

Practice Questions, Test 1, Herpetology, Spring 2015

- 1 Discuss some anatomical traits that are characteristic of amphibians.
- 2 Discuss some anatomical traits that are characteristic of reptiles.
- 3 How would you distinguish a caecilian from a snake?
- 4 Describe some unusual aspects of the anatomy of turtles ('unusual' relative to other tetrapods).
- 5 "Exhaustive" approaches to finding optimal phylogenetic trees evaluate every possible tree and select the best one. "Heuristic" approaches evaluate only some possible trees and are not guaranteed to find the optimal tree. Why are heuristic rather than exact methods usually used to find optimal trees in phylogenetics?
- 6 List five graduate programs and/or museums that are well known for herpetological study. Also list associated professors for each group.
- 7 What is the science of systematics? How is systematics different from classification? Give an example to illustrate your point(s).
- 8 Discuss arguments for studying amphibians and reptiles together as the single informal group "herps."
- 9 If you tell a nonbiologist that you are a herpetologist, they often will think that you study the Herpes virus. Explain why this inference is not unreasonable.
- 10 Discuss the contributions of three important figures in the history of herpetology. Include figures from both pre- and post-1900.
- 11 There are many 'species concepts' available to researchers. Discuss some of these concepts with reference to 'conceptual' and 'operational' criteria for species. (de Queiroz' article should be useful in your answer).
- 12 How does the 'General Lineage Concept,' or 'Evolutionary Concept' of species solve problems associated with the 'Biological Species Concept?'
- 13 How does speciation occur?
- 14 What is 'vicariance?' Contrast this term with 'dispersal.' Give herpetological examples of each term.
- 15 Give a herpetological example where a taxonomic name change was necessitated by the results of a phylogenetic analysis, and explain why this change was necessary according to the accepted standards of taxonomy. Also give an example where a name was changed unnecessarily. (The Pauly paper may be helpful for this question).
- 16 What processes of speciation seem to be operating in *Ensatina* salamanders in California? Compare and contrast the speciation process in *Batrachoseps* with that of *Ensatina*. (The Wake paper may be helpful for this question).

17 How do frogs of the *Rana pipiens* complex present problems for some species concepts?

18 What are the different optimality criteria for reconstructing evolutionary relationships? Give a brief (one-two sentence) description of each.

19 Rosenblum and Harmon claim that the White Sands *Holbrookia maculata* could be considered a distinct species from the *Holbrookia maculata* that live in the surrounding desert. Which of the following processes of speciation seem to be operating (explain your answers)?: dispersal, vicariance, selection, drift, ecological speciation, reproductive isolation, ring speciation, genetic divergence.

20 Describe similarities and differences across *Holbrookia*, *Sceloporus*, and *Aspidoscelis* in their evolutionary response to the White Sands environment. What aspects of the White Sands lizard system suggest evolutionary convergence? Explain your answer.

21 What is a ring species? Give a herpetological example of a ring species.

22 Give an apomorphy--based definition of the group Anura (=frogs).

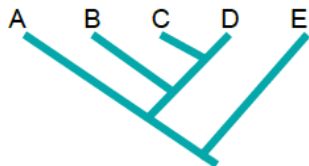
23 Give herpetological examples of the following terms: homoplasy, homology, synapomorphy, convergence. (be sure to explain why each term applies to whatever example you give. For example, "loss of limbs in snakes is an example of convergence" is not a good answer because it does not explain how 'loss of limbs' can be interpreted as an example of 'convergence'.)

24 List kinds of data that are used to reconstruct phylogeny.

25 What approaches are used to assess confidence in the results of a phylogenetic analysis?

26 What two countries border Panama?

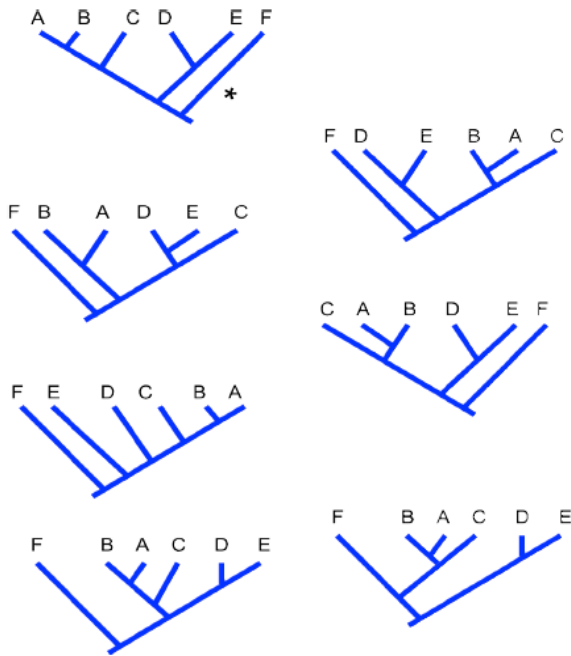
27 Use the following set of phylogenetic relationships to give a (verbal, not graphical) node-based definition of a group that includes taxa B and C but not taxon A. Also give a stem-based definition for this group.



28 Assume you perform a phylogenetic analysis and obtain the set of relationships shown in question 27. Assume A= *Corytophanes cristatus*, B=*Corytophanes hernandezi*, C=*Laemanctus longipes*, D=*Corytophanes percarinatus*, E= *Laemanctus serratus*. The name *Corytophanes* was first applied by Boie to *cristatus* in 1827. *Laemanctus* dates to Wiegmann's description of *longipes* in 1834.

Do you recommend taxonomic changes based on these results? If so, what changes do you recommend?

29 Circle all trees that show the same rooted relationships as tree \*. Draw a smiley face by all trees that show the same unrooted relationships as tree \*.



30 Discuss potential causes of the decline of *Anaxyrus microscaphus* in New Mexico. Compare and contrast these causes to causes of amphibian decline in other areas.