

ECOLOGY and EVOLUTION FINAL EXAM

COMPREHENSIVE PORTION - will include all materials presented in class including Chapters 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 15, and 16 of the text

NON-COMPREHENSIVE PORTION - will cover chapters 13, 14 15 & 16. and all notes presented since the last exam. The question below are review questions for the non-comprehensive portion.

- Which two substrates (chemicals) are required as inputs for cellular respiration?
A. O₂ & H₂O B. CO₂ & O₂ C. CO₂ & H₂O D. C₆H₁₂O₆ & O₂ E. O₂ & CH₄
- According to your text what percent of the earth's surface is covered by the oceans?
A. 10% B. 25% C. 56% D. 70% E. 83%
- Who won the Nobel Prize for developing an industrial method of nitrogen fixation?
A. Melvin Calvin B. Keefer Hartline C. Linus Pauling
D. Francis Crick E. Fritz Haber
- In general where would you expect to find the most species per square kilometer?
A. at the poles B. in the oceans C. In the mid latitudes (30-60°)
D. near the equator E. on islands
- Which of the following is the best description of succession?
A. the relationship between size of area sampled and the number of species found.
B. A predictable change in the structure of a community over time.
C. The flow of energy through an ecosystem
D. The cycling of nutrients through an ecosystem
E. The change in stability of a community because of pollution
- Which of the following is **not** a greenhouse gas?
A. CO₂ B. CO C. H₂O D. N₂ E. CH₄
- What is primary productivity?
A. A measure of the rate at which carbon is being cycled through an ecosystem.
B. The ability of the system to maintain its diversity, productivity and function in response to stress and change
C. The amount of radiant energy striking the surface of the earth each minute.
D. The amount of chemical energy made and retained in animals that eat plants in a given area in a given amount of time.
E. The amount of chemical energy made available by plants in a given area in a given amount of time.
- What is the process of converting N₂ to NH₄⁺ or NO₃⁻ called?
A. Denitrification B. nitrogen fixation C. Haber-Bosch process
D. Decay E. ammonification
- According to your text where is the largest pool of Carbon found in the biosphere?
A. the atmosphere B. Living animals C. The soil D. Shallow oceans
E. Mars

10. In ecosystems what processes converts radiant energy into chemical energy?

- A. Photosynthesis B. Cellular respiration C. Decay
 D. 1st law of thermodynamics E. 2nd law of thermodynamics

11. Which of the following is a "primary producer"?

- A. a cow B. a lion C. a vulture D. an oak tree E. zooplankton

12. What is evapotranspiration?

- A. The loss of CO₂ from respiring animals B. The take-up of nitrogen by growing plants
 C. The flow of water by from land to the air either because of transpiration from plants or evaporation from soils.
 D. The cycling of water from air to the surface as either rain or snow. E. all of above

13. Which of the following best summarizes photosynthesis?

- A. $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$ B. $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ -- Occurring only in animals
 C. $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ -- Occurring in all living organisms
 D. $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ -- Occurring only in plants
 E. $\text{UV light} + \text{O}_2 \rightarrow \text{O}_3^-$ -- Occurring in all living organisms

14. Which of the following is the best description of a climax community?

- A. A stable community that, in the absence of disturbance, will continue to maintain itself forever.
 B. The first community that forms following a disturbance
 C. A community found on the top of a large mountain
 D. A community formed by secondary succession. E. A community formed by primary succession

15. Which of the following is the best summary of the 1st law of thermodynamics?

- A. Energy can neither be created or destroyed. B. Energy can be created but not destroyed.
 C. Any time energy is converted from one form to another some of the energy is dissipated as heat and is no longer available to do work.
 D. Any time energy is converted from one form to another after the conversion less energy is available to do work with than before the conversion.
 E. Energy flows through ecosystems

16. In ecosystems what processes converts radiant energy into chemical energy?

- A. Photosynthesis B. Cellular respiration C. Decay
 D. 1st law of thermodynamics E. 2nd law of thermodynamics

17. In general what is the relationship between lake size and food web length?

- A. there is no relationship. B. the larger the lake the fewer links in the web
 C. the larger the lake the more links in the web D. lakes do not have food webs
 E. Web size increases with the square root of the log of the cube of the area of the lake.

18. What is the maximum number of steps in a food chain?

- A. 5-6 B. 2 C. 15-20 D. Infinity E. 256

19. What is the Haber-Bosch Process?

- A. the industrial conversion of N_2 gas into nitrogen that can be used by plants (ammonium nitrate)
- B. the industrial conversion of CO_2 gas into nitrogen that can be used by plants (ammonium nitrate)
- C. the conversion of N_2 gas into nitrogen that can be used by plants (ammonium nitrate), by bacteria
- D. The mathematical program used to model climate change
- E. All of above

20. According to your text, what is the epilimnion?

- A. The top layer of a lake that mixes very little with the deeper layers of the lake
- B. The bottom layer of a lake that mixes very little with the shallower layers of the lake
- C. A thermocline
- D. the top predator in a community
- E. The layer of the atmosphere that absorbs UV light.

