

MAKE ALL YOUR RESPONSES ON THE ANSWER SHEET USING A #2 PENCIL. BE SURE TO FILL IN NAME AND IDENTIFICATION NUMBER.

MULTIPLE CHOICE : (choose the one best answer) [2 pts. each]

1. At least two of the necessary preconditions for allopatric speciation include the following: a) geographic variation within a species and geographic contact among geographic variants of that species; b) geographic variation within a species and geographic isolation of geographic variants; c) geographic variation within a species and genetic divergence among closely related species; d) sympatry among geographic variants and genetic divergence among closely related species.
2. Which of the following zoological names are in the correct format: a) Rana Catesbiana; b) Etheostoma burri; c) hyla versicolor; d) Ambystoma tigrinum.
3. The type-locality of a named zoological entity is: a) the location where the species is most common; b) the place where the type specimen was collected; c) the location where "typical" looking individuals of the species occur; d) none of the preceding.
4. Binominal nomenclature is: a) a two-name naming system; b) a two-word naming system; c) a bastardization of binomial nomenclature; d) a system of giving each species a name consisting of two parts: generic name and specific epithet; e) a and d; f) b and c.
5. Which of the following statements is true: a) Rana pipiens is a member of the category Ranidae; b) Rana pipiens is a member of the family Ranidae.
6. The radiation of freshwater fishes onto all of the continental land masses (except at the poles) is thought to have occurred while Pangaea was nearly complete in the: a) Cambrian; b) Ordovician; c) Devonian; or d) Triassic.
7. Pangaea had fragmented into Laurasia and Gondwanaland by: a) late Pennsylvanian; b) early Jurassic; c) mid-Triassic; d) late Cretaceous.
8. The earth's crust (lithosphere) consists of: a) a few major rocky plates and several smaller ones; b) a thickly plastic mantle that produces hot lava at spreading centers in the ocean; c) approximately 7 major plates that constantly cause friction with the 5 oceanic plates; d) sandy sublayers that allow for exchange of dangerous gases between the earth's core and our atmosphere.
9. Some obvious results of continental drift might include: a) range extensions of animals; b) geographic separation of species; c) radical changes in climate; d) all of the preceding.

10. The term used to describe the food habits of most anuran tadpoles is: a) frugivorous; b) nectivorous; c) algivorous; d) herbivorous; e) none of the preceding.
11. In anurans successful fertilization of eggs is accomplished by: a) amplexus and cloacal apposition; b) amplexus and internal fertilization through the phallodeum; c) amplexus and the use of spermatophores; d) rubbing of hedonic glands and internal fertilization along a groove in the tail.
12. Apodans (Gymniophiona) are: a) an order of reptiles referred to as "naked snakes"; b) anuran tadpoles; c) an order of amphibians referred to as caecilians; d) close relatives of amphisbaenians, but of uncertain taxonomic position.
13. The earliest amphibians almost certainly have their ancestry among: a) sarcopterygian fishes; b) porolepiform fishes of the Devonian; c) Osteichthyan fishes of the Silurian; d) crossopterygian fishes of the upper Ordovician.
14. Marine teleost (Osteichthyes or Actinopterygii) fishes are: a) hyperosmotic; b) hyposmotic; c) isosmotic; d) none of the preceding.
15. The rectal gland in sharks secretes: a) urea; b) sodium ions; c) ammonia; d) uric acid.
16. Body fluids are maintained more concentrated than the surrounding water in: a) hagfishes; b) sea snakes; c) marine teleosts (Osteichthyes); d) none of the preceding.
17. Pelagic sea birds have no access to fresh water. Their urine is less concentrated than sea water. Adaptations are: a) they excrete sodium and chloride ions from nasal glands; b) they excrete little water in their urine; c) they excrete uric acid; d) all of the preceding; e) none of the preceding.
18. Vampire bats feed only on blood. To cope with excessive weight and water after feeding, they: a) sleep it off; b) excrete copious, dilute urine while feeding; c) visit nearby ponds and cool themselves down; d) none of the preceding.
19. Freshwater teleost (Osteichthyes) fishes: a) do not drink water; b) produce copious, dilute urine; c) excrete sodium and chloride ions from gill glands; d) none of the preceding; e) all of the preceding; f) only a and b are correct.
20. African lungfish regulate their water balance during aestivation by: a) excreting copious urine rich in ammonia; b) excreting urea and retaining it in the body; c) excreting urea into the surrounding mud cocoon; d) producing sodium and chloride ions in the cloaca.

