Date _____

BIOGEOCHEMICAL CYCLES:

A DECENTLY COMPREHENSIVE REVIEW

1. Which of the following elements would be the most influential limiting factors involving plant growth?
   (A) oxygen
   (B) phosphorus
   (C) hydrogen
   (D) calcium
   (E) potassium

2. The phosphorus cycle differs from the carbon cycle in that
   (A) there is little or no human impact on the phosphorus cycle
   (B) phosphorus is not a critical component of living organisms
   (C) the hydrosphere contributes to part of the phosphorus cycle
   (D) the atmosphere does not contribute to part of the phosphorus cycle
   (E) plants play a role in the carbon cycle, but have no role in the phosphorus cycle

3. Which of the following processes plays an important role in the phosphorus cycle?
   (A) weathering and erosion
   (B) assimilation
   (C) combustion
   (D) cell respiration
   (E) ammonification

4. $CaCO_3$ is a compound of carbon that

   I. is found in the chemical composition of limestone
   II. is found in the shells and skeletons of marine organisms
   III. is used by plants as a major source of nutrition

   (A) I only
   (B) II only
   (C) I and II, only
   (D) I and III, only
   (E) I, II, and III

5. Carbon dioxide makes up less than 1% of Earth's atmosphere, and oxygen makes up about 21% percent. These percentages are maintained most directly by
   (A) respiration and photosynthesis
   (B) the ozone shield
   (C) assimilation and ammonification
   (D) carbonification and sedimentation
   (E) evaporation and precipitation

6. Water re-enters the atmosphere by the processes of
   (A) evaporation and precipitation
   (B) evaporation and transpiration
   (C) percolation and infiltration
   (D) evaporation and condensation
   (E) evapotranspiration and precipitation

7. How do humans influence the carbon cycle?
   (A) agricultural practices
   (B) extracting fossil fuels from the ground
   (C) aquaculture
   (D) releasing fertilizers into the environment
   (E) all of the above

8. One human impact on the phosphorus cycle is
   (A) the burning of fossil fuels
   (B) the use of fertilizers
   (C) the greenhouse effect
   (D) global warming
   (E) acid rain formation

9. Water that percolates through the soil and rock
   (A) increases in areas where runoff is a dominant process
   (B) is no longer part of the hydrologic cycle
   (C) becomes groundwater or recharges aquifers
   (D) is part of the process known as transpiration
   (E) must move into the ocean before returning to the surface

10. Transpiration occurs in
   (A) oceans.
   (B) groundwater
   (C) the atmosphere
   (D) animals
   (E) terrestrial plants

11. Biogeochemical cycles:
   (A) only include processes conducted by or within living organisms
   (B) pertain only to the abiotic environment
   (C) describe the movement of water and other materials throughout the abiotic and biotic environment
   (D) only pertain to exchanges and interactions that occur within the atmosphere
   (E) are used to describe the attempts of humans to recycle various pollutants

12.. As written the below chemical process occurs in which of the following?
   $6CO_2 + 12H_2O +$ radiant energy $\rightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$
   (A) anaerobic bacteria
   (B) terrestrial plants
   (C) aquatic plants
   (D) B and C only
   (E) all of the above

13. Which of the following is NOT a source of carbon for the carbon cycle?
    (A) shells of marine organisms
    (B) oil
    (C) decomposers
    (D) fertilizer
    (E) the atmosphere

14. Approximately how much water is usable and attainable freshwater?
    (A) less than 1%
    (B) 1%
    (C) 2%
    (D) 3%
    (E) 71%

15. Which of the following processes add carbon dioxide to the atmosphere?

    I. photosynthesis
    II. combustion
    III. decomposer respiration
    IV. animal respiration

    (A) I, only
    (B) I and II, only
    (C) II and IV, only
    (D) II, III, and IV, only
    (E) I, II, III, and IV

16. Which two processes contribute to an excess of CO_2 in the atmosphere?
    (A) carbonification and combustion
    (B) combustion and deforestation
    (C) smelting and chemical fertilizer use
    (D) land clearing and animal respiration
    (E) decomposition and sedimentation

17. What is the first step in the nitrogen cycle, in which gaseous nitrogen is converted into ammonia?
    (A) nitrification
    (B) ammonification
    (C) assimilation
    (D) denitrification
    (E) nitrogen fixation

18. What part of the nitrogen cycle deals with the conversion of nitrogen in waste products or dead organisms into ammonia?
    (A) nitrification
    (B) ammonification
    (C) assimilation
    (D) denitrification
    (E) nitrogen fixation

19. The process where some bacteria remove nitrate from the soil by converting it to nitrogen gas is
    (A) nitrification
    (B) ammonification
    (C) assimilation
    (D) denitrification
    (E) nitrogen fixation

20. The step in the nitrogen cycle where bacteria convert ammonia (NH_3) to nitrate (NO_3^-) is
    (A) nitrification
    (B) ammonification
    (C) assimilation
    (D) denitrification
    (E) nitrogen fixation

21. The step in the nitrogen cycle where plants take up nitrate and use it to make biological molecules is
    (A) nitrification
    (B) ammonification
    (C) assimilation
    (D) denitrification
    (E) nitrogen fixation

22. Which of the following is NOT one of the biogeochemical cycles considered to have particular importance for organisms?
    (A) carbon
    (B) hydrogen
    (C) nitrogen
    (D) phosphorus
    (E) water

23. Approximately what percentage of the atmosphere is CO_2?
    (A) 0.04%
    (B) 3%
    (C) 10%
    (D) 30%
    (E) 75%

24. Which of the following accurately represents a carbon source and the process which releases carbon from that source?
    (A) fossil fuels, respiration
    (B) animals, photosynthesis
    (C) plants, cell respiration
    (D) bicarbonate, combustion
    (E) limestone, combustion

25. Which two processes refer to the compaction of minerals, rock fragments and/or organic particles into rock?
    (A) carbonification and combustion
    (B) decomposition and sedimentation
    (C) sedimentation and carbonification
    (D) eutrophication and nitrification
    (E) carbonification and eutrophication