

## Multiple Choice

| Question | Test A | Test B |
|----------|--------|--------|
| 1        | D      | E      |
| 2        | B      | C      |
| 3        | C      | C      |
| 4        | A      | B      |
| 5        | B      | E      |
| 6        | A      | C      |
| 7        | C      | A      |
| 8        | D      | C      |
| 9        | C      | D      |
| 10       | B      | A      |
| 11       | E      | D      |
| 12       | C      | B      |
| 13       | C      | C      |
| 14       | B      | A      |
| 15       | E      | B      |
| 16       | C      | A      |
| 17       | A      | C      |
| 18       | C      | D      |
| 19       | D      | C      |
| 20       | A      | B      |

Short Answers

1. List the ways homoplasious characters arise.

*Convergent evolution*

*Parallel evolution*

*Character reversal*

2. Why do scientists generally believe that all life present today probably descended from a common ancestor?

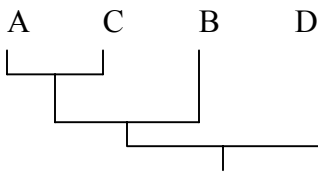
*The genetic code is almost universal for all organisms.*

*The machinery for protein synthesis is almost universal.*

*All amino acids use only L isomers of amino acids.*

*Mechanisms for nucleic acid replication are general .*

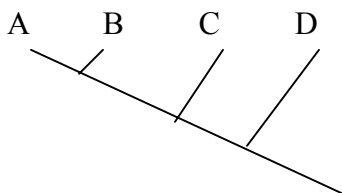
3. Draw the phenogram indicated by these data?



4. Draw the construct a table indicating the number of shared derived characters for each pair of species.

|   | A | B | C | D |
|---|---|---|---|---|
| A | - | 6 | 4 | 0 |
| B |   | - | 4 | 0 |
| C |   |   | - | 0 |
| D |   |   |   | - |

5. Draw the most parsimonious phylogeny inferred from these data.



6. Define 'evolution' as used in this class. *Descent with modification, or change in allele frequencies over time, or genetic changes in populations of organisms through time that lead to differences among them*

7. Define the dispersal hypothesis and the vicariance hypothesis of biogeography.

*Dispersal hypothesis– Taxon that originated in area, expanded to other areas by crossing a barrier (jump dispersal)... areas were separated before they became occupied by this species*

*Vicariance hypothesis – Areas were formerly contiguous and occupied by an ancestor, taxa differentiated after the barrier was created and split range*

8. Describe a study that provides evidence testing the relative merits of the dispersal versus vicariance hypothesis in explaining species diversity of fruitflies in the Hawaiian islands. I am interested in the type of data gathered and how it is used to discriminate between the two hypotheses.

*Such a study would compare the geographic distribution to the phylogeny of a group of taxa. If the spatial arrangement of geographic distribution of taxa matches the branching sequence, vicariance is supported. If the spatial arrangement is not consistent with the branching sequence, the data support dispersal. The spatial distribution of fruitfly species on the Hawaiian Islands is consistent with vicariance. The islands are formed over a "hot spot" for volcanic activity under a plate that is moving. As the plate moves, new islands are formed. Today, the geographic distribution of fruitfly taxa are nested consistent with the known ages of the islands.*

*Draw figure of area cladogram to illustrate.*