21. According to your text which biome is Pennsylvania in?

- A. Northern Coniferous forest
- B. Tropical Rainforest
- C. Savanna
- D. Boreal Forest
- E. Temperate deciduous forest

22. How is secondary succession different from primary succession?

- A. secondary succession occurs only in the tropics, primary occurs everywhere
- B. secondary succession occurs only in the temperate climates, primary succession occurs in the tropics.
- C. secondary succession occurs following a disturbance so that some organisms are already present, primary succession starts from bare rock.
- D. secondary succession occurs first than then climaxes into primary succession.
- E. all of above

23. What are "Ecosystem Services"?

- A. The productivity of the ecosystem
- B. A term used to describe the benefits that ecosystems provide to humans.
- C. The flow of energy through an ecosystem
- D. the cycling of nutrients through an ecosystem
- E. The trapping of heat by greenhouse gasses

24. What are greenhouse gasses?

- A. Gasses that are released by cellular respiration
- B. Gasses found exclusively in greenhouses
- C. Gasses that will oxidize free radicals
- D. Gasses that will absorb infrared radiation and therefore retain heat.
- E. Gasses absorbed by burning fossil fuels.

25. Which of the following best describes the 2nd law of thermodynamics?

- A. Any time energy is converted from one form to another after the conversion less energy is available to do work with than before the conversion.
- B. Energy always flows from low to high
- C. Energy is destroyed by cellular respiration
- D. Energy can not be created but can be destroyed.
- E. Energy can neither be created nor destroyed.

26. What does the term "anthropocentric" mean?

- A. "Human centered" -- assuming the value of something is best measured in its utility to humans
- B. Atheistic – assuming there is no god.
- C. The study of apes
- D. Ecologically stable
- E. "All connected" – assuming that all components of an ecosystem are part of a spiritual whole that should not be desecrated.

27. What percent of the dry weight of an organism is typically composed of the element Nitrogen?

- A. 0-0.001%
- B. 0.001-0.01%
- C. 0.1-1.0%
- D. 2-5%
- E. 25-50%

28. According to your text which greenhouse gas traps the most heat?

- A. CO₂ B. CO C. N₂ D. O₃ E. H₂O

29. Where would a rain shadow be found?

- A. beneath a cloud B. on the windward side of a mountain
C. on the lee side (the side opposite of the wind direction) side of a mountain.
D. in a tropical forest E. at dew point

30. A ecosystem with high resilience is capable of ...?

- A. Having high productivity
B. Regaining function after a stress induced change in system function, diversity or productivity.
C. Maintaining function when stressed. D. Supporting high diversity
E. Have maximal efficiency in converting energy from one form to another.

31. CO₂ concentrations in the atmosphere are ...?

- A. Decreasing B. Increasing C. Fluctuating randomly
D. Remaining constant E. Have not been measured

32. Which trophic level in an ecosystem would have the least biomass?

- A. Autotrophs B. Primary consumers C. Secondary Consumers
D. Herbivores E. Plants

33. Which of the following elements is essential for life?

- A. Au (gold) B. N (nitrogen) C. Ag (Silver)
D. Pb (lead) E. Si (Silica)

34. Which of the following gasses contribute to the greenhouse effect?

- A. O₂ B. CO₂ C. H₂ D. N₂ E. He

35. What is denitrification?

- A. the conversion of N₂ to NO₃⁻ B. The conversion of N₂ to NH₄⁺
C. the conversion of NH₄⁺ to NO₂⁻ D. the conversion of NO₃⁻ to N₂
E. The synthesis of amino acids

36. A stable ecosystem is one that...?

- A. Has many biotic species and communities in the system.
B. Has a large flow of energy through the system.
C. Has the ability to regain the original system function after a stress induced change in system function, diversity or productivity.
D. Has the ability to maintain its diversity, productivity and function in response to stress and change.
E. Is not impacted by man

37. On what mountain have the CO₂ levels in the atmosphere been monitored continuously for since the early 1950s?

- A. Shasta B. McKinnely C. Mauna Loa D. Kenya E. St. Helens

38. What is primary productivity?

- A. A measure of the rate at which carbon is being cycled through an ecosystem.
B. The amount of chemical energy made available by plants in a given area in a given amount of time.
C. The amount of radiant energy striking the surface of the earth each minute.

- D.** The amount of chemical energy made and retained in animals that eat plants in a given area in a given amount of time.
- E.** The ability of the system to maintain its diversity, productivity and function in response to stress and change