Practice Questions 1: Evolution

1. Which concept is best illustrated in the flowchart below?

$$\left.\begin{array}{c}\text{Overproduction}\\+\\\text{limited niches}\end{array}\right\} \longrightarrow \left.\begin{array}{c}\text{Struggle for}\\\text{existence}\\+\\\text{hereditary}\\\text{variation}\end{array}\right\} \longrightarrow \left.\begin{array}{c}\text{Survival}\\\text{of the}\\\text{fittest}\\+\\\text{environmental}\\\text{change}\end{array}\right\} \longrightarrow \begin{array}{c}\text{Change of}\\\text{species}\\\text{or}\\\text{new species}\end{array}$$
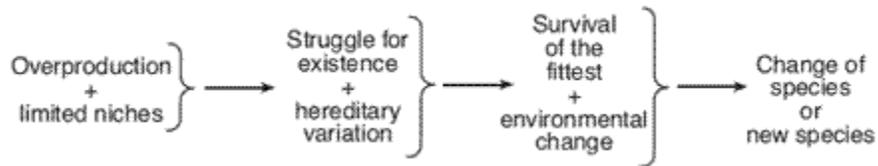
A. natural selection
B. genetic manipulation
C. dynamic equilibrium
D. material cycles

2. The diagram below illustrates possible evolutionary pathways of some species.
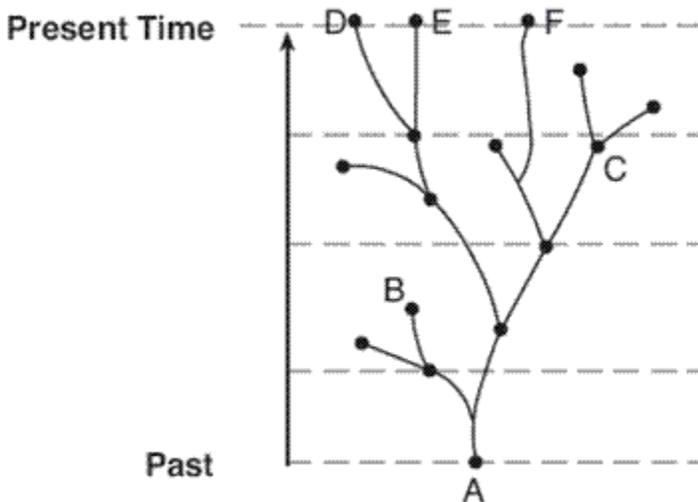
Which statement is a valid inference based on the information in the diagram?

A. Species A is the common ancestor of all life on Earth.
B. Species D is more closely related to species E than to species F.
C. Species B is the ancestor of species F.
D. Species C is the ancestor of species that exist at the present time.