MATCHING: (choose the one best answer per question from the list at the right) [2 points each]

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| 21. The theory and practice of describing and classifying species. | A. Taxonomy |
| 22. The process by which new species arise | B. Linnaean hierarchy |
| 23. The scientific study of organic diversity with the goal of inferring phylogenies | C. Systematics |
| 24. The system of names given to taxa of organisms | D. Speciation |
| 25. Any group of animals formally recognized in a classification | E. Nomenclature |
| 26. A system of 5 classification levels used in the <u>Systema Naturae</u> | G. Phylogeny |
| 27. An inferred history of evolutionary descent | H. Taxon |

MUL TIPLE CHOICE : (choose the one best answer) [2 pts. each]

28. The number of amphibian species in the world today is approximately: a) 1000; b) 2000; c) 4000; d) 8000; e) 16,000.
29. Amphibians are characterized by having: a) heavily keratinized skin; b) skin rich in glands that secrete mucus and other substances; c) having tiny epidermal scales; d) skin impermeable to water and salt ions; e) highly spontaneous activity and metabolism; f) all of the preceding; g) none of the preceding.
30. The process of metamorphosis in amphibians involves: a) thyrotropin releasing hormone from the hypothalamus; b) pepsin from the adrenal glands; c) vitamin G from the parathyroids; d) ion loss from the kidney; e) all of the preceding; f) none of the preceding.
31. Amphibians first appear in the fossil record in: a) Late Cambrian (ca. 520 mybp); b) Devonian (ca. 380 mybp); c) Pennsylvanian (ca. 300 mybp); d) Triassic (ca. 240 mybp); e) Jurassic (ca. 180 mybp); f) Late Cretaceous (ca. 67 mybp).
32. During metamorphosis, frogs typically: a) shed the skin and tail; b) increase the relative length of the digestive tract; c) develop epithelial teeth; d) develop paired limbs; e) all of the preceding; f) none of the preceding.

TRUE-FALSE : (mark “**A**” if your answer is **true** ; mark “**B**” is your answer is **false**). [1 point each]

33. The present location of the Earth’s continents is the result of plate tectonics and the breakup of a single large land mass called Pangaea.
34. Most amphibian species are anurans.
35. Vertebrate animals are osmoregulators as well as ion regulators.

36. Metamorphosis occurs in all amphibians because they must shift from the aquatic environment of larval development to the terrestrial environment of adult life.
37. External fertilization is typical of frogs and toads whereas internal fertilization is typical of salamanders.
38. Some zoological names (i.e., family, genus, and species groups) are regulated by an international agreement among zoologists.
39. Aquatic animals that easily tolerate variation in the salinity of their surrounding water are considered stenohaline organisms.
40. Predator defense is one of the possible functions of mucus secreted from the skin of amphibians.
41. Paedomorphosis is evident in mudpuppies.
42. Some amphibians have an extensible tongue that is used to capture prey.

MATCHING: (choose the one best answer per question from the list at the right of each set).
[2 points each]

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| 43. Eggs of caecilians are fertilized in | A. Oral birth |
| 44. The site of fertilization for eggs of the hellbender is | B. Foam nest |
| 45. Item placed on substrate by male salamanders | C. Vocal pouch of female |
| 46. Tailed frog eggs are fertilized in | D. Phallodeum |
| 47. Male ranid frogs fertilize eggs in | E. Spermatophore |
| 48. The intromittent organ of the male caecilian is the | F. Open water without nest |
| 49. Female Surinam toad's carry their eggs in | G. On leaf surface |
| 50. Female <u>Rheobatrachus</u> are the only frogs to practice | H. Female's cloaca or oviduct |
| | I. Gravel depression under rock |
| | J. pits on their back |

MULTIPLE CHOICE : (choose the one best answer) [2 pts. each]

51. Subduction zones are: a) those regions where hot molten rock reaches the mid-ocean ridges; b) where oceanic plates meet continental plates and slide under them at steep angles; c) part of

the thickly plastic mantle that carries the earth's plates; d) zones of convectional currents that add new crust to the lithosphere.

52. The continental plate that includes North America has been drifting westward away from Europe and Africa at a rate of: a) 8 inches/year; b) 8 cm/year; c) 8 mm/year; d) 8 m/year.

