

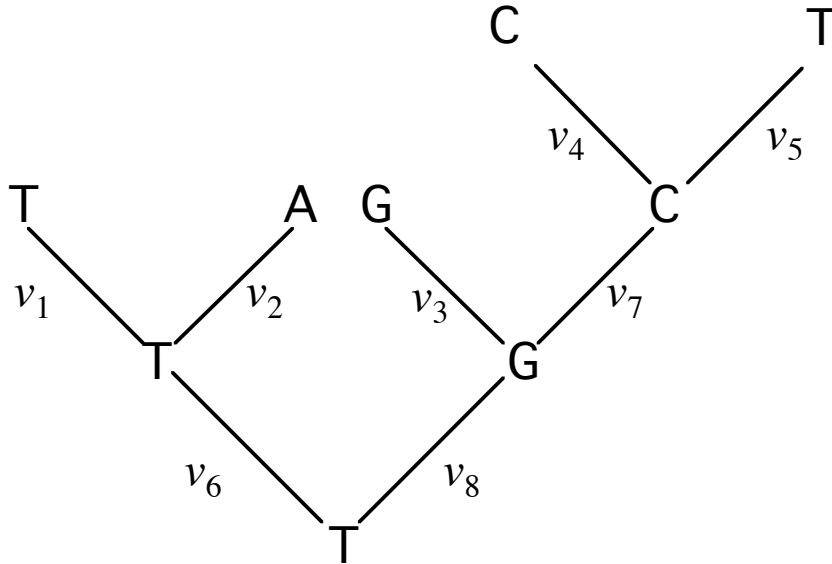
Biology 545 Exam I – Spring 2019

Name: _____

1) Briefly, describe three ways that systematics impacts society (12 pts.)

2) Describe the fundamental differences between cladistics and statistical phylogenetics with respect to phylogeny inference (16 pts.).

3) Consider the following character on the tree shown. The taxa at the tips have the nucleotides shown, and v_1 - v_8 represent branch lengths. Write out the contribution of the reconstruction shown to the single-site likelihood for this character (18 pts.).



How many such reconstructions would there be in the calculation of the single-site likelihood for this character with (you can just show the equation – 2 pts.)?

Would this reconstruction contribute much to the SSL for the site (2 pts.)?

Why or why not (2 pts.)?

4) In words, briefly describe the manner in which progressive alignments work (it's fine to describe the steps; 12 pts.).

5) Please define homology (4 pts.). What type of observation might be used to hypothesize that two structures are homologous (4 pts.)? What types of evidence might be used to test such a hypothesis (10 pts.)?

6) Use Fitch Optimization to determine the length of this character on the tree shown (18 pts).
Show all state sets and accumulated lengths.

