These are a few sample questions. A typical exam will have about 40 multiple choice questions and you are expected to select the BEST answer from among those given. Of the questions asked, I try to make 13% challenging (A-student questions); 15% more difficult than average (B-student questions), and the remaining 72% average questions (C-student questions). The correct answers are indicated by the bold type.

Good luck.

Dr. Peterjohn

Examples of average questions.

1. The streamlined shape of some _____ allows them to reduce the effect of _____ on their ability to move.

A) benthos; high pressure
B) nekton; viscosity
C) zooplankton; low oxygen
D) nekton; bouyancy
E) phytoplankton; their small size

2. Adult crabs, sea urchins and clams would be classified as a _____.

A) nekton
B) phytoplankton
C) zooplankton
D) benthic organisms
E) autotrophs
F) both D & E

3. Biogeochemical cycles _____.

A) are either biotic or abiotic
B) all have a gaseous phase present
C) make a limited supply of materials continuously available
D) are a fundamental property of populations of organisms
E) recycle energy that flows into an ecosystem

4. Being deciduous can help a plant survive _____.

A) drought
B) grazing
C) freezing temperatures
D) fire
E) both A & C

5. The region of the ocean where the photosynthetic rate of _____ exceeds its respiration rate is called the _____.

A) nekton; neritic zone
B) zooplankton; intertidal zone
C) phytoplankton; oceanic
D) benthos; bethnic region
E) phytoplankton; euphotic zone

6. Which of the following pairs are not found in the same type of biome?

A) creosote bush; spadefoot toads
B) drip tips; gelisols
C) chamaephytes; lemmings
D) sunken stomates; crossbills
E) both B & D

7. Which of the following processes requires anaerobic conditions?

A) Nitrogen fixation.
B) Nitrification.
C) Denitrification
D) Both A & B
E) Both A & C

8. In a "healthy" aquarium, toxic levels of ammonium (NH_4^+) are avoided by what process?

A) Nitrification
B) Ammonification
C) Denitrification
D) Nitrogen fixation

9. Organisms living at the boundary between the bathyl and abyssal zones experience pressures of about _____.

A) 20 atm
B) 2000 atm
C) 600 atm
D) 200 atm

10. The reaction NO_2^- => NO_3^- occurs during _____.

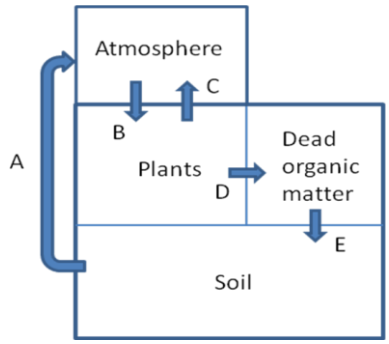
A) The Haber process.
B) Nitrification
C) Aerobic cellular respiration.
D) Denitrification

Examples of above-average & challenging questions.

11. Two thousand people live on the island of "Dynamic Equilibrium". Every year 20 babies are born and 20 people die. If the birth and death rates remain constant, what is the average life expectancy of the people living there?

A) 100 years
B) 75 years
C) 50 years
D) 400 years
E) Cannot be determined with the information provided.

Use the following diagram of the carbon cycle on land to answer the next two questions.



12. Assuming each component is in dynamic equilibrium, the mean residence time of carbon in plants would be calculated by _____.

A) amount of C in soils/(B-C)
B) amount of C in plants/D
C) amount of C in plants/(C+D+E)
D) amount of C in (plants + soil + dead organic matter)/(A+C)
E) amount of C in plants/(C+D)

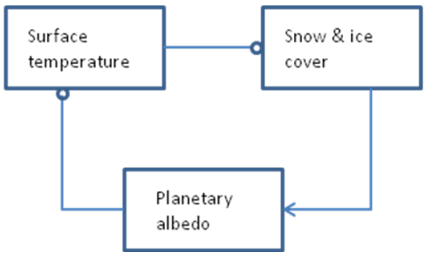
13. Assuming each component is in dynamic equilibrium, which of the following is true?

A) C=B+A
B) C=B+D
C) E=B-C
D) D=A
E) Both C & D

14. If photosynthesis fixes 600 moles of carbon dioxide, then how many moles of oxygen are produced?
A) 1200
B) 600
C) 300
D) 6
E) None of the above.

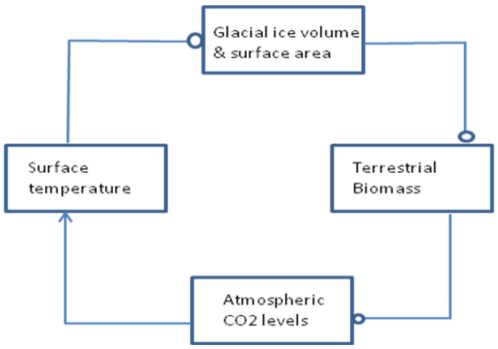
15. In the **southern hemisphere**, the concentration of carbon dioxide in the atmosphere will be _____ in _____.

A) high; July
B) low; July
C) high; January
D) the same; July and January



16. In the diagram shown above arrows represent a positive coupling and lines attached to open circles represent a negative coupling. A positive coupling is when a change (increase or decrease) in one component stimulates a change in the same direction in the linked component. A negative coupling is when a change in one component stimulates a change of the opposite direction in the linked component. With this in mind, the diagram above represents _____.

A) a positive feedback loop
B) a positive feedback loop for part and a negative feedback loop for the rest
C) neither because the positive coupling cancels out the negative couplings
D) a negative feedback loop because there are more negative couplings than positive ones



17. The diagram shown above represents _____.

A) a negative feedback loop
B) a positive feedback loop

18. When would you want to measure the transpiration rates of a saguaro cactus?

A) sunrise
B) 10:00 AM
C) noon
D) 4:00 PM
E) 2:00 AM

19. President Jimmy Carter and his wife Rosalynn shared a bed that had an electric blanket with dual controls – one control adjusted the temperature on his side of the bed, the other adjusted the temperature on her side. President Carter's autobiography chronicles the problems they were having:

> *During each of the increasingly cold winter nights, we argued about the temperature of our electric blanket. Whenever I said it was too warm, Rosalynn said it was too cold, and vice versa.*
>
> *From: Living Faith by Jimmy Carter 1996*

Which of the following accounted for their problem?

A) He was an ecotherm and she was not.
B) The dual blanket controls were on the wrong sides of the bed creating a negative feedback loop.
C) The controls were on the correct side of the bed but one of the controls was broken while the other worked.
D) The dual blanket controls were on the wrong sides of the bed creating a positive feedback loop.

20. If European butterflies keep pace with regional changes in temperature, then the observed increase in their northern range by ~124 miles suggests that regional temperatures have increased by _____.

A) ~2.0 C
B) ~0.6 C
C) ~0.25 C
D) ~1.2 C
E) none of the above