

You will benefit most from the practice questions below if you answer them from thought, notes, or text before you check the key!

To answer the next 5 questions associate the scientists with the fields and concepts listed below (see Sec 23.1 in text):

- a. comparative anatomy
- b. acquired characteristics
- c. binomial nomenclature
- d. uniformitarianism
- e. natural selection

1. Alfred Wallace
2. Carol Linnaeus
3. James Hutton
4. Jean Lamarck
5. Baron Cuvier

6. The notion that educated persons will have smarter children is consistent with the ideas of :

- a. Darwin
- b. Linnaeus
- c. Cuvier
- d. Lamarck
- e. Hutton

7. Darwin's observation of groups of closely related species on the Galapagos probably led him to think about:

- a. Natural selection
- b. Genetic drift
- c. Speciation
- d. Mutation

8. Which of the following would be likely to cause adaptation?

- a. mutation.
- b. genetic drift.
- c. natural selection.
- d. all of the above

9. Natural selection of certain genotypes is synonymous with

- a. Differential reproductive success
- b. Stabilizing selection
- c. Genetic drift
- d. Mutation

10. If the toad-lubber grasshoppers discussed in lecture are all one species, then the selection that maintains the color adaptations of the populations would be called:

- a. Stabilizing
- b. Directional
- c. Diversifying
- d. Artificial
- e. Sexual

11. Which of the following structures is homologous to the wing of a bat?

- a. The wing of a fly
- b. The arm of a man
- c. The eye of a newt
- d. The tongue of an adder

12. If the forelimbs of penguins and whales are homologous structures but their adaptation to swimming is analogous, then the last (most recent) common ancestor of penguins and whales had:

- a. neither forelimbs nor flippers.
- b. forelimbs which were flippers.
- c. forelimbs which were not flippers.
- d. flippers which were not forelimbs.

13. Convergent evolution results in:

- a. genetic drift
- b. natural selection
- c. analogous similarity
- d. homologous similarity

14. Which of the following cannot evolve?

- a. An individual
- b. A population
- c. A species
- d. All of the above can evolve

15. Inbreeding tends to:

- a. cause adaptation.
- b. create new alleles.
- c. prevent genetic drift.
- d. increase heterozygosity.
- e. increase homozygosity.

16. Which of the following is likely to result in the loss of rare alleles?

- a. Genetic drift
- b. Sexual selection
- c. Balancing selection
- d. Large population size

The next 3 questions involve Hardy-Weinberg calculations. Assume that there are two alleles of a gene present in a population: allele A and allele A', and that the frequency of the A' allele in the gene pool is 0.3.

17. What is the expected frequency of individuals having the genotype AA?

- a. 0.09
- b. 0.21
- c. 0.42
- d. 0.49
- e. 1.00

18. What is the expected frequency of heterozygous individuals?

- a. 0.09
- b. 0.21
- c. 0.42
- d. 0.49
- e. 1.00

19. If A' is a fatal allele but recessive, what proportion of individuals born would you expect to die of its effect?

- a. 0.09
- b. 0.21
- c. 0.42
- d. 0.49
- e. 1.00

20. The ability of a species to produce a variety of genetically unique individuals in each generation depends upon:

- a. mutation.
- b. natural selection.
- c. allopatric speciation.
- d. genetic polymorphism.

21. Selection that removes only the smallest individuals of a population would be called:

- a. directional.
- b. stabilizing.
- c. disruptive.
- d. random.

22. The preservation of the sickle-cell form of hemoglobin in equatorial Africa, despite its deleterious effects is an example of:

- a. natural selection
- b. artificial selection
- c. diversifying selection
- d. frequency-dependent selection.

23. A plant species being preyed upon by cows possesses a protein which, through a single mutation, can change into a potent cow repellent. Natural selection will:

- a. cause this gene to mutate more often.
- b. cause this gene to mutate less often.
- c. have no effect on the rate of mutation.

24. In a population of beetles a few individuals possess an allele which confers resistance to insecticide. Which of the following are examples of microevolution?

- The farmer applies insecticide, and the allele becomes relatively more common as susceptible individuals die.
- Two insects fly to a neighboring field, where they multiply. Both lack the allele, so it is absent from the new population.
- A beetle learns to avoid eating the insecticide if the first dose is small and doesn't kill him.
- all of the above.
- a and b only

25. In the preceding question, a, b, and c are examples of:

- selection, genetic drift and acquired characteristic.
- acquired characteristic, genetic drift and selection.
- genetic drift, selection and acquired characteristic.
- acquired characteristic, selection and genetic drift.
- selection, acquired characteristic, and genetic drift.

