Evolution Exam 1.  Review material.  NOTE:  These are examples of the material that will be on the test.  Other material from the lectures will also likely be on the exam.

The structure of the exam will be primarily multiple choice for the material on Genetics. There will be some multiple choice questions on the other material as well, but there will also be some short answer and definitions as shown below.

1. Define evolution.

2. How does evolution unify the biological sciences?

3. Outline the principal features of Cuvier's catastrophism theory.  How did Darwin's observations on the Galapagos support or contradict catastrophism?

4. What was the importance and major features of the Modern Synthesis?  Describe one major modification of evolutionary theory that has taken place since the Synthesis.

5. Contrast phenotypic variation with genetic variation.

6. How did the Mendelian geneticists and the Naturalists differ in their views on variation among populations?

7. How did Malthus' writings influence Darwin?

8. What is the principle of Uniformitarianism in geology and how did this principle influence Darwin?  Give one of the geologists who was important for developing the concept of Uniformitarianism and approximately when he or she worked.

9. When Darwin published his theory of evolution by natural selection in 1859, evolution was very quickly widely accepted, but natural selection was not.  Why was evolution accepted, but not natural selection?

10. Discuss the hereditary ideas of blending, pangenesis, and germplasm theory.

11. Differentiate between evolution and natural selection.

12. A sample from a population of butterflies is found to have the following numbers of each genotype:  \( AA = 35; AA' = 33; A'A' = 32. \) Calculate the allele frequencies and the genotype frequencies expected under Hardy-Weinberg equilibrium.  Is this population at Hardy-Weinberg equilibrium?  Why or why not?

13. How did Cuvier demonstrate that extinction had occurred?  Why was extinction a problem for the then-prevalent belief of "special creation"?

14. What were the main features of Lamarck's evolutionary theory?
15. Define:
   Genetic recombination
   Natural Theology
   Blending theory of inheritance
   heterozygous
   haplotype
   Hardy-Weinberg equilibrium
   Inheritance of acquired characteristics

16. Place the following events in chronological order, from the earliest to the latest.

   Lamarck publishes his evolutionary ideas
   Steno shows that the “Tongue-stones of Malta” are actually fossilized shark’s teeth.
   Darwin sails on the Beagle
   Cuvier shows that extinction has occurred.
   Ray publishes on Natural Theology

Genetics:
Understand how meiosis and sexual reproduction functions to generate genetic variability.

Know the following terms:  gene, allele, dominant, recessive, heterozygous, homozygous, recombination, monohybrid cross, dihybrid cross, phenotype, genotype, testcross, incomplete dominance, codominance, epistasis, pleiotrophy, quantitative characters, discrete characters, polygenic inheritance.

Be able to determine gamete genotypes given the parental diploid genotype.

Be able to calculate (for both monohybrid and dihybrid crosses) the expected frequencies of genotypes and phenotypes using a Punnett Square.

Be able to recognize the patterns (ratios) of phenotypes produced in monohybrid and dihybrid crosses in cases of dominant/recessive alleles, incomplete dominance, epistasis, and additive polygenic inheritance. In other words, if given the data on observed phenotypes, be able to determine which of the above genetic systems is controlling the phenotypes.