Modern Evolutionary Theory

Modern evolutionary theory supports Darwin's concepts of variation and natural selection. It also includes the genetic basis of variations in individual organism and populations.

The genetic basis of variations is a result of **MUTATIONS** and **SEXUAL REPRODUCTION.** Mutations are random changes in the DNA, which usually occur when there is a deletion, substitution, or addition of a nitrogenous base, changing the base sequence of the DNA. If mutations occur in the *sex cells (sperm or egg)* then these mutations can be passed to the next generation. Mutations occurring in the body (somatic) cells cannot be passed on to future generations through sexual reproduction. Mutations generally occur spontaneously, but they can be brought on by exposure to radiation and/or certain chemicals.

Although most mutations can be potentially harmful to an organism, there are some changes that may be beneficial. The ***adaptive value*** of a gene mutation is dependent on the type of mutation and environment in which the organism interacts. **Adaptive mutations can help an organism survive in a changing environment.**

Please answer the following questions on separate paper:

1. Describe the differences between Darwin's theory of natural selection and modern evolutionary theory.
2. Discuss the two main causes of variations within a species.
3. Define mutation.
4. Describe how mutations can occur.
5. What is meant by adaptive value?
6. How can mutations benefit an organism?