

BIO 213—Principles of Evolution—Summer 2001, Final

1. Read these directions before you begin.
 2. Write your name on your Scantron sheet (tests without names will not be graded).
 3. Check this test to make sure it has all pages, 1–4.
 4. Mark all answers on the Scantron sheet. There is only one correct answer to each question.
 5. When you are finished, turn in the Scantron on the front table. Please keep this sheet.
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1. A duplicated gene which has lost function because of mutations that prevent its function is called a (p. 260)
 - a. β -like gene
 - b. clean gene
 - c. multigene family
 - d. myoglobin gene
 - e. pseudogene
2. A genealogy of species, based on their evolutionary relationships, is called a(n)
 - a. adaptive radiation
 - b. mutation
 - c. ontogeny
 - d. phylogeny
 - e. zoonosis
3. A piece of evidence that does *not* support the theory of an asteroid impact causing the Cretaceous-Tertiary (K-T) extinction is the presence of
 - a. iridium-enriched clay at the K-T boundary
 - b. an impact crater in Yucatán
 - c. lava flows in India
 - d. shocked quartz grains of the sort formed by meteor impacts in sediments at the K-T boundary
 - e. wave-deposited breccia (sediments made of chunks of assorted rocks) in Cuba and Haiti
4. A taxonomic group that consists of a common ancestor and all of its descendants is called a(n) _____ group.
 - a. artificial
 - b. monophyletic
 - c. ontogenetic
 - d. paraphyletic
 - e. polyphyletic
5. A tree diagram that depicts a hypothesis of kinship between species is called a
 - a. candygram
 - b. cladogram
 - c. scala naturae
 - d. sonogram
 - e. telegram
6. According to the cladogram on p. 272, the closest relative of the pygmy chimpanzee, *Pan paniscus*, is
 - a. the (common) chimpanzee, *Pan troglodytes*
 - b. the common gibbon, *Hylobates lar*
 - c. the gorilla, *Gorilla gorilla*
 - d. the human, *Homo sapiens*
 - e. the orangutan, *Pongo pygmaeus*
7. According to the principle of historical contingency,
 - a. a knowledge of general principles allows us to predict the future with great accuracy.
 - b. all you have to do is enroll in the courses and you'll automatically graduate.
 - c. extinctions are always the result of organisms being poorly adapted.
 - d. single random events can have great effects on history, both human and evolutionary.
 - e. the evolution of organisms over the history of the earth has been shaped entirely by changes in the gene frequencies of populations.
8. As a result of the K-T impact,
 - a. all life on earth was eliminated
 - b. most ecosystems were unaffected
 - c. no marine species became extinct
 - d. only the dinosaurs became extinct
 - e. small terrestrial organisms were more likely to survive than large ones
9. Biologists estimate the amount of evolutionary kinship between *any* two organisms by looking at
 - a. how primitive or advanced they are
 - b. the homologies they share
 - c. their fossils
 - d. their place in the classification in the book
 - e. their place on a cladogram
10. Compression fossils
 - a. are a result of the replacement of organic materials with minerals
 - b. are always unaltered from their original biological composition
 - c. faithfully preserve internal structure with no distortion
 - d. often still contain organic matter, possibly including DNA
 - e. only show the surface of an organism
11. Evidence from both the DNA of modern people and fossils strongly suggests that modern humans originated in
 - a. Africa
 - b. Australia
 - c. Europe
 - d. North America
 - e. South America

