Biology-Honors: Evolution (Chapter 16 and 17)

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. Darwin noticed that many organisms seemed well suited to
   a. being preserved as fossils.
   b. providing humans with food.
   c. surviving in the environments in which they lived.
   d. swimming from South America to the Galápagos Islands.

2. Which of the following ideas was NOT part of Darwin’s contribution to science?
   a. descent with modification
   b. inheritance of acquired characteristics
   c. survival of the fittest
   d. natural selection

3. Darwin first began to formulate his concept of evolution by natural selection after
   a. experimenting with animals.
   b. observing patterns among the geographical location of certain species.
   c. reading the writings of Wallace.
   d. agreeing with Lamarck about the driving force behind evolution.

4. James Hutton’s and Charles Lyell’s work was important to Darwin because these scientists
   a. explained volcanoes and earthquakes.
   b. explained all geologic events on Earth.
   c. suggested that Earth was old enough for evolution to have occurred.
   d. refuted the work of Lamarck, which was based on misunderstandings.

5. Jean-Baptiste Lamarck proposed that organisms
   a. have an innate tendency toward complexity and perfection.
   b. have an innate tendency to become simpler as time passes.
   c. inherit all of the adaptations they display.
   d. belong to species that never change.

6. Which is a major concept included in Lamarck’s evolutionary hypothesis?
   a. Change is the result of survival of the fittest.
   b. Body structures can change according to the actions of the organism.
   c. A small population size decreases the rate of evolution.
   d. Artificial selection is the basis for evolution.

7. The economist Thomas Malthus suggested that
   a. in the human population, people die faster than babies are born.
   b. without certain checks on population size, there would soon be insufficient food for the growing human population.
   c. in the 1700s, England needed more housing.
   d. the majority of a species’ offspring die.
8. Darwin realized that the economist Malthus’s theory of population control
   a. applied only to humans.
   b. could be generalized to any population of organisms.
   c. could be generalized only when populations lived in crowded conditions.
   d. explained why the number of deaths exceeded that of births.

9. When a dairy farmer chooses to breed the cows that give the most milk in the herd, the farmers are following
   the principle of
   a. acquired characteristics.
   b. descent with modification.
   c. artificial selection.
   d. natural selection.

10. According to Darwin’s theory of natural selection, individuals who survive are the ones best adapted for their
    environment. Their survival is due to the
    a. possession of adaptations developed through use.
    b. possession of inherited adaptations that maximize fitness.
    c. lack of competition within the species.
    d. choices made by plant and animal breeders.

11. Charles Darwin called the ability of an organism to survive and reproduce in its specific environment
    a. diversity.
    b. fitness.
    c. adaptation.
    d. evolution.

12. The hypothesis that all species are descended from common ancestors was proposed by
    a. James Hutton.
    b. Jean-Baptiste Lamarck.
    c. Thomas Malthus.
    d. Charles Darwin.

13. Biogeography is the study of
    a. where species and their ancestors live.
    b. how extinct species can be related to living species.
    c. how different species can interbreed.
    d. how animals that live in the same area are closely related.
14. In humans, the pelvis and femur, or thigh bone, are involved in walking. In whales, the pelvis and femur shown in Figure 16–1 are
   a. examples of fossils.
   b. vestigial structures.
   c. acquired traits.
   d. examples of natural variation.

15. Molecular evidence in support of natural selection includes
   a. the nearly universal genetic code.
   b. the presence of vestigial structures.
   c. a tendency toward perfect, unchanging DNA in various species.
   d. the transmission of acquired characteristics by DNA.

16. Anatomical structures that have similar bone structure but do not have similar functions are called:
   a. homologous structures.
   b. analogous structures.
   c. Hox genes.
   d. intermediate fossil forms.

17. What principle does the Grants’ investigation of finch adaptation in the Galápagos Islands best support?
   a. biogeography
   b. evolutionary embryology
   c. uniformitarianism
   d. natural selection

18. The genes carried by all members of a particular population make up the population’s
   a. allele frequency.
   b. phenotype.
   c. genotype.
   d. gene pool.
19. Natural selection acts directly on
   a. alleles.
   b. genes.
   c. phenotypes.
   d. mutations.

20. In a fox population, the allele frequency of a gene for red fur changes from 20 percent to 30 percent. What can you say about that population of foxes?
   a. The population is expanding.
   b. The population is evolving.
   c. The population is decreasing.
   d. The population is not evolving.

