Evolution: Practice MC

AP Biology

1. On the Bahamian island of Andros, mosquitofish populations live in various, now-isolated, freshwater ponds that were once united. Currently, some predator-rich ponds have mosquitofish that can swim in short, fast bursts; other predator-poor ponds have mosquitofish that can swim continuously for a long time. Which of the following have operated to increase divergence between mosquitofish populations on Andros?

A. improved gene flow

B. bottleneck effect

C. natural selection

D. founder effect

2. The introduction of antibiotics such as penicillin decades ago was immediately effective in combating infections caused by *Staphylococcus* bacteria*.* In 1958, however, there were several outbreaks. People with staphylococcal infections did not respond to treatment with any of the antibiotics and there were a large number of deaths. The best explanation for this situation is that

1. antibiotic-resistant bacteria survived and multiplied, causing the infections
2. the bacteria reproduced in hosts that were not contaminated with antibiotics
3. the bacteria exposed to nonlethal doses of antibiotics quickly learned to avoid them
4. each generation of bacteria acquired the ability to use antibiotics as nutrients

3. Prairie dogs are small mammals that live in large colonies in burrows in the ground. Prairie dogs that are near their own relatives when a predator approaches are much more likely to issue a warning bark than those that are near unrelated prairie dogs. The prairie dogs that hear a warning bark are more likely to hide in their burrows than to remain above ground. However, the prairie dog that gives the warning bark is putting itself at increased risk of being identified and killed by the predator. Which of the following presents the most likely evolutionary explanation for the behaviors described?

(A) The warning bark changes the behavior of the related prairie dogs nearby, allowing the prairie dog’s family to have increased survival and reproductive success.

(B) The barking prairie dog chooses to warn other prairie dogs, leading to more prairie dogs living above ground.

(C) The barking prairie dog is alerting unrelated prairie dogs to the predator, so it is not giving any advantage to its own relatives.

(D) The failure of the individual to bark when surrounded by unrelated prairie dogs ensures survival of the individual.

4. How does natural selection affect the frequency of mutations?

1. Under conditions of high selection pressure, beneficial mutations occur more frequently
2. Natural selection does not affect the frequency of mutations
3. All mutations increase when selection pressure is high
4. When there is no selection pressure, mutations do not occur
5. Mutations occur less frequently when selection pressure is high

5. A population of squirrels is preyed upon by small hawks. Smaller squirrels escape into underground burrows; larger squirrels can fight of the hawks. After several generations, the squirrels in the area tend to be very large, or very small. What process is responsible for this outcome, and what would you predict would be its effect on allele frequencies?

1. Directional selection; the allele for small size is not favored over the allele for large size
2. Disruptive selection; the allele for large size is favored over the allele for small size
3. Stabilizing selection; the alleles for large and small size are found in equal frequency

 in the population

1. Disruptive selection; the allele for large and small size favored equally in the

 population

In an experiment, 100 mice were released into a field to which no other mice had access. Immediately after their release, a representative sample of mice was captured, their fur color was recorded, and they were returned to the field. After twenty years, a representative sample of mice was captured and the distribution of fur color was again recorded.



6. Which of the following could best explain the change in fur color distribution, as shown in the table above?

(A) The allele for black fur color is unstable, and over twenty years most of the black fur alleles mutated to become alleles for gray fur.

(B) The field was primarily composed of light- colored soil and little vegetation, affording gray mice protection from predators.

(C) Sexual selection led to increased mating frequency of black and brown versus gray and brown.

(D) The gray mice were harder to catch, and so were underrepresented in the twenty-year sample.