3. Base your answer to the question on the diagram below, which represents possible relationships between animals in the family tree of the modern horse, and on your knowledge of biology.
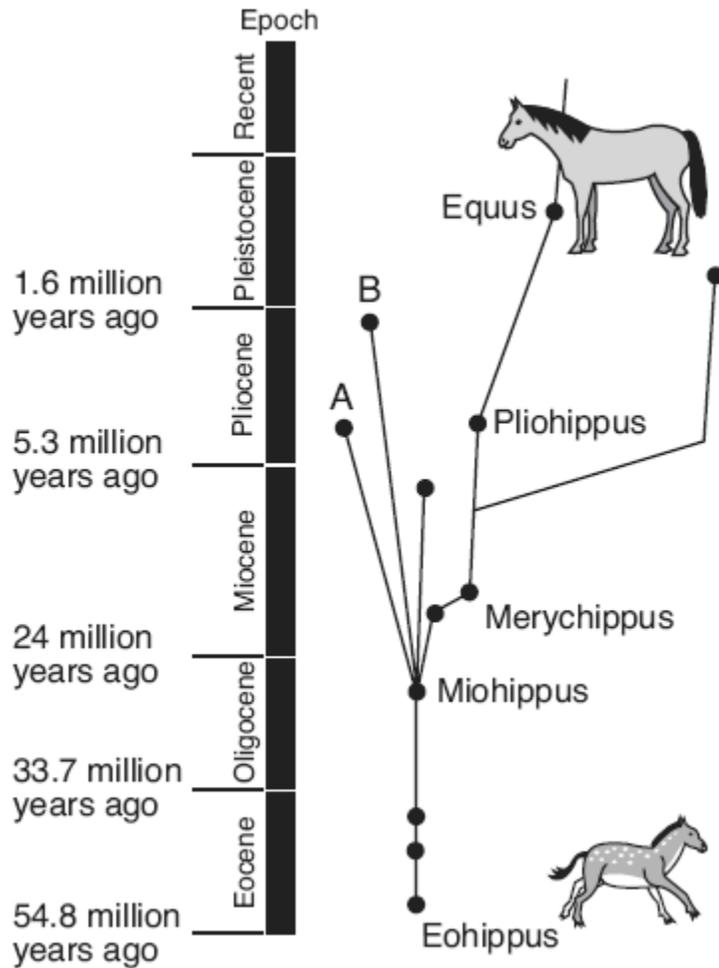
One possible conclusion that can be drawn regarding ancestral horses A and B is that

   A. *A* was better adapted to changes that occurred during the Pliocene Epoch than was *B*
   B. the areas that *B* migrated to contained fewer varieties of producers than did the areas that *A* migrated to
   C. competition between *A* and *B* led to the extinction of *Pliohippus*
   D. the adaptive characteristics present in both *A* and *B* were insufficient for survival

4. Base your answer to the question on the diagram below, which represents possible relationships between animals in the family tree of the modern horse, and on your knowledge of biology.
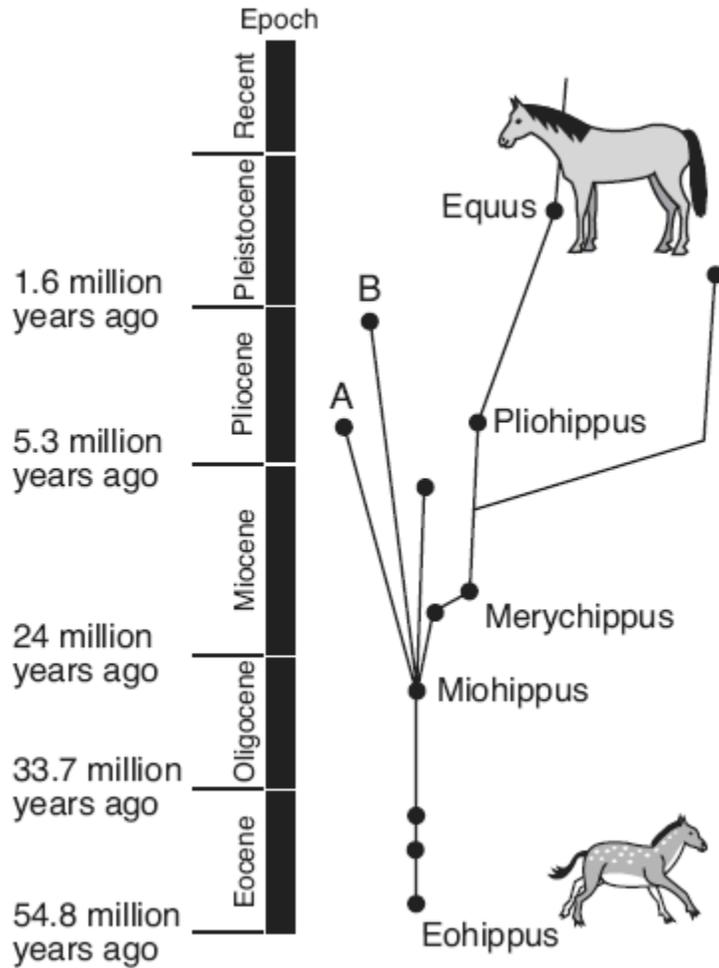
Miohippus has been classified as a browser (an animal that feeds on shrubs and trees) while *Merychippus* has been classified as a grazer (an animal that feeds on grasses). One valid inference that can be made regarding the evolution of modern horses based on this information is that

