

- ~~42. Consider the statement "Evolution would cease in any population in which all mutations were prevented." This statement is~~
- ~~A. true, because mutations are the source of all genetic variation.~~
 - ~~B. false, because mutations have only a minimal effect in shifting allelic frequencies compared to the effects of natural selection.~~
 - ~~C. false, because altered expression of Homeotic genes (like the *Hox* gene) can create variation.~~
 - ~~D. true, because the rate of natural selection depends directly on the rate at which mutations occur.~~
 - ~~E. false, because some modes of natural selection maintain genetic variation.~~

~~TAKEN OUT~~

43. The temperature of Northern Canada has been progressively warming overtime. The polar bear population living there has been decreasing in size, and the population has been developing a lighter fur coat over successive generations. This is an example of
- A. stabilizing selection.
 - ☒ B. directional selection.
 - C. disruptive selection.
 - D. negative frequency-dependent selection.
 - E. positive frequency-dependent selection.

44. A balanced polymorphism may be maintained by all of the following **except**

- ☒ A. negative frequency-dependent selection.
- B. a spatially variable environment.
- ☒ C. positive frequency-dependent selection.
- D. disruptive selection.
- E. All of A, B, C and D maintain balanced polymorphisms.

45. Fish and salamanders that live in caves where it is completely dark do not have eyes, although it is thought that they evolved from ancestors that had eyes. Which of the following is the best explanation for this?

- A. Darkness caused mutations in the genes that control eye development, resulting in the eyes of these species being lost.
- B. These animals responded to the darkness by increasing their other senses (e.g. hearing) to compensate for not being able to see in the dark; these enhanced senses required more energy, and crowded out the eyes.
- C. These fish and salamanders are eyeless populations of fish and salamanders with eyes that do not live in caves.
- ☒ D. In a dark environment, individuals with smaller eyes save energy because eyes are energetically expensive to maintain. Those individuals with smallest eyes subsequently had the most energy to allocate to reproduction and passing on their genes in greater proportion to subsequent generations.
- ☒ E. In the absence of light, there was no selection for eyes, so eyes were slowly lost from the dark environment populations.

46. Which of the following scenarios regarding the mode of selection is **mismatched**?

- ☒ A. Extinct early ancestors of horses are smaller than modern horses—disruptive selection because the ancestor is small and the modern living descendent is large.
- B. Madagascar hissing cockroaches lives in a woodpile and experience heavy predation from lizards. The lizards are unable to eat the very largest adult cockroaches, and instead prey upon small and medium sized cockroaches—directional selection.
- C. As a poisonous morph of tree frogs becomes more abundant in the area, it is less likely to be eaten by snakes—positive frequency-dependent selection.
- D. A rare version of plant is visited by fewer pollinators; pollination is required for successful plant reproduction—positive frequency-dependent selection.
- E. None of A, B, C and D is mismatched.