12. Mass extinctions seem to come at the end of geological eras and periods because
- asteroids wait until the end of an era to strike.
 - evolutionists ignore extinctions at other times.
 - geologists are very sloppy about figuring out the actual dates.
 - if the extinctions were delayed, they would mess up the subsequent adaptive radiation.
 - that is how geologists define eras and periods.
13. Movement of genes from one species to another through hybrid intermediates is called _____. (p. 596)
- allopolyploidy
 - hybrid swarm
 - introgressive hybridization
 - polymorphism
 - sympatric origin
14. Punctuated equilibrium
- applies the model of speciation in small peripheral populations to the evidence from the fossil record
 - is rejected by all modern evolutionists
 - looks at the fossil record only from a gradualist viewpoint
 - shows that rapid replacement of a species by its descendent in the fossil record represents an evolutionary transition, not an ecological transition.
 - totally explains gradual evolution of fossil lineages
15. The "Piltdown Man" from England (p. 472)
- had a small braincase and a jaw similar to that of modern humans
 - is more similar to *Australopithecus* than it is to modern humans
 - is proof that early humans were carnivores
 - represents the earliest human ancestors from Europe
 - was a hoax, made from the cranium of a human and the jaw of an orangutan
16. The "punctuated" in punctuated equilibrium refers to _____ and the "equilibrium" means _____.
- Huxley's statement "Evolution is true! Period!" ... The balance of power between evolutionists and creationists in the late 1800s.
 - mass extinctions caused by external factors ... the Hardy-Weinberg equilibrium.
 - the alternation of sediments and lava in geological strata ... the equal amounts of both.
 - the formation of new species rapidly in the scale of geological time ... persistence of species over long periods with little morphological change.
 - the imperfections of the fossil record ... the slow process of allopatric speciation.
17. The average *extinction* rates of species are important in recognizing
- adaptive radiations
 - mass extinctions
 - punctuated equilibrium
 - the background extinction rate
 - the birth rates of individuals
18. The birds and flowering plants underwent adaptive radiations that were not associated with mass extinctions. The most likely reason for the adaptive radiation of birds was that
- birds were light-weight, and were dispersed by the wind to new continents
 - birds were the only dinosaurs with no teeth
 - feathers allowed birds to become homeothermic, unlike the sluggish, cold-blooded dinosaurs
 - flight gave birds access to many niches that were unoccupied: eating flying insects, eating insects from tall trees, etc.
 - there were no other small animals on earth at that time
19. The chances of a given fossil being a *relative* of a living organism are
- 100%
 - moderately high (50-70%)
 - moderately low (20-40%)
 - very low (less than 20%)
 - fossils can never be relatives of organisms alive today
20. The great apes diverged from the rest of the primates about ____ million years ago.
- 0.1
 - 6
 - 33
 - 65
 - 500
21. The important evolutionary lesson from mass extinction and subsequent adaptive radiation is
- being big like the dinosaurs is not very adaptive
 - everything that evolution has accomplished can be wiped out in an instant
 - evolution at the large scale is merely an extrapolation of the changes in gene frequencies in populations
 - evolutionary processes during "ordinary" times are not the main factors affecting the diversity of life on earth
 - organisms should prepare for mass extinctions

22. The one factor that seems to be most important in making complex multicellular animals and sponges different from fungi, green plants, brown algae, and red algae is that
- animals and sponges both have blood, lungs, and kidneys
 - animals and sponges both have embryos that are filaments
 - animals and sponges lack cell walls
 - fungi, plants, and algae all have xylem for water and gills for oxygen
 - fungi, plants, and algae are all photosynthetic
23. The skeleton of "Lucy" (*Australopithecus afarensis*) was important in that it showed that:
- arthritis is an ancient disease
 - Australopithecines had the running speed and size to be active hunters
 - large brains were present before upright walking
 - scavenging was better than just plant-eating
 - upright walking was present before large brains
24. We can separate homology from homoplasy because
- actually, they are impossible to separate
 - all homologies tell parts of the same story, but each homoplasy can tell a different, contradictory story
 - all homoplasies look alike, but all homologies look different
 - homologies are always adaptive, but homoplasies never are
 - homologies are not controlled by genes, but homoplasies are
25. When applied to the diversity of living organisms, the term hierarchy refers to an
- arrangement of organisms in a textbook, no matter how it is done
 - arrangement of organisms into a linear sequence from the most primitive to the most advanced
 - arrangement of organisms into an arbitrary sequence
 - arrangement of organisms into groups, the groups into larger groups, and so on
 - assignment of different species to different levels of authority, so that, for example, the lion is the king of the beasts.
26. Which mechanism ordinarily results in hybrid speciation:
- allopolyploidy (alloploidy)
 - aneuploidy
 - Hardy-Weinberg equilibrium
 - mass extinction
 - punctuated equilibrium
27. Which of the following is a logical prediction based on the hypothesis that early humans were scavengers?
- human marks on bones should be on top of those of predatory carnivores
 - human marks on bones should be under those of predatory carnivores
 - most of the broken bones with evidence of being smashed with human tools should be the flat bones which do not contain any marrow
 - one should find sharp, meat-cutting tools with the animal bones
 - one should find small, neat little piles of carefully arranged, broken animal bones
28. Which of the following statements about fossils is *false*?
- Fossils always preserve the DNA and other organic components that made up the original organism.
 - Fossils are classified taxonomically on the basis of morphological differences, rather than on their ability to interbreed.
 - Most individual organisms never form fossils.
 - Some organisms fossilize more easily than others.
 - The order in which fossils are found in geological strata can tell us something about the evolution of the organisms that formed them.
29. Which of the following statements about the probability of an individual organism being fossilized is *false*?
- It depends in part on the circumstances of the organism's death.
 - It depends in part on the environment in which the organism lives.
 - It depends in part on the later geological history of the sediments in which the organism is buried.
 - It depends in part on whether the organism has any resistant body parts.
 - The probability is always very high.
30. Which of the following statements is *false*?
- All complex multicellular organisms must deal with the transport of food, water, oxygen, and wastes.
 - All complex multicellular organisms start their lives as a solid ball of cells.
 - The food-conducting tissues of green plants and brown algae evolved independently.
 - The hallmark of a complex multicellular organism is division of labor—different cells and tissues specialized for different tasks.
 - The six different major lineages of complex multicellular organisms have evolved from different unicellular ancestors.