    A. *Eohippus* inhabited grassland areas throughout the world
    B. *Pliohippus* had teeth adapted for grazing
    C. *Equus* evolved as a result of the migration of *Pliohippus* into forested areas due to increased competition
    D. ecological succession led to changes in tooth structure during the Eocene Epoch

5. The bones in the forelimbs of three mammals are shown below.
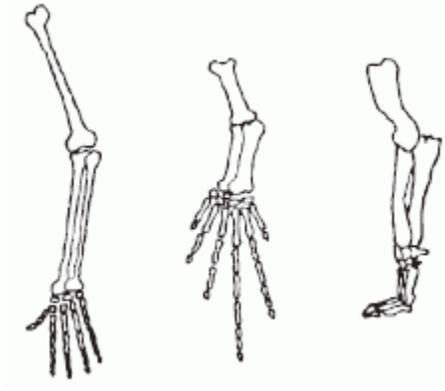
For these mammals, the number, position, and shape of the bones most likely indicates that they may have

    A. developed in a common environment
    B. developed from the same earlier species
    C. identical genetic makeup
    D. identical methods of obtaining food

6. Information related to the organisms found on Earth during various geological time periods is represented in the chart below.

Common Organisms				
Time	4.6 (?) Billion Years Ago	600 Million Years Ago	200 Million Years Ago	60 Million Years Ago
Era	Precambrian (Simple Multicellular Organisms and First Protists)	Paleozoic (Age of Amphibians, Fishes, and Invertebrates)	Mesozoic (Age of Reptiles)	Cenozoic (Age of Mammals)

Past ⟶ Present

Geologic Time

Which statement concerning the first appearance of the organisms over the time period represented in this chart is most likely correct?

    A. Life on Earth has remained the same.
    B. Life on Earth has changed from primitive organisms to more complex organisms.
    C. Life on Earth began with complex organisms and changed to more complex organisms.
    D. Life on Earth has changed rapidly.

7. Which process is correctly matched with its explanation?

	Process	**Explanation**
A.	extinction	adaptive characteristics of a species are not adequate
B.	natural selection	the most complex organisms survive
C.	gene recombination	genes are copied as a part of mitosis
D.	mutation	overproduction of offspring takes place within a certain population

8. The information below was printed on a calendar of important events in the field of biology.

1859
Darwin Publishes
On the Origin of Species by Natural Selection

This information is most closely associated with

    A. an explanation for the change in types of minerals in an area through ecological succession
    B. the reasons for the loss of biodiversity in all habitats on Earth
    C. an attempt to explain the structural similarities observed among diverse living organisms
    D. the effect of carrying capacity on the size of populations

9. The Florida panther, a member of the cat family, has a population of fewer than 100 individuals and has limited genetic variation. Which inference based on this information is valid?

    A. These animals will begin to evolve rapidly.
    B. Over time, these animals will become less likely to survive in a changing environment.
    C. These animals are easily able to adapt to the environment.
    D. Over time, these animals will become more likely to be resistant to disease.