21. A change in the genetic material of a cell is called a
   a. recombination.
   b. polygenic trait.
   c. single-gene trait.
   d. mutation.

22. In organisms that reproduce sexually, most variation that can be inherited is due to
   a. mutations during gamete formation.
   b. polygenic traits.
   c. gene recombination during sexual reproduction.
   d. the effects of radiation.

23. Genetic recombination includes the independent movement of chromosomes during meiosis as well as
   a. mutations from radiation.
   b. changes in the allele frequencies.
   c. crossing-over.
   d. mutations from chemicals.

24. A single-gene trait that has two alleles and that shows a simple dominant-recessive pattern will result in
   a. one phenotype.
   b. two phenotypes.
   c. four phenotypes.
   d. millions of phenotypes.

25. The frequency of phenotypes for a typical polygenic trait is most often illustrated as
   a. a scatter plot.
   b. a bell-shaped curve.
   c. a pie chart.
   d. a histogram.
26. One end of Figure 17–1 shows an increase in average beak size for a population of birds. When individuals at only one end of a bell curve of phenotype frequencies have high fitness, the result is
   a. directional selection.
   b. stabilizing selection.
   c. disruptive selection.
   d. genetic drift.

27. Figure 17–2 shows highest fitness toward the center of the curve. When individuals with an average form of a trait have the highest fitness, the result is
   a. not predictable.
   b. disruptive selection.
   c. directional selection.
   d. stabilizing selection.
28. Figure 17–3 shows smaller and larger beaks in a population of finches. One group of birds has a short, parrotlike beak and another group has a long, narrow beak. What process has probably occurred?
   a. directional selection
   b. disruptive selection
   c. stabilizing selection
   d. genetic drift

29. If a mutation introduces a new skin color in a lizard population, which factor might determine whether the frequency of the new allele will increase?
   a. how many other alleles are present
   b. whether the mutation makes some lizards more fit for their environment than other lizards
   c. how many phenotypes the population has
   d. whether the mutation was caused by nature or by human intervention

30. Which of the following events do biologists consider a random change?
   a. directional selection
   b. speciation
   c. disruptive selection
   d. genetic drift

31. The type of genetic drift that follows the colonization of a new habitat by a small group of individuals is called
   a. the Hardy-Weinberg principle.
   b. the founder effect.
   c. directional selection.
   d. stabilizing selection.

32. The situation in which allele frequencies in the gene pool of a population remain constant is called
   a. evolution.
   b. genetic drift.
   c. genetic equilibrium.
   d. natural selection.
33. The separation of populations by barriers such as rivers, mountains, or bodies of water is called
   a. temporal isolation.
   b. geographic isolation.
   c. behavioral isolation.
   d. genetic equilibrium.

34. The definition of a species is:
   a. similar types of animals from similar types of environments.
   b. similar types of animals that can interbreed.
   c. animals with similar genes and DNA.
   d. animals that can interbreed and produce fertile offspring.

35. Which of the following statements defines the members of a species?
   a. They are temporally isolated from each other.
   b. They are geographically isolated from each other.
   c. They mate and produce offspring.
   d. They have identical genes.

36. The geographic isolation of two populations of a species tends to increase differences between their gene
pools because it
   a. prevents interbreeding between the populations.
   b. prevents interbreeding within each population.
   c. causes temporal isolation of the two populations.
   d. increases differences in courtship behavior.

37. Although they often live in the same habitat, the American toad breeds earlier in the spring than the Fowler’s
   toad does. What can be inferred from this information?
   a. The two species do not interbreed because of geographic isolation.
   b. The two species do not interbreed because of temporal isolation.
   c. The two species interbreed throughout the spring season.
   d. The American toad will cause the extinction of the Fowler’s toad.

38. Species Y and Z have very similar proteins, genes and genetic sequences. What is most likely true about
these two species? Species Y
   a. is older than Species Z.
   b. is younger than Species Z.
   c. evolved for a long time separately from Species Z.
   d. shares a relatively recent common ancestor with Species Z.

