Chapter 5 How Ecosystems Work STUDY GUIDE

Multiple Choice (1 point each)
Identify the choice that best completes the statement or answers the question.

Q 1. Which of the following statements is not correct?
   a. Plants and other producers get their energy directly from the sun.
   b. Animals get their energy from the sun indirectly.
   c. Rare bacteria that live deep in the ocean get their energy from hydrogen sulfide in hot water.
   d. Consumers get their energy directly from the sun.

Q 2. Which kind of organism obtains energy only from producers?
   a. decomposers
   b. herbivores
   c. omnivores
   d. All of the above

Q 3. If an insect eats a plant and a bird eats the insect, about how much energy from the plant is stored in the insect for the bird to use?
   a. 90 percent
   b. 50 percent
   c. 10 percent
   d. 1 percent

Q 4. Which of the following does not contain carbon from the bodies of plants and animals that died millions of years ago?
   a. coal
   b. oil
   c. natural gas
   d. phosphate salts

Q 5. Which gas makes up 78 percent of our atmosphere but can be used by plants only when transformed by bacteria first?
   a. nitrogen
   b. oxygen
   c. hydrogen
   d. carbon dioxide

Q 6. Which of the following plants is likely to be a pioneer species?
   a. lichen
   b. grass
   c. shrub
   d. oak tree

Q 7. What kind of natural disaster helps some forest communities by allowing some trees to release their seeds, by clearing away deadwood, and by encouraging new growth?
   a. fire
   b. flood
   c. windstorm
   d. drought

Q 8. Where would an ecologist be least likely to go to study primary succession?
   a. a new island formed by a volcanic eruption
   b. a gravel-filled valley that had been covered by a glacier until recently
   c. a locked, abandoned asphalt parking lot in New York City
   d. the Amazon Rain Forest

Q 9. Which statement describes how humans are affecting the balance of carbon in the atmosphere?
   a. Fewer agricultural crops are planted, reducing the amount of carbon dioxide released into the atmosphere.
   b. Burning fossil fuels in great quantities has increased the amount of carbon dioxide in the atmosphere.
   c. Overgrazing of grasslands has reduced the amount of carbon dioxide in the atmosphere.
   d. Severe drought in large areas of the world has decreased the amount of carbon dioxide that is released into the atmosphere.
10. Which of the following is not a true statement about cellular respiration?
   a. It is essentially photosynthesis in reverse.
   b. Oxygen is one of the primary reactants.
   c. It produces energy for organisms to use.
   d. Sugar molecules are its primary products.

11. Which of the following are photosynthetic organisms?
   a. fungal decomposers
   b. deeply buried soil bacteria
   c. freshwater algae
   d. intestinal bacteria

12. Consumers are organisms that
   a. eat only other animal species.
   b. get solar or other energy indirectly.
   c. are also known as self-feeders.
   d. occupy an ecosystem’s lowest energy level.

13. The energy consumed by organisms
   a. can be stored in fat and sugar molecules.
   b. remains constant at all trophic levels.
   c. undergoes magnification in food chains.
   d. is not partially lost during digestion.

14. Plants play a crucial role in the carbon cycle because they
   a. do not release carbon dioxide during cellular respiration.
   b. allow carbon to enter an ecosystem through photosynthesis.
   c. have special bacteria that live in their root systems.
   d. are chemically converted into fossil fuels when burned.

15. The bacteria that live within the roots of a soybean plant are a critical part of the nitrogen cycle because they
   a. provide the plant with sugars needed for growth.
   b. transform nitrates into nitrogen gas for release.
   c. change atmospheric nitrogen into a usable form.
   d. release nitrogen by decomposing dead plant parts.

16. Succession is possible because
   a. climates change over time.
   b. it is a rapid and chaotic process that is very difficult to control.
   c. existing plants reproduce quickly.
   d. new species make the environment less suitable for previous ones.