10. Areas with many different niches will most likely have

   A. large numbers of organisms that will become extinct
   B. no organisms that will become extinct
   C. little diversity among the organisms
   D. great diversity among the organisms

11. Scientists in the United States, Europe, and Africa have now suggested that the hippopotamus is a relative of the whale. Earlier studies placed the hippo as a close relative of wild pigs, but recent studies have discovered stronger evidence for the connection to whales. This information suggests that

   A. genetic engineering was involved in the earlier theories
   B. structural evidence is the best evolutionary factor to consider
   C. natural selection does not occur in hippopotamuses
   D. scientific explanations are tentative and subject to change

12. When the adaptive characteristics of a species are insufficient to allow its survival, that species is likely to

   A. mate with other species
   B. produce a beneficial mutation
   C. form a fossil
   D. become extinct

13. The remains of three organisms are shown below.
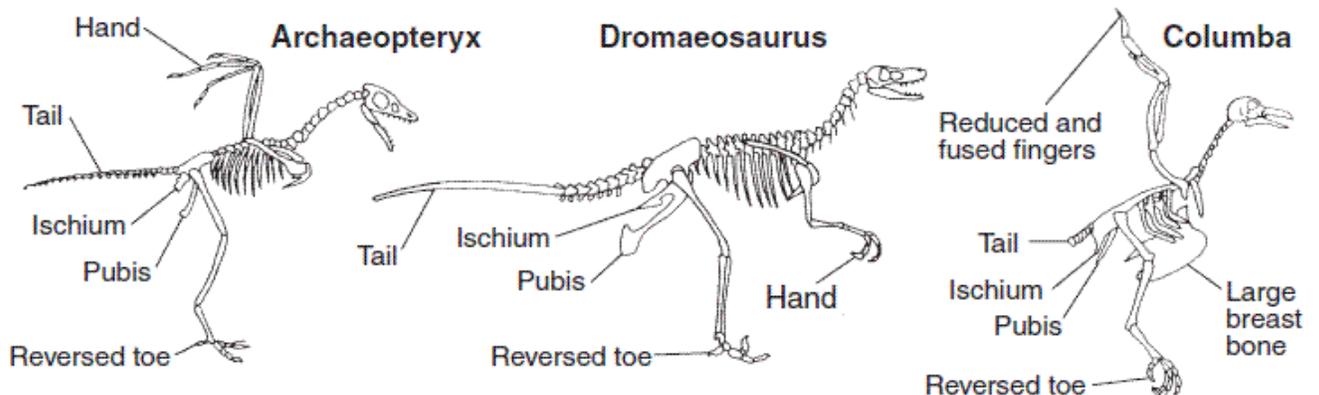
A study of these remains would indicate that these organisms have

   A. identical food preferences
   B. identical body sizes
   C. structural similarities
   D. habitat similarities

14. One possible pathway for the evolution of elephants is represented in the diagram below.
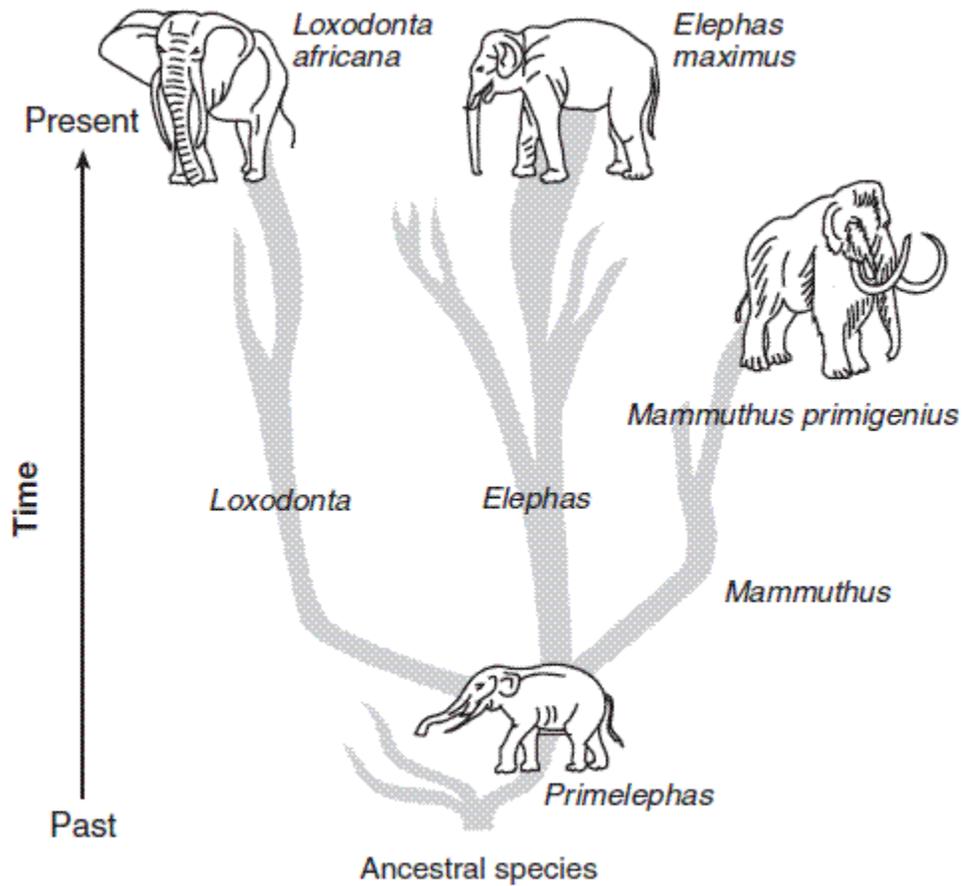
Which statement concerning this pattern of evolution is correct?