53. The geographical distribution of lungfishes (Sarcopterygii) is one the best examples zoologists have of: a) the oceanic dispersal hypothesis; b) the continental drift hypothesis; c) the panbiogeography hypothesis; d) none of the preceding.

54. One of the biggest problems with using continental drift as a hypothesis to explain the present-day distributions of vertebrates is: a) most of the groups used as examples are not geologically old enough to have been present during the breakup of Gondwana; b) the timing of the breakup of Gondwana has never been accurately dated; c) the geological and oceanographic evidence for drifting continents is weak; d) all of the preceding.

55. Pangaea included: a) only the northern continents of Europe, Asia, and North America; b) only the southern continents of Africa, Australia, and South America; c) all of the continental land masses; d) the oceanic plates plus Gondwanaland.

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1. In the scientific name *Homo sapiens* Linnaeus 1758, the numbers "1758" and word "Linnaeus" clarify that: a) the binominal nomenclature follows the Linnaean system of 1758; b) type specimen was personally collected by Linnaeus in 1758; c) type specimen #1758 is in the Linnaeus Museum in Sweden; d) species was first described and named by Linnaeus in a publication of that year; e) the species was named in honor of Linnaeus.
2. Which of the following zoological names are in the correct format: a) Rana Catesbiana; b) Etheostoma stewarti; c) hyla versicolor; d) Ambystoma tigrinum.
3. The type-locality of a named zoological entity is: a) the location where the species is most common; b) the place where the type specimen was collected; c) the location where "typical" looking individuals of the species occur; d) none of the preceding.
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5. Which of the following statements is true: a) *Hyla versicolor* is a member of the category Hylidae; b) *Hyla versicolor* is a member of the family Hylidae.
6. The radiation of freshwater fishes onto all of the continental land masses (except at the poles) is thought to have occurred while Pangaea was nearly complete in the: a) Cambrian; b) Ordovician; c) Devonian; or d) Triassic.
7. Examples of endangered or threatened amphibians in Illinois include: a) bullfrog, hellbender; b) American toad, dusky salamander; c) Illinois chorus frog, silvery salamander; d) none of the preceding.
8. The earth's crust (lithosphere) consists of: a) a few major rocky plates and several smaller ones; b) a thickly plastic mantle that produces hot lava at spreading centers in the ocean; c) approximately 7 major plates that constantly cause friction with the 5 oceanic plates; d) sandy sublayers that allow for exchange of dangerous gases between the earth's core and our atmosphere.

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12. Apodans (Gymniophiona) are: a) an order of reptiles referred to as "naked snakes"; b) anuran tadpoles; c) an order of amphibians referred to colloquially as Silicians; d) an order of amphibians referred to as caecilians; e) close relatives of amphisbaenians, but of uncertain taxonomic position.
13. Which of the following is not considered a modern (extant) reptile: a) turtles; b) crocodilians, c) snakes; d) amphisbaenians; e) tuatara; f) pterosaurs
14. Marine teleost (Osteichthyes or Actinopterygii) fishes are: a) hyperosmotic; b) hyposmotic; c) isosmotic; d) none of the preceding.
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30. Male crocodylians successfully fertilize eggs through an intromittent organ referred to as: a) phallosome; b) gonopodium; c) penis; d) hemipenes; e) myxopterygia.
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56. The cleidoic egg shell: a) prevents desiccation of the embryo; b) maintains spherical shape of the ovum; c) provides mechanical protection to the developing embryo; d) all of the preceding.

57. Examples of sperm storage by female reptiles after mating include: a) sea turtles; b) vipers; c) box turtles; d) none of the preceding.

58. The number of reptile species recognized in the world today is approximately: a) 25,000; b) 4,000; c) 6,500; d) 7,500.

59. Temperate snakes over-winter in: a) hybernacula; b) mud-bottomed ponds; c) abandoned mines; d) in the middle of corn fields.

60. Which of the following reptiles uses cloacal apposition as a means of fertilization: a) boa constrictor; b) leatherback turtle; c) American alligator; d) fence lizard; e) tuatara

61. Illinois has a rich herpetofauna in terms of number of species, because of: a) its great length from north to south; b) its ecologically intermediate position in the Midwest; c) its variety of habitat types; d) all of the preceding; e) none of the preceding.