

Multiple Choice Questions

Each of the following questions is followed by four possible answers. Select the best answer for each question.

- Scientists have discovered differences in the stream communities of guppy populations in Caribbean islands. Upstream, there are fewer predators of the guppies, whereas downstream, predators thrive. Which of the following scenarios is most likely as an evolutionary effect of this ecological difference?
 - Guppies found upstream will grow more quickly, stay small in size and reproduce early in life.
 - Guppies in the high predation pools will exhibit drab coloration.
 - Guppies found downstream reproduce slowly and die older.
 - The guppy populations downstream will be larger.

- A population of budgies has 37 individuals who are blue in color and 194 individuals who express the dominant green color. What is the dominant allele frequency for this population? Answer: _____

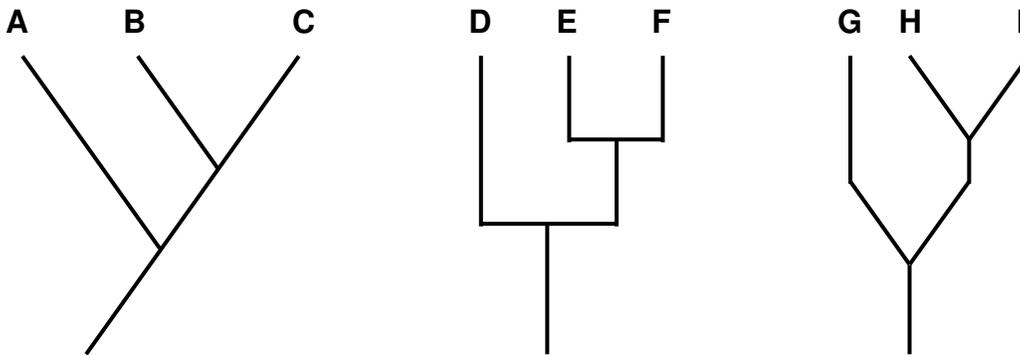
	Percentage of Single Gene Mutations in Specific Populations		
	African Americans	European Americans	Asian Americans
Cystic Fibrosis	21%	71%	8%
Phenylketonuria	4%	82%	14%
Sickle Cell Anemia	98%	<1%	<1%

- The chart above shows the percentage of single gene disorders in specific American populations. Which of the following is **NOT** a plausible explanation for the variance in the data as described above?
 - The disease frequency varies from year to year in specific populations
 - Disease frequency among different populations results from genetic differences as well as environmental differences.
 - Some genetic variations associated with disease may prevail in specific populations because they provide a selective advantage to some populations
 - A small population of individuals with a defective gene has grown, and the gene has increased in frequency because it has not interfered with reproductive fitness.

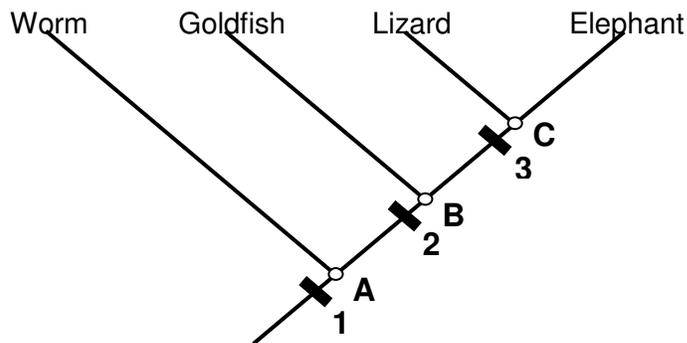
Human beta chain	0
Gorilla	1
Gibbon	2
Rhesus monkey	8
Dog	15
Horse, cow	25
Mouse	27
Gray kangaroo	38
Chicken	45
Frog	67
Lamprey	125
Sea slug	127
Soybean	124