    A. Evolution always results in favorable traits.
    B. Evolution does not always result in a species that will survive to present time.
    C. Evolution leads to less complex organisms.
   D. Evolution results in the same changes in all species.

15. An evolutionary pathway is represented below.
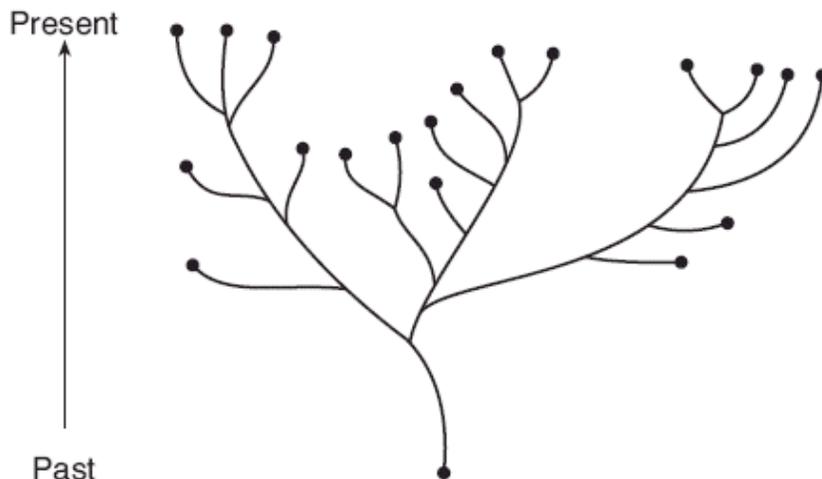
Which statement about evolutionary pathways is most accurate?

    A. All evolutionary pathways show that life began with autotrophic organisms that soon evolved into heterotrophic organisms.
    B. Two organisms on the same branch of an evolutionary pathway are more closely related to each other than to those on distant branches.
    C. All the organisms shown at the ends of evolutionary pathway branch tips are alive today.
    D. Evolutionary pathways show that evolution is a short-term process.

