Tracing Evolutionary History

1. The relationship between dinosaurs and birds

a) has always been seen as close, with birds considered dinosaur descendants

b) has finally been resolved, with birds now clearly considered dinosaur descendants

c) has finally been resolved, with birds now clearly considered to have evolved from
nondinosaur ancestors

d) remains controversial, with some evidence suggesting that birds evolved from dinosaurs, and other evidence that argues for a nondinosaur origin of birds

e) remains uncertain because no fossils exist that help to determine the relationship

2. By studying fossils in strata from many locations, scientists can trace

a) microevolution

b) macroevolution

c) counterevolution

d) the life habits of extinct organisms

e) speciation frequencies

3. The earliest discovered fossils are _____dating back to _____years ago.

a) single-celled eukaryotes ... 4.5 billion

b) prokaryotes ... 3.5 billion

c) algae…1 billion

d) fish…600 million

e) dinosaurs ... 180 million

4. Strata containing highly diverse fossils, including jellyfish, corals, and worms, were formed during which of the following eras?

a) the early Precambrian

b) the late Precambrian

c) the Paleozoic

d) the Mesozoic

e) the Cenozoic

5. Plants and animals first became established on land during the

a) early Precambrian

b) late Precambrian

c) Cenozoic

d) Paleozoic

e) Mesozoic

6. Which of the following eras is often called the "Age of Reptiles"?

a) late Precambrian

b) Permian

c) Paleozoic

d) Mesozoic

e) Cenozoic

7. The earliest known flowering plants date to the

a) Cambrian.
b) Cenozoic.
c) Mesozoic.
d) Paleozoic
e) Oligocene

8. Scientists who study fossils are called

a) ecologists

b) paleontologists

c) geologists

d) phylogenists

e) systematists

9. Living animals have the same ratio of 14C to 12C (called the 14e:12C ratio) as the Earth's atmosphere. Which of the following statements best explains why the 14e:12C ratio in a fossil can often be used to tell approximately how long ago the animal died?

a) The ^{14}C:^{12}C ratio of a fossil drops progressively as the radioactive isotope ^{14}C changes into ^{12}C.

b) The ^{14}C:^{12}C ratio of a fossil rises progressively as the radioactive isotope ^{12}C changes into ^{14}C.

c) The ^{14}C:^{12}C ratio of a fossil drops progressively as the radioactive isotope ^{14}C decays into other chemical elements.

d) The ^{14}C:^{12}C ratio of a fossil drops progressively because groundwater dissolves ^{14}C faster than ^{12}C.

e) The ^{14}C:^{14}C ratio of a fossil rises progressively because groundwater contains mainly ^{12}C, which replaces ^{14}C in the fossil.

10. The ^{14}C:^{12}C ratio can be used to date fossils that are up to approximately how old?

a) 3.5 billion years

b) 100 million years

c) 50,000 years

d) 10,000 years

e) 5,600 years

11. Potassium-40 can be used to date fossils that are up to approximately how old?

a) 3.5 billion years

b) 1.3 billion years

c) several hundred million years

d) 50,000 years

e) 10,000 years

12. The technique called radiometric dating is based on

a) the type of plant material that an animal consumed

b) the atomic isotopes contained in organisms and their rate of decay

c) the atomic isotopes of the rocks surrounding fossilized organisms

d) the quantity of radioactive isotopes in the atmosphere

e) None of the choices are correct

13. When the continent of Pangaea first split apart, it formed

a) a northern landmass called Gondwana and a southern landmass called Laurasia

b) a northern landmass called Laurasia and a southern landmass called Gondwana

c) a western landmass corresponding to North and South America and an eastern landmass corresponding to the other modem continents

d) a western landmass corresponding to North and South America, an eastern landmass corresponding to Eurasia, and a southern landmass corresponding to Africa, Australia, India, and Antarctica

e) an array of landmasses similar to the current ones but more compact

14. It is estimated that the modem continents were beginning to take shape how long ago?

a) 1.3 billion years ago

b) 1.3 million years ago

c) 500 million years ago

d) 65 million years ago

e) 65 billion years ago

15. The crustal plates are constantly moving. For example, North America and Eurasia are presently drifting apart at a rate of about _____per year.