39. Anatomical structures that have similar functions but do not have similar structures are called:
   a. homologous structures
   b. analogous structures
   c. vestigial structures
   d. common structures

40. A large number of manatees is killed off due to a major hurricane event in the state of Florida, what type of
effect may occur within this population relating to its gene pool.
   a. a founder effect
   b. a speciation effect
   c. a genetic equilibrium effect
   d. a bottleneck effect
41. Allopatric speciation is best described as:
   a. speciation through temporal isolation   c. speciation through geographical isolation
   b. speciation through artificial selection   d. speciation through behavioral isolation

42. Microevolution is evolution that occurs at this level:
   a. at the population level   c. at the community level
   b. below the species level   d. between different environments

43. Punctuated equilibrium or evolution can be best described as:
   a. consistent and gradual change over extremely long periods of time
   b. sporadic (stops and starts, not gradual and consistent) but significant changes over relatively short evolutionary periods of time
   c. uniformitarianism   d. genetic equilibrium

44. The process by which one species significantly influences the evolution of another species is called:
   a. sympatric evolution   c. macroevolution
   b. adaptive radiation   d. co-evolution

45. The person/scientist(s) who had almost the same exact idea as Darwin did regarding natural selection and evolution and who ultimately forced Darwin to publish his results and write the Origin of Species.
   a. Thomas Malthus   c. Peter and Rosemary Grant
   b. Jean Baptiste Lamarck   d. Alfred Russell Wallace
MULTIPLE CHOICE

1. ANS: C  PTS: 1  DIF: L1  REF: p. 452
   OBJ: 16.1.1 State Charles Darwin's contribution to science.
   BLM: comprehension
   TOP: Foundation Edition

2. ANS: B  PTS: 1  DIF: L1  REF: p. 450
   OBJ: 16.1.1 State Charles Darwin's contribution to science.
   BLM: knowledge
   TOP: Foundation Edition

3. ANS: B  PTS: 1  DIF: L2  REF: p. 452
   OBJ: 16.1.2 Describe the three patterns of biodiversity noted by Darwin.
   BLM: comprehension
   TOP: Foundation Edition

4. ANS: C  PTS: 1  DIF: L3  REF: p. 455
   OBJ: 16.2.1 Identify the conclusions drawn by Hutton and Lyell about Earth's history.
   BLM: synthesis
   TOP: Foundation Edition

5. ANS: A  PTS: 1  DIF: L2  REF: p. 456
   OBJ: 16.2.2 Describe Lamarck's hypothesis of evolution.
   BLM: comprehension
   TOP: Foundation Edition

6. ANS: B  PTS: 1  DIF: L2  REF: p. 456
   OBJ: 16.2.2 Describe Lamarck's hypothesis of evolution.
   BLM: comprehension
   TOP: Foundation Edition

7. ANS: B  PTS: 1  DIF: L2  REF: p. 457
   OBJ: 16.2.3 Describe Malthus's view of population growth.
   BLM: comprehension
   TOP: Foundation Edition

8. ANS: B  PTS: 1  DIF: L2  REF: p. 457
   OBJ: 16.2.3 Describe Malthus's view of population growth.
   BLM: comprehension
   TOP: Foundation Edition

9. ANS: C  PTS: 1  DIF: L1  REF: p. 457
   OBJ: 16.2.4 Explain the role of inherited variation in artificial selection.
   BLM: comprehension
   TOP: Foundation Edition

10. ANS: B  PTS: 1  DIF: L2  REF: p. 461
    OBJ: 16.3.1 Describe the conditions under which natural selection occurs.
    BLM: comprehension
    TOP: Foundation Edition

11. ANS: B  PTS: 1  DIF: L1  REF: p. 461
    OBJ: 16.3.1 Describe the conditions under which natural selection occurs.
    BLM: knowledge
    TOP: Foundation Edition

12. ANS: D  PTS: 1  DIF: L1  REF: p. 464
    OBJ: 16.3.2 Explain the principle of common descent.
    BLM: knowledge
    TOP: Foundation Edition

    OBJ: 16.4.1 Explain how geologic distribution of species relates to their evolutionary history.
    BLM: comprehension
    TOP: Foundation Edition

14. ANS: B  PTS: 1  DIF: L1  REF: p. 469
    OBJ: 16.4.3 Describe what homologous structures and embryology suggest about the process of evolutionary change.
    BLM: application
    TOP: Foundation Edition
15. ANS: A  PTS: 1  DIF: L2  REF: p. 470
OBJ: 16.4.4 Explain how molecular evidence can be used to trace the process of evolution.
TOP: Foundation Edition  BLM: comprehension

OBJ: 16.4.4 Explain how molecular evidence can be used to trace the process of evolution.
TOP: Foundation Edition  BLM: comprehension

17. ANS: D  PTS: 1  DIF: L2  REF: p. 472 | p. 473
OBJ: 16.4.5 Explain the results of the Grants' investigation of adaptation in Galapagos finches.
TOP: Foundation Edition  BLM: comprehension

