Name _____

Integrative Biology 200A Spring 2008

"PRINCIPLES OF PHYLOGENETICS: SYSTEMATICS"

Quiz 2

You may use any books, notes, or references, but you must work independently of other people. To keep the amount of writing under control, please confine the answers to the space provided (but write clearly and large enough to see!); outlines and pictures are fine. Word-processed answers are OK, as long as they are the equivalent length. **The Quiz is due at 3:30 sharp**, either in room 3083 VLSB, or by email to: BMishler@berkeley.edu. Relative point value is given -- 100 points total.

1. (10 pts.) Define each of the following morphometric techniques and give an example of a systematic question that this procedure might help to answer.

a. Bivariant data plot –

b. Multivariant data plot –

c. Procrustes analysis –

d. Geometric morphometrics –

2. (10 pts.) You need to estimate the age of divergence of two sister taxa. How are you going to do this? Give a short list of the steps you will perform to complete this task and the appropriate caveats that you will need to consider at each step. What tests would you perform and how would you proceed given different outcomes of these tests? What are the assumptions that go along with your approach?

3. (10 pts.) Paleontology is said to play an important role in macroevolutionary studies. Give an example of the role of paleontological data in a macro-evolutionary study and a second example of a macroevolutionary study that would not require paleontological data. Be sure to spell out the role and non-role of paleontological data in both examples.

4. (10 pts.) Compare and contrast: Bremer support, Bootstrap support, and Bayesian posterior probability measures.

5. (10 pts.) You have analyzed two sets of data for two separate groups of interest. The result is four trees for one group and 12,480 for the other. Do you think it is valid to select a single tree from each set of equally most optimal trees found by your analysis of character data for further use and discussion? If so, how would you do this? If not, explain how you will address the problem of having so many trees assuming you still want to discuss the evolution of the groups or want to discuss properties other trees (e.g. dating, biogeography or comparative aspects).

6. (10 pts.) Compare and contrast these four types of cladograms used in biogeography:
Taxon Cladogram (TA): Taxon Area Cladogram (TAC): Fundamental Area Cladogram (FAC): General Area Cladogram (GAC).

7. (20 pts.) Compare and contrast the following four methods of inferring phylogenies. Explain what they have in common, and how they differ. [a table might be useful, but optional]
Distance, Parsimony, Maximum Likelihood, Bayesian Inference

8. (20 pts.) Why should species not be treated as independent samples in a comparative analysis? Discuss one method designed to correct this problem for discrete-state data, and one method for quantitative data.