a) 2 inches

b) 2 millimeters

c) 2 centimeters

d) 2 feet

e) 2 meters

16. How is the merging of continents to form Pangaea believed to have altered

the Earth's environments at that time?

a) It changed the pattern of ocean currents, which in turn affected climates on land.

b) It reduced the amount of coastal and shallow-sea environments, and it brought organisms
into competition with unfamiliar organisms.

c) It may have made much of Pangaea drier and more varied in climate.

d) All of the choices are correct.

17. Which of the following lines of evidence suggests that lungfishes evolved while Pangaea was intact?

a) the fact that modem lungfishes on different continents show similar patterns of behavior

b) the fact that lungfishes are found today in Africa, Australia, and South America

c) the fact that fossillungfishes have been found on every continent except Antarctica

d) All of the choices are correct.

e) None of the choices are correct.

18. When did the Himalaya mountains begin to form?

a) 10 million years ago

b) 10 billion years ago

c) 100 million years ago

d) 100 billion years ago

e) There is not enough evidence to know.

19. The continents and seafloors together form a thin outer layer of the Earth called the

a) mantle

b) crust

c) strata

d) biosphere

e) tectonic plate

20. Which of the following phenomena can be caused by continental drift?

a) mountain formation

b) volcanoes

c) earthquakes

d) the merging and breaking up of continents

e) All of the choices are correct.

21. Geologists call the forces within Earth that cause movements of the crust

a) volcanism

b) plate tectonics

c) mantle activity

d) reorganizational events

e) geomagnetism

22. During the _____, over 90% of marine species and many terrestrial species became extinct.

a) Precambrian

b) Permian

c) Cretaceous

d) Mesozoic

e) Cenozoic

23. The strongest evidence of a meteor impact in the late Cretaceous is

a) the extinction of the dinosaur

b) the increase in the diversity of mammals

c) a thin layer of potassium-40

d) a thin layer of iridium

e) climatic warming

24. Mass extinctions

a) limit opportunities for diversification

b) have occurred only twice in the history of life on Earth

c) can only be caused by an asteroid impact

d) are periods of time during which rates of extinction increase almost sixfold

e) All of the choices are correct

25. Which of the following factors may have contributed to the extinction of the dinosaurs?

a) cooling of the climate

b) recession of shallow seas from coastal lowlands

c) extinction of plant types used by dinosaurs for food

d) the effects of a large meteorite that hit the Earth

e) All of the choices are correct.

26. How many periods of mass extinction have occurred in the last 600 million years?

a) One

b) two

c) four

d) six

e) eight

27. The situation in which a structure that evolved in one context is later adapted for another function is called

a) exaptation

b) conversion evolution

c) parallel evolution

d) coincidental adaptation

e) coevolution

28. Which one of the following is not an exaptation?

a) feathers in birds

b) lightweight, honeycombed bones in birds

c) longer winglike forelimbs in birds

d) leaves of a pineapple that form a rainwater catch-basin

e) All of the choices are examples of exaptations

29. Which of the following is an example of paedomorphosis?

a) the retention of juvenile body features in the adult organism

b) slowing of the development of some organs relative to others

c) reproductively incompatible organisms

d) using a structure for some purpose other than the purpose for which it was intended

e) None of the choices are correct.

30. A paleontologist who specializes in amphibians notices that there are very few differences in the skull of the adult and juvenile form of a salamander. This suggests that the salamander exhibits

a) paedomorphosis

b) polymorphism

c) dimorphism

d) sexual dimorphism

e) convergent evolution

31. _____is a response to interactions between organisms and their current environment.

a) Extinction

b) Expansion of species

c) Evolution

d) Hybridization

e) All of the choices are correct.