4. In the chart, the numbers represent the number of amino acid differences between the beta chain of humans and the hemoglobins of the other species. Which of the following statements is supported by the data?
- (A) The cow is more closely related to the dog than the mouse.
 - (B) The kangaroo diverged from a common ancestor more recently than the gorilla.
 - (C) A gray kangaroo and chicken are more closely related than a rhesus monkey and a dog.
 - (D) Humans are more closely related to a jawless fish than to a mollusk.
5. In a particular species of insects, you observe that over the last 300 years, the color pattern has alternated from being overwhelmingly blue with a few orange and red forms to the current pattern where the orange and red forms are dominant and there are only a few blue specimens. What type of natural selection may lead to this observation?
- (A) Stabilizing selection
 - (B) Disruptive selection
 - (C) Diversifying selection
 - (D) Directional selection

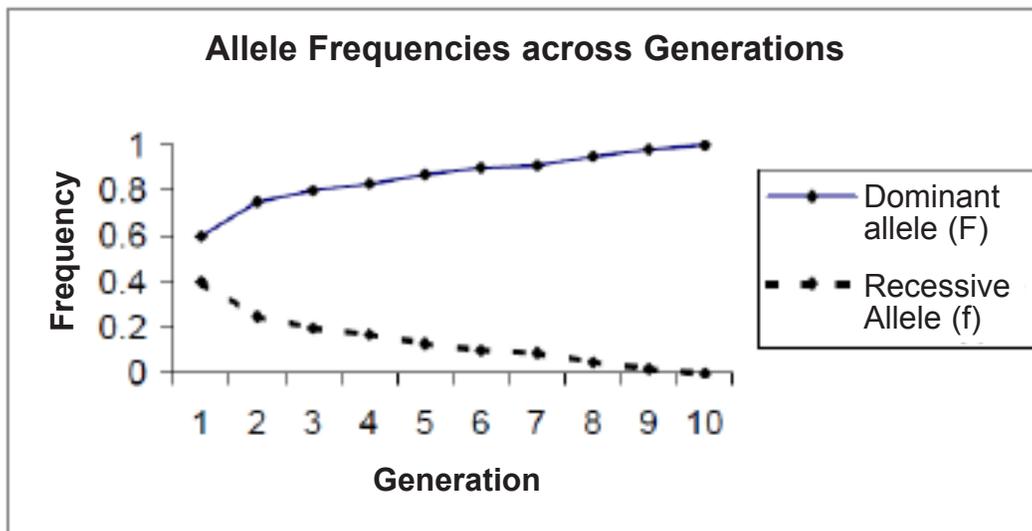
6. A natural disaster devastates an area of the midwestern United States, causing mass extinction of several species. Which of the following scenarios is LEAST likely to occur in the years following the devastation?
- (A) The remaining organisms may quickly diversify and begin establishing themselves in the new ecosystem
 - (B) The species will repopulate in the same manner as prior to the natural disaster.
 - (C) Post extinction species may fail to diversify due to the changes in the ecosystem that are not suited to their survival.
 - (D) The genetic diversity of the population will decrease, as a bottleneck was incurred.



7. Which of the following statements is true regarding the cladograms above, all of which show the relatedness between species (A-I)?
- (A) The cladograms would explain the same relationships if G and H were reversed on the second cladograms.
 - (B) Assuming the three letters in each cladograms represent earthworms, lizards and crocodiles, earthworms could not represent letters E, C, or H.
 - (C) Species H and I are more closely related than Species B and C.
 - (D) Species D is more distantly related to Species F than to Species E.



8. Cladograms are constructed based upon shared characteristics of organisms and show relatedness of those organisms. Which of the following statements about the clades is correct?
- (A) Bar 1 represents the presence of a backbone.
 - (B) Node B represents invertebrates.
 - (C) Bar 2 represents the presence of a backbone.
 - (D) Node C represents mammals.



9. Which of the following statements is supported by the graph?
- (A) The population is in Hardy Weinberg equilibrium, as the sum of the frequency of the dominant allele and the recessive allele is always equal to 1.
 - (B) The percentage of individuals homozygote recessive for this particular trait is increasing over time.
 - (C) Selection has caused frequencies to change over time because individuals with a dominant allele survive at higher rates than individuals with recessive alleles.
 - (D) Individuals who are homozygous recessive for this particular trait have migrated into the population, causing the frequency to approach 1.