26. The term "fitness" is used to describe what is maximized by natural selection. How can fitness be quantified?

- Long life
- Good health
- Athletic ability
- Reproductive success
- all of the above

27. Natural selection apparently favors peacocks with big tails. Why?

- Males with big tails live longer
- They are healthier than other males
- They have more reproductive success
- They can escape predators more easily

28. Assume that two closely related but genetically distinct populations of fish live in different river systems, never come into contact, yet are capable of interbreeding if paired artificially. Are they different species by the Biological Species Concept or the Phylogenetic Species Concept?

- Yes by BSC but not by PSC
- Yes by BSC and by PSC
- Not by BSC but yes by PSC
- Not by either the BSC or PSC

29. The biological species concept is not applicable to:

- plants
- parasites
- asexual organisms
- endemic populations
- sympatric populations

30. Prezygotic barriers to hybridization between sympatric populations include:

- Hybrid sterility.
- Inability to mate.
- Hybrid inviability.
- Geographic barriers.
- all of the above

31. Sympatric speciation can result from:

- stabilizing selection
- geographic isolation
- microevolution
- genetic drift
- polyploidy

32. Squirrel species on opposite sides of the Grand Canyon provide an example of:

- anagenesis.
- sexual selection.
- allopatric speciation.
- sympatric speciation.
- all of the above

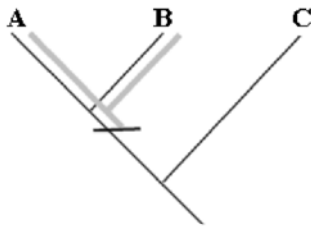
33. Evolutionary processes cannot be expected to:
- respond to present conditions
 - prepare for future conditions
 - produce phenotypic changes
 - alter population gene pools
34. The whiptail lizard species being kept at the Stowers Institute in Kansas City provide an example of:
- allopatric speciation
 - sympatric speciation
 - geographic variation
 - sexual selection
 - genetic polymorphism
35. Evidence for the early large-scale production of oxygen by photosynthesis is the formation of marine deposits of
- Stromatolites
 - Limestones
 - Cherts
 - Banded iron deposits
 - All of the above
36. What process can lead to polyploidy?
- Mitosis
 - Synapsis
 - Genetic drift
 - Nondisjunction
37. Complex multicellular animals first appeared in the fossil record about
- 3.8 billion years ago
 - 1.8 billion years ago
 - 1 billion years ago
 - 0.6 billion years ago
38. Which example shows that evolution can make organisms simpler as well as more complex?
- Sacculina* in crabs
 - Darwin's finches
 - Potato blight
 - Toad-lubbers
39. The boundaries of the geological eras were originally defined on the basis of:
- Fossils
 - Continental drift
 - Carbon-14 dating
 - Changes in sea level
40. Which of these is used for relative dating?
- Carbon-14
 - index fossils
 - racemization
 - family reunions
41. Carbon-14 dating would be an appropriate method for dating fossils from the:
- Paleozoic.
 - Mesozoic.
 - Cretaceous.
 - Pleistocene.
42. The most severe mass extinction was the:
- Permian extinction, 250 mya
 - KT extinction, 250 mya
 - KT extinction, 65 mya
 - Cambrian explosion, 540 mya
43. Pick the list with correct order of taxonomic categories:
- Phylum, Class, Family, Species
 - Phylum, Genus, Class, Family
 - Kingdom, Class, Phylum, Genus
 - Class, Order, Family, Genus
 - Class, Family, Order, Genus
44. Which taxonomic level is the taxon Archaea?
- Domain
 - Order
 - Class
 - Kingdom
 - Genus

45. The biological classification of species into higher taxa is based on inferences about

- a. phylogeny
- b. overall similarity
- c. ability to interbreed
- d. convergent evolution

46. The cladogram below indicates a character shared by species A and species B. The character is a(n):

- a. plesiomorphy
- b. synapomorphy
- c. autapomorphy
- d. analogy



47. In trying to decide which pair of a group of three species is most closely related, what kind of similarity is useful?

- a. Derived homology in 1 of 3
- b. Derived homology in 2 of 3
- c. Derived homology in 3 of 3
- d. Primitive homology in 2 of 3
- e. Primitive homology in 3 of 3

48. An outgroup is useful for distinguishing between:

- a. Drift and selection
- b. Homology and analogy
- c. Primitive and derived characters
- d. Sympatric and allopatric species

KEY

1 E	11 B	21 A	31 E	41 D
2 C	12 C	22 D	32 C	42 A
3 D	13 C	23 C	33 B	43 D
4 B	14 A	24 E	34 B	44 A
5 A	15 E	25 A	35 D	45 A
6 D	16 A	26 D	36 D	46 B
7 C	17 D	27 C	37 D	47 B
8 C	18 C	28 C	38 A	48 C
9 A	19 A	29 C	39 A	
10 C	20 D	30 B	40 A	