Preview Test: Take-home exam 7

Test Information

Description	This exam is due on Friday 5pm before the Thanksgiving break.
Instructions	
Multiple Attempts	Not allowed. This test can only be taken once.
Force Completion	This test can be saved and resumed later.

QUESTION 1 **1 points** Saved

Models used to describe sequence evolution frequently use the Gamma distribution, using the alpha parameter.

A. What is the name of the process often described by the Gamma distribution?

B. Why is the Gamma distribution more useful than the normal distribution?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Arial 3 (12pt)

Among Site Rate variation.

the shape parameter allow the distribution to change from normal to more extrem than the exponential distribution.

the normal distribution assumes that all sites are equal ($\pm \sigma$) in their rate (mean = median)

Path: p Words:48

QUESTION 2 **1 points** Saved

Long Branch Attraction is caused by which of the following?

- A. Homoplasies resulting from the long branches independently acquiring the same substitution.
- B. Alignment programs misalign sequences to maximize similarity
- C. Tree building programs underestimating the number of substitutions occurring
- D. All of the above.
- E. None of the above.

QUESTION 3 **1 points** Saved

True/False The neutral theory states that all evolution is neutral and everything is only due to genetic drift.

- True
- False

QUESTION 4 **1 points** Saved

True/False The distribution on phylogenetic tree of Eukaryotes of the presence/absence data of the intron found in mosquito (Culex) Triose Phosphate Isomerase gene supports the Intron Early hypothesis.

- True
- False

QUESTION 5 **1 points** Saved

True/False Phylogenetic reconstruction using Markov chain Monte Carlo sampling aims to find the phylogenetic tree that is most probable given the data by walking around in tree and parameter space with a biased walk and sampling trees and other parameters.

- True

False

QUESTION 6

1 points Saved

True/False Parsimony does a better job handling gaps and missing data than Neighbor Joining, but Neighbor Joining can do better with long branches (provided a correction for multiple substitutions is applied).

True

False

QUESTION 7

1 points Saved

True/False For exon shuffling to work, the introns need to be in the same phase.

True

False

QUESTION 8

1 points Saved

True/False A substitution is a mutation that was fixed in a population.

True

False

QUESTION 9

1 points Saved

True/False - Most mutations disappear in a few generations due to random drift.

True

False

QUESTION 10

1 points Save Answer

The size of successive populations is 500, 10000, 1 billion, 4 billion, 8 billion. What is the "effective population size" for the 5 generations (ignoring spatial heterogeneity, mating etc.) ?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

-- Font fam -- Font size

Path: p » span Words:7

QUESTION 11 **1 points** Save Answer

The **time till** fixation for a single neutral mutation in a population of 15 million individuals as compared to a population of 1,000 individuals is

A. the same,

B. shorter,

C. longer

QUESTION 12 **1 points** Save Answer

The **probability for fixation** for a single neutral mutation in a population of 15 million individuals as compared to a population of 1,000 individuals is

A. the same,

B. lower,

C. higher

QUESTION 13 **1 points** Save Answer

The mutation rate is _____ the substitution rate for a mutation that provides a selective **advantage**?

equal to

less than

- greater than
- proportional to
- Is unrelated to

QUESTION 14 **1 points** Save Answer

The mutation rate _____ the substitution rate for a selective **neutral** mutation?

- (•) Is equal to
- Is less than
- Is greater than
- proportional to
- Is unrelated to

QUESTION 15 **1 points** Save Answer

The mutation rate _____ the substitution rate for a mutation that provides a selective **disadvantage**?

- Is equal to
- Is less than
- (•) Is greater than
- proportional to
- Is unrelated to

QUESTION 16 **1 points** Save Answer

True or False - the car trunk analogy illustrates that genes can be under

purifying selection without increasing the fitness of the individuals carrying the gene.

(•) A. True

( ) B. False

Question Completion Status:

QUESTION 17 **1 points** Save Answer

True/False - If the mutant allele reaches a frequency of 50% in a population, it will almost always go on to fixation, even if the mutation does not provide a selective advantage.

( ) True

(•) False

QUESTION 18 **1 points** Save Answer

What is the chance (probability) that a mutation that arose in a single copy and that provides no selective advantage or disadvantage is fixed in population of 125 haploid organisms?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Arial 3 (12pt)

Path: p Words:2

QUESTION 19 **1 points** Save Answer

Which value of non-synonymous/synonymous rate ratio (+omega or dN/dS) would you expect for a protein-coding gene that encodes an enzyme vital for photosynthesis?

(•) A. 0.01 or smaller

B. about 1.0

C. 1.2 or larger

QUESTION 20 **1 points** Save Answer

True/False Among Site Rate Variation (ASRV) means that some sites will undergo multiple substitutions while other sites do not undergo any substitutions. Due to ASRV, protein and nucleotide sequences take longer to become saturated with substitutions than without ASRV.

True

Click Save and Submit to save and submit. Click Save All Answers to save all answers.

QUESTION 21 **1 points** Save Answer

Which program can align nucleotide sequences based on a protein alignment?

A. MrBayes

B. Seaview

C. psiBLAST

D. Clustalo

E. Cluster

QUESTION 22 **1 points** Save Answer

Which processes allow favorable genetic changes to be combined into the same individual, speeding up the rate of evolution?

A. Gene duplication and neofunctionalization

B. Genetic drift

C. Punctuated equilibrium

D. Sex and HGT

E. None of the above.