

- 1) Which of the following is not a hypothesis for the evolution of bipedalism?
  - a) climate change
  - b) thermoregulation
  - c) better visibility
  - d) carrying tools
  - e) enhanced aggression
- 2) Differential diversification and survival of hominins is an example of:
  - a) species selection
  - b) kin selection
  - c) individual selection
  - d) purifying selection
  - e) positive selection
- 3) Bacterial fossils are known as:
  - a) microtektites
  - b) stromatolites
  - c) stalagtites
  - d) stalagmites
  - e) thamnopyrites
- 4) Which of the following is unlikely to explain why an RNA-like molecule preceded the evolution of DNA?
  - a) RNA can interact directly with the environment
  - b) RNA can replicate without an intermediate
  - c) RNA can catalyze biochemical reactions
  - d) RNA's error-prone replication produces many variants
  - e) none of the above
- 5) Which of the following human traits evolved last?
  - a) bipedalism
  - b) precision grip
  - c) big brain
  - d) language
  - e) straight big toe
- 6) Which recent fossil discovery has revised our view of human evolution?
  - a) Ardipithecus ramidus
  - b) Homo neandertalensis
  - c) Australopithecus afarensis
  - d) Paranthropus boisei
  - e) Homo erectus
- 7) Initially, the earth's atmosphere was composed largely of:
  - a) oxygen and carbon dioxide
  - b) oxygen and nitrogen
  - c) nitrogen and ammonia
  - d) ozone and carbon monoxide
  - e) water vapor and carbon dioxide
- 8) Horizontal gene transfer
  - a) was important for the evolution of duplicate genes
  - b) was important in the evolution of housekeeping genes
  - c) was important in the evolution of rRNA genes
  - d) was important in the early evolution of life
  - e) rarely occurs
- 9) The Cambrian explosion
  - a) occurred approximately 550 million years ago
  - b) included most extant and some extinct phyla
  - c) is the earliest fossilization of an adaptive radiation
  - d) is the earliest fossilization of hard-bodied organisms
  - e) all of the above
- 10) The Biological Species Concept applies to which of the following species?
  - a) Homo sapiens
  - b) Homo neandertalensis
  - c) Homo ergaster
  - d) Homo erectus
  - e) the BSC applies to all of them

11) In allopatry, the males of two species of birds both have a red head stripe which the females use in mate choice. Where the two species occur together, one species lack the red head stripe instead having a red patch on the breast. Females select males on the basis of this red breast stripe. \_\_\_\_\_ is likely to have produced this phenomenon.

- a) reinforcement
- b) reproductive character displacement
- c) character divergence
- d) reproductive isolation
- e) ecological divergence

12) The adaptive radiation of Lake Malawi cichlids is a consequence of:

- a) initial speciation through macrohabitat specialization
- b) ecological speciation through foraging specialization
- c) behavioral speciation through habitat choice
- d) behavioral speciation through sexual selection
- e) all of the above

13) Hybridization between two species can lead to the formation of a third species, if

- a) the hybrid offspring can occupy a habitat different from either parental species
- b) the hybrid offspring have higher fitness than either parental species in each habitat occupied by the parental species
- c) the hybrid offspring are reproductively isolated from both parental species
- d) the hybrid offspring are geographically isolated from both parental species
- e) the hybrid offspring have greater genetic variance than either parental species

14) Which of the following does not commonly show a negative phenotypic correlation (trade-off)?

- a) number of offspring, size of offspring
- b) adult size, offspring size
- c) growth rate, age at maturity
- d) lifespan, age at maturity
- e) age at maturity, clutch size

15) Shiners are small fish that live in streams. Different streams contain different suites of predators. Gobies feed on adult shiners and eat relatively few juveniles. Lancefish eat juvenile shiners; adults are too large for them to consume. Which of the following statements best describes life history variation in shiners.

- a) shiners in streams with only lancefish will have larger offspring than those in streams with only gobies
- b) shiners in streams with only gobies will have larger offspring than those in streams with only lancefish
- c) shiners in streams with only lancefish will have more offspring over their lifetime than those in streams with only gobies
- d) shiners in streams with only gobies will reproduce more often than those in streams with only lancefish
- e) shiners in streams with only lancefish will have greater reproductive effort than those in streams with only gobies

16) In experimental tests of the antagonistic pleiotropy hypothesis for the evolution of senescence,

- a) there is selection for increased fecundity early in life, and correlated increase in early survival
- b) there is selection for increased fecundity late in life, and correlated increase in early survival
- c) there is selection for increased fecundity early in life, and correlated decrease in early survival
- d) there is selection for increased fecundity late in life, and correlated decrease in early survival
- e) there is selection for increased fecundity in late in life, and correlated increase in late survival

17) Compared to their free-living relatives, mitochondria have approximately

- a) ten times fewer genes
- b) one hundred times fewer genes
- c) have one thousand times fewer genes
- d) have ten times more genes
- e) have one hundred times more genes

18) Compared to their free-living relatives, mitochondria have retained genes involved in  
a) DNA replication    b) amino acid biosynthesis    c) DNA repair  
d) gene regulation    e) respiration

19) The potassium channel blocking venom of three species--a sea anemone, a snake and a scorpion--all contain a hydrophobic residue and a lysine that are close to each other in the final molecular structure, even though they occur at different places in the amino acid sequence of the molecule in each species. This is an example of:

- a) convergent evolution
- b) parallel evolution
- c) homology
- d) synapomorphy
- e) reversal

20) Which of the following questions can be answered with phylogenetic information?

- a) Have the long head plumes of Gunnison's sage grouse evolved through sexual selection?
- b) Have storm petrels undergone allochronic speciation?
- c) Have growth rates of juvenile red squirrels increased with global warming?
- d) Is the bill morphology of the large cactus finch subject to disruptive selection?
- e) Do mimetic kingsnakes gain protection from predators only when sympatric with coral snakes?

21) Which of the following statements about speciation is not true?

- a) speciation need not occur between isolated populations
- b) the purpose of evolutionary change is to form new species
- c) speciation can happen very rapidly
- d) speciation can occurs when two populations diverge
- e) genetic isolation between species can result from either pre-mating or postmating mechanisms

22) In eukaryotic cells, the products of chloroplast genes that have been transferred to the nucleus are directed back to the organelle:

- a) all of the time
- b) only 5% of the time
- c) about 10% of the time
- d) about 50% of the time
- e) never

23) The biological species concept applies best to

- a) species that are sexually reproducing
- b) species that are diploid
- c) species that have overlapping geographic ranges
- d) species that have arisen in allopatry
- e) species that have isolating mechanisms