16. The diagram below represents a species of bee that helps one type of orchid plant reproduce by carrying pollen on structure X from one orchid flower to another. Pollination by this species of bee is the only way the orchid can reproduce.
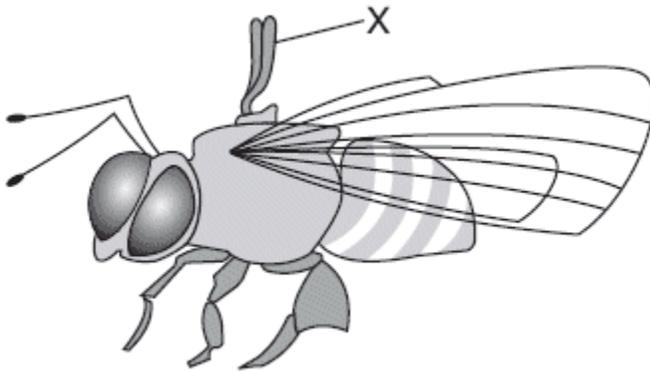
If this bee species dies out, this orchid species would most likely

    A. cease to exist
    B. find another animal to carry the pollen
    C. flower at a different time of year
    D. develop another way to reproduce

17. The diagram below represents the bones of the forelimbs of two animals alive today that most likely evolved from a common ancestor. Members of the original ancestral population were isolated into two groups by natural events.
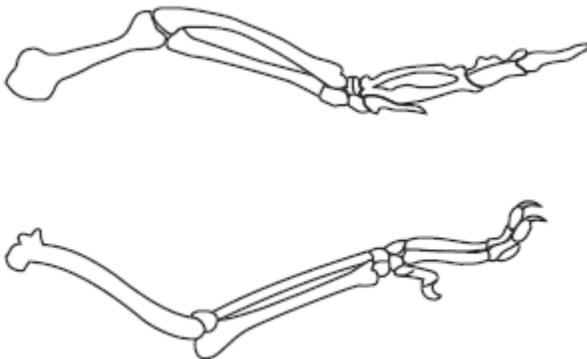
If these two animals did have a common ancestor, which statement would best explain why there are differences in the bones?

A. Changes occurred to help the animals return to their original environment.
B. Changes contributed to the survival of the organisms in their new environment.
C. Changes helped reduce competition within each group.
D. Changes indicate the species are evolving to be more like the ancestral species.

18. Certain insects resemble the bark of the trees on which they live. Which statement provides a possible biological explanation for this resemblance?

A. The insects needed camouflage so they developed protective coloration.
B. Natural selection played a role in the development of this protective coloration.
C. The lack of mutations resulted in the protective coloration.
D. The trees caused mutations in the insects that resulted in protective coloration.

19. When is extinction of a species most likely to occur?

A. when environmental conditions remain the same and the proportion of individuals within the species that lack adaptive traits increases
B. when environmental conditions remain the same and the proportion of individuals within the species that possess adaptive traits increases
C. when environmental conditions change and the adaptive traits of the species favor the survival and reproduction of some of its members
D. when environmental conditions change and the members of the species lack adaptive traits to survive and reproduce

20. The diagram below represents four different species of bacteria.

Species A   Species B   Species C   Species D
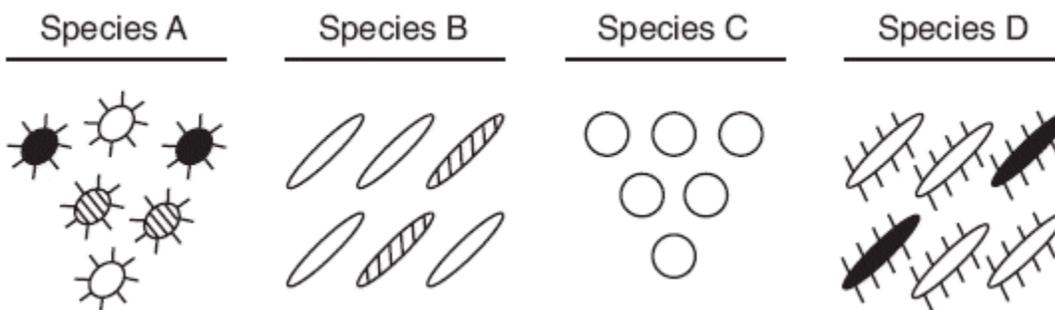
Which statement is correct concerning the chances of survival for these species if there is a change in the environment?

