

Instructions:

1. Answer each of the following questions.
2. There is one correct answer per question and each correct answer is worth 2 points (total = 20 points).

1. In “DNA fingerprinting” individual persons are usually identified based on unique _____ that have been generated by _____.
 - a. genes, radiation
 - b. alleles, unequal crossing over
 - c. proteins, nonsynonymous mutations
 - d. monosomies, mistakes during meiosis
 - e. sock colors, improper separation of darks and whites when doing laundry
2. SNPs are
 - a. Silent Nuclear Polymorphisms
 - b. Sequenced Natural Selection Phenotypes
 - c. Sequenced Nonsense Polymerases
 - d. Single Nuclear Pedigrees
 - e. Single Nucleotide Polymorphisms
3. Which of the following is an example of an evolutionary change (as defined in Bio 352)?
 - a. On one of the Galapagos islands, researchers observed an increase in bird beak size over only a few generations. Beak size is controlled by 3 major genes.
 - b. During flu season each year, different strains (genotypes) usually replace the strains from the previous year.
 - c. Human life span has increased over the past 1000 years, due entirely to better nutrition and medical advances
 - d. A and B only
 - e. A, B and C
4. Ancient humans (> 7000 years ago) made which of the following contributions to our understanding of genetics?
 - a. discovery of artificial selection and the basic principles of heredity
 - b. establish the basic rules of inheritance using controlled breeding experiments with pea plants
 - c. discovery that cells are the basic building blocks of life
 - d. a basic appreciation of human embryology, and discovery of germ cells
 - e. none of the above
5. The box at the right shows an example of a single
 - a. synonymous mutation
 - b. insertion mutation
 - c. inversion mutation
 - d. deletion mutation
 - e. duplication mutation

AAGACAGAGCGG...	Generation 1
↓	
AAACAGAGCGGG...	Generation 2
6. Bees and wasps have “X0” systems of sex determination. Which of the following is true in these organisms?
 - a. Individual bees can switch between male and female within their lifetime, as dictated by natural selection.
 - b. Females are heterogametic.
 - c. Males do not have a Y chromosome.
 - d. There is no male phenotype in these organisms.
 - e. Sex determination has no genetic basis.

7. In a protein-coding gene, why do some mutations have no effect on the polypeptide or the phenotype?
- The genetic code is redundant.
 - Only insertions and deletions can affect the phenotype, other types of mutations do not.
 - Approximately 33% of single base pair frame shift mutations do not affect downstream codons.
 - Only transition mutations affect the phenotype.
 - No correct answer because ALL mutations affect the phenotype.
8. If a human inherits two X chromosomes and one Y chromosome, this person would be
- male
 - female
 - both male and female
 - irrelevant, because this mutation does not occur in humans.
 - a duck
9. Which of the following are FALSE regarding polymorphisms?
- Insertion mutations can lead to polymorphism.
 - A polymorphic population may someday become monomorphic.
 - A monomorphic population may someday become polymorphic.
 - A population can be polymorphic for a base pair position even though all individuals have the same phenotype.
 - Polymorphisms are rare in natural populations.
10. A particular *Drosophila* male has copy of one chromosome #2 with normal gene order, and one copy of chromosome #2 with a paracentric inversion. In the section where the inversion is, a crossover between chromatids is normally expected to occur about 0.1% of the time. How often will recombinants be recovered in this particular male's offspring?
- 100% of the time
 - 0.1% of the time
 - 0.05% of the time
 - 0.01% of the time
 - never