17. Which of the following is an example of secondary succession?
   a. breaking down of bare rock by fungi and mosses
   b. pioneer plants begin to grow after glacial melting
   c. growth of plants after a forest is destroyed by fire
   d. appearance of weeds in cracks in a concrete surface

18. Which of the following is not a likely component of soil formed during primary succession?
   a. cast-off parts of shrubs and trees
   b. decayed lichens and bacteria
   c. dust particles from the air
   d. broken bits of stone and rock

19. Which organism is likely to be in the bottom trophic level of a food chain?
   a. leopard seal
   b. algae
   c. krill
   d. killer whale

20. What term is used to refer to the many feeding relationships that are possible in an ecosystem?
   a. food web
   b. food chain
   c. energy pyramid
   d. energy transfer
21. Which of the following is responsible for making nitrogen in the atmosphere usable by living organisms?
   a. absorption of nitrogen into water systems
   b. conversion of nitrogen into carbohydrates by photosynthesis
   c. nitrogen-fixing bacteria
   d. decomposing bacteria

22. Which item is a carbon sink and not part of the carbon cycle?
   a. carbon in the atmosphere in the form of carbon dioxide
   b. consumers breaking down carbohydrates into carbon dioxide during respiration
   c. carbon found within limestone rocks
   d. carbon dioxide being converted into carbohydrates during photosynthesis

23. What type of vegetation would you expect to find on an abandoned farm that has remained undisturbed for 150 years?
   a. short grasses
   b. shrubs
   c. young pine trees
   d. tall, mature oak trees

24. What type of succession occurs after a natural process such as a volcanic eruption or flood?
   a. primary succession
   b. secondary succession
   c. old-field succession
   d. climax community

25. Which of the following is one of the largest carbon reservoirs on Earth?
   a. limestone
   b. fossil fuels
   c. Amazon rain forest
   d. Atlantic Ocean

Completion (1 point)
Complete each statement.

26. A process in which energy from the sun is used to make sugar molecules is called __photosynthesis__.

27. In deep-ocean ecosystems, the ____hydrogen sulfide____ that escapes from the cracks in the ocean floor is used by bacteria to make their own food.

28. Organisms that get their food by breaking down dead organisms are called __decomposers__.

29. A process within the cell of an organism that uses glucose and oxygen to produce carbon dioxide, water, and energy is called __cellular respiration__.

30. Nitrogen-fixing bacteria live within the nodules on the roots of plants called __legumes__.

31. Some natural disasters, such as ____fire____, help some forest communities by allowing some trees to release their seeds, by clearing away deadwood, and by encouraging new growth.

32. On new islands formed by volcanic activity, you will most likely find __primary__ succession.

33. The first organisms to colonize any newly available area are known as __pioneer species__.

34. During primary succession, ____lichens____ often begin the process by breaking down the rocks into soil.

35. When energy is passed from one trophic level to the next, only about ____10%____ of the energy is passed to the next level.

36. In the deep-ocean ecosystem, ____Bacteria____ would occupy the bottom trophic level of an energy pyramid.
37. Excessive use of _fertilizers_ on lawns and gardens can affect the nitrogen and phosphorus cycles in nearby lakes and streams.

38. During succession, a final and stable community is referred to as a(n) _climax community_.

39. Succession that occurs on abandoned farmland is called _old field_ succession.

40. A gradual process of change and replacement of the types of species in a community is called _ecological_ succession.

41. Horses and cattle are _herbivores_ because they eat only producers.

42. Organisms called _nitrogen-fixing bacteria_ can transform unusable nitrogen in the atmosphere into chemical compounds containing nitrogen that can be used by other organisms.

43. A common type of succession that occurs on a surface where an ecosystem has previously existed is known as _secondary succession_.

44. A lion is an example of a group of consumers called _carnivores_.

45. Bacteria and fungi are examples of a group of consumers called _decomposers_.

46. The energy transfer in a(n) _food web_ is more complex than energy transfer in a food chain, because the interaction between many organisms is considered.

47. The ultimate source of energy for all organisms except those living deep in the ocean near a thermal vent is the _Sun_.

48. In the carbon cycle, the source of carbon for producers is the _Atmosphere_.

49. Underground carbon sources composed of plants and animals that died millions of years ago are known as _fossil fuels_.

50. The burning of _fossil fuels_ over many years has resulted in an increase in the amount of carbon dioxide in the atmosphere.