**Unit 1 Related FRQ - Evolution**

**FRQ #1**

Biologists are interested in preserving the diversity of living organisms on the planet.

1. **Explain** THREE of the following processes of phenomena, using an appropriate example for each.

* Mutation
* Adaptive Radiation
* Polyploidy
* Population Bottlenecks
* Founder Effect
* Asexual Reproduction

1. For each process of phenomenon you selected in (a), **discuss** its impact on the diversity of life on Earth.

**FRQ #2**

Charles Darwin proposed that evolution by natural selection was the basis for the difference that he saw in similar organisms as he traveled and collected specimen in South America and on the Galapagos Islands.

a. Explain the theory of evolution by natural selection as presented by Darwin.

b. Each of the following relates to an aspect of evolution. Explain **two** of the following in terms of natural selection.

i. insecticide resistant insects or antibiotic

resistant bacteria.

ii. speciation and isolation

iii. behavior (imprinting, social behaviors, habituation), etc.

iv. heterozygote advantage

**FRQ #3**

Darwin is considered the “father of modern evolutionary biology”. Four of his contributions to the field of evolutionary biology are listed below:

* The non-constancy of species
* Branching evolution, which implies the common descent of all species
* Occurrence of gradual changes in species
* Natural selection as the mechanism for evolution

1. For EACH of the four contributions listed above, explain each idea. Provide examples or supporting evidence when possible.
2. Darwin’s ideas have been enhanced and modified as new knowledge and technologies have become available. **Discuss** how TWO of the following have deviated from, enhanced or modified biologists’ interpretation of Darwin’s original contributions.

* Hardy-Weinberg equilibrium
* Punctuated equilibrium
* Genetic engineering
* Sexual Selection

**FRQ #4**

**Evolution is one of the major unifying concepts of modern biology.**

a. Explain the mechanisms that lead to evolutionary change.

b. Describe how scientists use each of the following as evidence for evolution.

(1) Bacterial resistance

(2) Comparative biochemistry

(3) The fossil record

**FRQ #5**

In a laboratory population of diploid, sexually reproducing organisms a certain trait is determined by a single autosomal gene and is expressed as two phenotypes. A new population was created crossing 51 pure-breeding (homozygous) dominant individuals with 49 pure breeding (homozygous) recessive individuals. After four generations, the following results were obtained.

Number of Individuals

Total

100

280

320

400

480

Recessive

49

0

80

100

120

Dominant

51

280

240

300

360

Generation

1

2

3

4

5

1. Identify an organism that might have been used to perform this experiment, and explain why this organism is a good choice for conducting this experiment.
2. On the basis of the data, propose a hypothesis that explains the change in the phenotypic frequency between generation 1 and generation 3.
3. Is there evidence indicating whether or not this population is in Hardy-Weinberg equilibrium? Explain.