32. Which one of the following is most analogous to the evolutionary history of

most animal groups?

a) a single-file line of people

b) a field of wild plants

c) a forest

d) a bush

e) grains of sand on a beach

33. A diagram that traces the evolutionary relationships of a set of organisms is called a

a) phylogenetic tree

b) classification

c) pedigree

d) genealogy

e) taxonomy

34. The term phylogeny would be used for the genealogic relations of a set of organisms that

a) live in the same kind of habitat and exhibit similar adaptations

b) have a common ancestor and look similar

c) constitute all the descendants of a common ancestor

d) are similar in appearance

e) None of the choices are correct

35. Which of the following is written correctly? The scientific name of the human species is

a) Homo

b) homo sapiens

c) Sapiens

d) Homo sapien

e) Homo sapiens

36. Which of the following choices lists taxonomic categories in order from

least inclusive to most inclusive?

a) genus, family, class, order, phylum

b) genus, phylum, family, order, class

c) genus, family, order, class, phylum

d) family, genus, order, phylum, class

e) family, genus, class, order, phylum

37. Ever since Darwin, systematics has tried to

a) provide a hierarchical classification system

b) reflect evolutionary relationships

c) provide a hierarchical classification system and reflect evolutionary relationships

d) provide a hierarchical classification system and explain the reasons for evolutionary patterns

e) identify the causes of evolutionary change and reflect evolutionary relationships

38. Which of the following is the process by which species not closely related may come to resemble one another if they live in a similar environment?

a) coevolution

b) convergent evolution

c) similar evolution

d) parallel evolution

e) neoteny

39. Structures that evolved from the same structure in an ancestor <u>and</u> that also perform the same function(s) are

a) homologous

b) heterologous

c) analogous

d) homologous and analogous

e) heterologous and analogous

40. Which one of the following statements is not true?

a) Genes shown to have a reliable average rate of change can be used as a molecular clock.

b) Phylogenetic trees based upon cytochrome c are generally consistent with those based on comparative anatomy.

c) Mitochondrial DNA mutates more slowly than nuclear DNA, making mitochondrial DNA more suitable for analyzing species that are more distantly related.

d) The DNA that codes for ribosomal RNA changes slowly and therefore is most suitable for comparing the earliest of all evolutionary relationships.

e) The more recently two species have branched from a common ancestor, the more similar we expect to find their DNA and amino acid sequences.

41. Which one of the following statements is not true?

a) Phylogenetic systematics tries to make classification as consistent as possible with the evolutionary history of a group.

b) In a cladistic analysis, new traits are called derived characters and original traits are said to be primitive characters.

c) Parsimony is a quest for the simplest explanation for observed phenomena.

d) Cladistic analysis takes into account the apparent degree of divergence between lineages.

e) Cladistic analysis attempts to make sure that all taxa are monophyletic.

42. The three-domain system

a) no longer distinguishes between eukaryotes and prokaryotes

b) subdivides the eukaryotes into 2 different domains

c) subdivides the prokaryotes into 2 different domains

d) separates plants, animals, and fungi

e) is based upon the presence or absence of cell walls

43. The four geologic eras are directly subdivided into

a) eons

b) periods

c) plates

d) sub-eras

e) epochs

44. _____first appeared during the Precambrian era.

a) Mammals

b) Reptiles

c) Amphibians

d) Cyanobacteria

e) Dinosaurs

45. The Paleozoic era began approximately _____million years ago.

a) 4,600

b) 570

c) 245

d) 65

46. _____were the dominant plant life during the early Mesozoic era.

a) Mosses

b) Gymnosperms

c) Angiosperms

d) Horsetails

e) Ferns

47. The Domain Eukarya includes all of the following kingdoms <u>except</u>

a) Animalia
b) Plantae
c) Monera
d) Fungi
e) All of these

48. Which of these domains includes prokaryotic cells?

a) Protista
b) Eukarya

c) Monera
d) Archaea
e) Fungi