A. Species *A* has the best chance of survival because it has the most genetic diversity.
B. Species *C* has the best chance of survival because it has no gene mutations.
C. Neither species *B* nor species *D* will survive because they compete for the same resources.
D. None of the species will survive because bacteria reproduce asexually.

21. The diagram below represents possible evolutionary relationships between groups of organisms.

Ancestral Protists
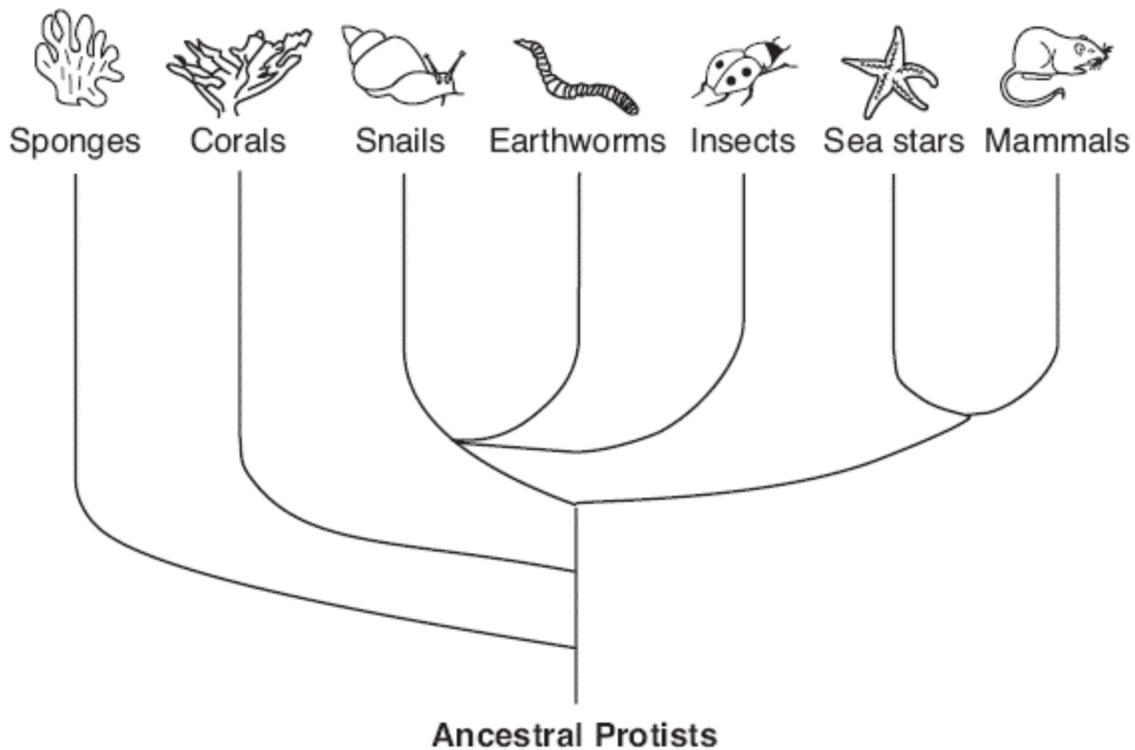
Which statement is a valid conclusion that can be drawn from the diagram?

    A. Snails appeared on Earth before corals.
    B. Sponges were the last new species to appear on Earth.
    C. Earthworms and sea stars have a common ancestor.
    D. Insects are more complex than mammals.

22. In order for new species to develop, there *must* be a change in the

    A. temperature of the environment
    B. migration patterns within a population
    C. genetic makeup of a population
    D. rate of succession in the environment

23. Which statement is *not* part of the concept of natural selection?

    A. Individuals that possess the most favorable variations will have the best chance of reproducing.
    B. Variation occurs among individuals in a population.
    C. More individuals are produced than will survive.
    D. Genes of an individual adapt to a changing environment.