18. ANS: D  PTS: 1  DIF: L1  REF: p. 483
OBJ: 17.1.1 Define evolution in genetic terms.
TOP: Foundation Edition  BLM: knowledge

19. ANS: C  PTS: 1  DIF: L2  REF: p. 483
OBJ: 17.1.1 Define evolution in genetic terms.
TOP: Foundation Edition  BLM: comprehension

20. ANS: B  PTS: 1  DIF: L2  REF: p. 483
OBJ: 17.1.1 Define evolution in genetic terms.
TOP: Foundation Edition  BLM: evaluation

21. ANS: D  PTS: 1  DIF: L1  REF: p. 484
OBJ: 17.1.2 Identify the main sources of genetic variation in a population.
TOP: Foundation Edition  BLM: knowledge

22. ANS: C  PTS: 1  DIF: L2  REF: p. 484
OBJ: 17.1.2 Identify the main sources of genetic variation in a population.
TOP: Foundation Edition  BLM: application

23. ANS: C  PTS: 1  DIF: L2  REF: p. 484
OBJ: 17.1.2 Identify the main sources of genetic variation in a population.
TOP: Foundation Edition  BLM: analysis

OBJ: 17.1.3 State what determines the number of phenotypes for a trait.
TOP: Foundation Edition  BLM: comprehension

25. ANS: B  PTS: 1  DIF: L2  REF: p. 486
OBJ: 17.1.3 State what determines the number of phenotypes for a trait.
TOP: Foundation Edition  BLM: application

OBJ: 17.2.1 Explain how natural selection affects single-gene and polygenic traits.
TOP: Foundation Edition  BLM: application

27. ANS: D  PTS: 1  DIF: L2  REF: p. 489
OBJ: 17.2.1 Explain how natural selection affects single-gene and polygenic traits.
TOP: Foundation Edition  BLM: application

28. ANS: B  PTS: 1  DIF: L2  REF: p. 489
OBJ: 17.2.1 Explain how natural selection affects single-gene and polygenic traits.
TOP: Foundation Edition  BLM: application

29. ANS: B  PTS: 1  DIF: L3  REF: p. 488
OBJ: 17.2.1 Explain how natural selection affects single-gene and polygenic traits.
TOP: Foundation Edition  BLM: evaluation

30. ANS: D  PTS: 1  DIF: L2  REF: p. 490
OBJ: 17.2.2 Describe genetic drift.
TOP: Foundation Edition  BLM: comprehension
31. ANS: B  PTS: 1  DIF: L2  REF: p. 490
   OBJ: 17.2.2 Describe genetic drift.
       TOP: Foundation Edition
       BLM: application

32. ANS: C  PTS: 1  DIF: L1  REF: p. 491
   OBJ: 17.2.3 Explain how different factors affect genetic equilibrium.
       TOP: Foundation Edition
       BLM: knowledge

33. ANS: B  PTS: 1  DIF: L1  REF: p. 495
   OBJ: 17.3.1 Identify the types of isolation that can lead to the formation of new species.
       TOP: Foundation Edition
       BLM: knowledge

34. ANS: D  PTS: 1  DIF: L1  REF: p. 494
   OBJ: 17.3.1 Identify the types of isolation that can lead to the formation of new species.
       TOP: Foundation Edition
       BLM: knowledge

35. ANS: C  PTS: 1  DIF: L2  REF: p. 483
   OBJ: 17.3.1 Identify the types of isolation that can lead to the formation of new species.
       BLM: comprehension

36. ANS: A  PTS: 1  DIF: L3  REF: p. 495
   OBJ: 17.3.1 Identify the types of isolation that can lead to the formation of new species.
       BLM: synthesis

37. ANS: B  PTS: 1  DIF: L2  REF: p. 495
   OBJ: 17.3.1 Identify the types of isolation that can lead to the formation of new species.
       TOP: Foundation Edition
       BLM: analysis

38. ANS: D  PTS: 1  DIF: L3  REF: p. 498 | p. 499
   OBJ: 17.4.1 Explain how molecular clocks are used.
       BLM: synthesis

39. ANS: B  PTS: 1

40. ANS: D  PTS: 1

41. ANS: C  PTS: 1

42. ANS: B  PTS: 1

43. ANS: B  PTS: 1

44. ANS: D  PTS: 1

45. ANS: D  PTS: 1