

**Sample: Molecular Biology - Knowledge Check****Multiple Choice**

Type in the letter that represents your best answer to the corresponding question from the original final exam document.

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|-------|-------|-------|
| 1. B  | 13. B | 25. D |
| 2. A  | 14. A | 26. C |
| 3. D  | 15. C | 27. B |
| 4. B  | 16. A | 28. B |
| 5. B  | 17. B | 29. A |
| 6. D  | 18. B | 30. D |
| 7. D  | 19. B | 31. C |
| 8. C  | 20. C | 32. C |
| 9. E  | 21. A | 33. D |
| 10. C | 22. D | 34. C |
| 11. D | 23. C | 35. B |
| 12. D | 24. A |       |

**Short Answer**

Complete these answers in your own words. Follow instructions in the Final Examination document. Answer all questions according to the instructions. Number each question here according to its number in the Final Examination document provided by your instructor.



36. **Answer:** Under DDT spraying natural selection “screens” population for individuals with such genes’ alleles that provide resistance to the pesticide. Such insects will have a greater chance of reproducing and passing on that alleles. Among the survivors, the frequency of the resistant allele is higher than before spraying. Thus, repeated application of the insecticide will result in an increase in the frequency of the resistant allele until most of the population is resistant and the insecticide ceases to be effective.

After DDT abolition such selective pressure disappears and insecticide resistance becomes selectively neutral trait. Thus through genetic drift, resistant allele may become less common in population.

37. **Answer:** In complete dominance, one allele is expressed, while the other isn’t. Alternatively, some genes show incomplete dominance, in which the heterozygous phenotype is intermediate between that of either homozygote. In essence, incomplete dominance is a lack of dominance.

38. **Answer:** The formation of new species involves the evolution of reproductive barriers to the production of viable offspring. Among ways of speciation I’d like to define ecological and mutation-order speciation. Ecological speciation is the process of adaptation to different environments during which adaptive changes occurred via natural selection. These differences might cause individuals from different populations to avoid mating with one another, or hybrids exhibit reduced fitness if mating occurs. Thus, the populations cease exchanging genes, thereby diverging into separate species. Mutation-order speciation is defined as the process by which reproductive isolation evolve between populations as a result of the fixation of different advantageous mutations in separate populations experiencing similar selection pressures. In other words, different populations find different genetic solutions to the same selective problem.

39. **Answer:** Biome is a group of ecosystems that shares a similar environment of vegetation and fauna. Terrestrial biomes are grouped in forests, grasslands, mountains, deserts, and polar regions. Aquatic biomes are divided into sea and freshwater.

Among human activities which negatively impacted biomes I must admit the high concentrations of greenhouse gases (especially carbon dioxide) in atmosphere. So-called greenhouse effect may be driving the process of global climate change and as a consequence, biomes changes. The biggest producers of CO<sub>2</sub> are industry and motor transport that rely on



the burning of fossil fuels. Thus replacement them with clean alternative sources of energy (wind, nuclear, solar, hydroelectric) and solar energy or electricity for cars will improve atmosphere composition. Increasing of tree planting is a global improvement in the sequestration of carbon.

The continuing loss of forest in tropical regions has negative effects on the ability of the terrestrial ecosystem to regulate riverflow – deforestation increases flow during flooding and decreases it during dry periods. Deforestation can diminish the terrestrial ecosystem's capacity to hold and recycle nutrients, releasing large quantities of nitrate and other plant nutrients. So the only way to change this situation is to stop the forests cutting and to increase of tree planting

40. **Answer:** Carrying capacity is the size of population which can live in an environment with defined resources. Density independent factors can limit population size when population is big or small, it does not matter; density dependent factors limit population size only when it reaches to some size. To density dependent factors belong competition and predation because when population reaches to certain size level of resources decreased and take places competition for the food and other nutrients. To density independent factors may belongs some environmental or climate conditions that can affect the size of population.

41. **Answer:** When the grass is green – brown grasshoppers are more prominent, so tend to get eaten by birds and survive to reproduce less often than green grasshoppers do. Thus green grasshoppers become more common in population. But in a drought period the more advantageous trait is brown coloration, which allows the grasshoppers to have more offspring and becomes more common in the population.