramid b. biomass pyramid c. numbers pyramid

___14. Which cycle does not directly involve the atmosphere?
a. hydrologic cycle b. nitrogen cycle c. carbon cycle d. phosphorus cycle
e. all of the above involve the atmosphere

___15 What are Rhizobium bacteria doing in the root nodules of legumes?
a. carrying on photosynthesis
b. changing phosphorus ions into phosphates
c. creating carbon dioxide needed by the roots'
d. protecting the legumes from predators
e. none of the above

___16. Which biome requires the most rainfall?
a. deciduous forest b. grassland c. chaparral d. desert

___17. Which of the following are factors that create tolerance limits for a population
a. temperature b. concentration of phosphate c. salinity d. water
e. all of the above

___18. Which of the following is not a common limiting factor for a lake ecosystem
a. rainfall b. phosphate c. light d. dissolved oxygen

___19. What scientific law explains why there are always fewer tertiary consumers than primary consumers in an ecosystem.
a. first law of conservation of energy (thermodynamics)
b. second law of conservation of energy (thermodynamics)
c. law of gravity
d. law of tolerance
e. law of conservation of matter

___20. Which of the following would not be a predicted effect of cutting the forest in a stream watershed such as at the Hubbard Brook Experimental Forest?
a. increased soil erosion b. less water infiltration c. higher nutrients in the water
d. nutrient loss in the soil e. decreased algae growth in the water

___21. Spotted owl is to *specialist* as human is to _____
a. consumer b. evolution c. generalist d. r-strategist e. decomposer

___22. A patch of weeds growing on soil in early summer may be exhibiting
a. interspecific competition b. predation c. mutualism d. parasitism

___23. Which of the following biomes has the highest gross primary productivity
a. arctic tundra b. coniferous forest c. grassland d. tropical rainforest
e. desert

___24. Which of the following is **not** usually a trait of a complex ecosystem
a. resilience b. stability c. high biodiversity d. high rate of succession

___25. Which of the following is a transitional community?
a. estuary b. ocean c. tropical rainforest d. desert e. tundra

___26. The Army Corps of Engineers has returned the Kissimmee River to its original state. This is an example of

a. mitigation b. bioaccumulation c. a negative feedback loop d. efficiency

___27 Another name for geometric growth is

a. exponential b. arithmetic c. sigmoidal

___28. What prevents a species from reaching its biotic potential?

a. environmental resistance b carrying capacity c. geometric growth

___29. Who first argued that human population grows faster than resources, eventually resulting in starvation

a. Julian Simon b. Charles Darwin c. John Muir d. Thomas Malthus

___30. What is most responsible for the great change in human population during the last century?

a. increased birth rate b. decreased birth rate c. increased death rate
d. decreased death rate

___31. Demographic transition describes the observed changes after economic development

a. decreased death rate following by increased birth rate
b. decreased birth rate following by increased death rate
c. decreased death rate following by decreased birth rate
d. increased death rate following by decreased birth rate
e. increased death rate following by increased birth rate

___32. What best describes the population of the United States?

a. population is growing
b. population is decreasing
c. population is stable

___33. What is world human population?

a. just under 2 billion b. just under 3 billion
c. just under 4 billion d. just under 5 billion
e. just under 6 billion

___34. What will happen to population if fertility rate = replacement rate

a. population will decrease rapidly
b. population will decrease gradually
c. population will become stable
d. population will slow down its growth, but won't stabilize for a while
e. population will continue to grow exponentially

Short questions:

1. Write the formula for photosynthesis

2. Write the formula for cellular respiration

3. Create a food web with the following, and label each trophic level

fox tree rabbit grasses grasshoppers bird bark beetle termites
dry rot fungus praying mantis hawk

4. Draw an energy pyramid using an aquatic ecosystem. Assume that there is 1 million kcal of energy available for the producers. Label the amount of energy available for each level.

5. Trace the changes from exposed rocks to a deciduous forest.

6. place an **r** or a **k** next to the characteristic or example of an r-strategist or a k-strategist

___ high investment in individual offspring
___slow growth
___many small offspring
___niche specialist
___few large offspring
___large population fluctuations
___adapted to stable environment
___generalist
___ high trophic level
___adapted to unstable environment
___low trophic level
___short life
___rapid growth

7. Draw an age structure diagram of an expanding population, a stable population, and a diminishing population, and give an example of each.