

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. Before the discovery of DNA by Watson and Crick,
 - a. The genetic processes of transcription and translation were not understood.
 - b. The selective breeding and domestication of animals was not possible.
 - c. Scientists and philosophers could not distinguish between germ cells and somatic cells.
 - d. The basic principles of inheritance and segregation were undiscovered.
 - e. Evolution could not occur.
2. Which of the following would be the best model organism for studying the principles of Mendelian inheritance?
 - a. a colony of elephants in a zoo
 - b. a banana tree, which reproduces through vegetative (clonal) offshoots
 - c. a small freshwater crustacean with high reproductive output
 - d. an endangered species of panda bear in the wild
 - e. a wild stand of California redwood trees
3. Crossovers ...
 - a. typically take place between homologous parental chromatids.
 - b. can lead to recombination within genes.
 - c. are similar to mutations, because both can produce new alleles.
 - d. A and B only
 - e. A, B and C
4. The monohybrid cross begins with
 - a. crossing heterozygote hybrids with each other
 - b. crossing 1) a heterozygous individual with 2) a homozygous individuals with the opposite phenotype
 - c. crossing a mutant phenotype with its own heterozygous offspring
 - d. crossing true-breeding lines with different phenotypes
 - e. none of the above
5. The central dogma
 - a. was generally accepted until the discovery of DNA.
 - b. states that genetic information flow in one direction, from genotype to phenotype.
 - c. motivated the Greeks to consider how heredity works.
 - d. states that the genetic code is redundant.
 - e. states that the 10,000+ species of dogs we have today all derived from one (central) evolutionary stock.
6. For any particular base pair position, a silent mutation during gamete production occurs (approximately) once per
 - a. generation.
 - b. one hundred generations.
 - c. one thousand generations.
 - d. one billion generations.
 - e. one hundred trillion generations.

7. An example of a tandem duplication mutation is
- the sickle cell anemia form of the beta-globin gene
 - red-green color blindness
 - Down Syndrome
 - origin of the Y chromosome in mammals from an ancient X chromosome
 - none of the above
8. Every 3 _____ corresponds to one _____.
- base pairs, chromatid
 - codons, protein
 - proteins, codon
 - mutations, codon
 - base pairs, amino acid

9. The box at the right shows an example of a(n)

- insertion mutation
- inversion mutation
- inclusion mutation
- deletion mutation
- duplication mutation

AAGACAGAGCGG...	Generation 1
↓	
AAGATCAGAGCG...	Generation 2

10. Coat color in guinea pigs is caused by a single gene. A homozygous white guinea pig is crossed with a homozygous brown guinea pig. Which of the following will be true? (Assume that no mutations occur in the offspring.)
- All of the offspring will be heterozygous.
 - If white is dominant to brown, offspring color will occur in a 3:1 ratio of white : brown.
 - All of the offspring will be haploid.
 - A and B only
 - A, B and C all must be true