24. Which statement describing a cause of extinction includes the other three?

    A. Members of the extinct species were unable to compete for food.
    B. Members of the extinct species were unable to conceal their presence by camouflage.
    C. Members of the extinct species lacked adaptations essential for survival.
    D. Members of the extinct species were too slow to escape from predators.

25. Scientists compared fossil remains of a species that lived 5,000 years ago with members of the same species living today. Scientists concluded that this species had changed very little over the entire time period. Which statement best accounts for this lack of change?

    A. The environment changed significantly and those offspring without favorable characteristics died.
    B. The environment changed significantly, but the species had no natural enemies for a long period of time.
    C. The environment did not change significantly and those offspring expressing new characteristics survived their natural enemies.
    D. The environment did not change significantly and those offspring expressing new characteristics did not survive.

26. A certain species has little genetic variation. The rapid extinction of this species would most likely result from the effect of

    A. successful cloning
    B. gene manipulation
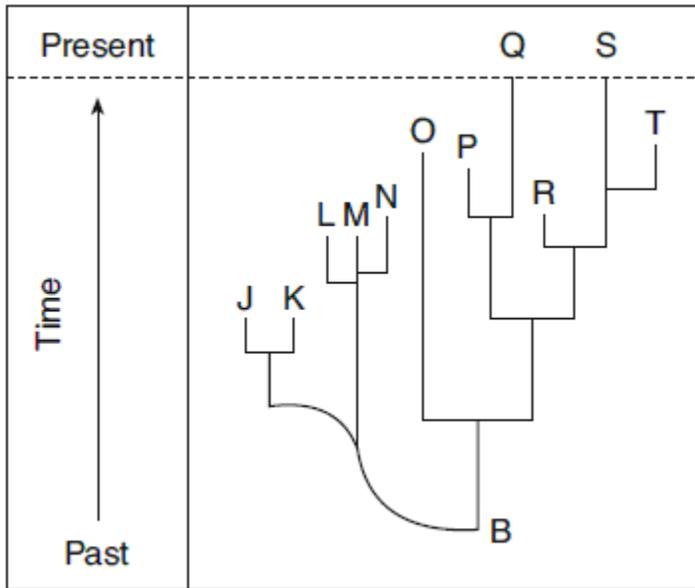   C. environmental change
    D. genetic recombination

27. A classification system is shown in the table below.

Classification	Examples
Kingdom — animal	△, ○, ◻, ☆, ▢, ◇, ε, ▽
Phylum — chordata	△, ◻, ε, ☆, ▢
Genus — Felis	▢, ε
Species — domestica	▢

This classification scheme indicates that ▢ is most closely related to

    A. ☆
    B. △
    C. ▢
    D. ε

28. Some evolutionary pathways are represented in the diagram below.

An inference that can be made from information in the diagram is that

    A. many of the descendants of organism *B* became extinct
    B. organism *B* was probably much larger than any of the other organisms represented
    C. most of the descendants of organism *B* successfully adapted to their environment and
       have survived to the present time
    D. the letters above organism *B* represent members of a single large population with much
       biodiversity

29. Which species in the chart below is most likely to have the fastest rate of evolution?

Species	Reproductive Rate	Environment
A	slow	stable
B	slow	changing
C	fast	stable
D	fast	changing

    A. *A*
    B. *B*
    C. *C*
    D. *D*

30. Which two processes result in variations that commonly influence the evolution of sexually reproducing species?

    A. mutation and genetic recombination
    B. mitosis and natural selection
    C. extinction and gene replacement
    D. environmental selection and selective breeding

Answer Key 1 Evolution

1.	A	16.	A
2.	B	17.	B
3.	D	18.	B
4.	B	19.	D
5.	B	20.	A
6.	B	21.	C
7.	A	22.	C
8.	C	23.	D
9.	B	24.	C
10.	D	25.	D
11.	D	26.	C
12.	D	27.	D
13.	C	28.	A
14.	B	29.	D
15.	B	30.	A