

General Genetics Exam III 15 questions

Question 1/10 pts

Which of the following is not a Mendelian law?

- a) Recessive characters, which are masked in the F1 from a cross between two pure-breeding strains, reappear in a specific proportion in the F2.
- b) The factors for different traits assort independently of one another.
- c) The farther apart two factors are on the same linkage group, the more likely it is that epistasis will occur between them.
- d) None (they are all Mendelian laws).

Question 2/10 pts

In pea seeds, smooth (S) is dominant to wrinkled (s), and yellow (Y) is dominant to green (y). If a plant that is heterozygous for both traits is allowed to self-fertilize, how many of the offspring would also be heterozygous for both traits?

- a) 9/16
- b) 4/16
- c) 3/16
- d) 2/16
- e) 1/16

Question 3/10 pts

In Mendel's experiment, what phenotypic ratio would you expect as a result of a test cross between a dihybrid organism and one that is homozygous recessive for alleles at two independent loci (e.g., the smooth/wrinkled locus and the yellow/green locus)?

- a) 3:1
- b) 1:2:1
- c) 1:1:1:1
- d) 9:3:3:1
- e) 9:4:2:1

Question 4/10 pts

Morgan's analysis of a white-eyed male *Drosophila* mutation helped explain

- a) autosomal dominance.
- b) mutation is random.
- c) crossing over.
- d) independent assortment.
- e) X-linked inheritance.

Question 5/10 pts

The Human ABO blood group system has

- a) 3 alleles, 3 genotypes, and 3 phenotypes.
- b) 3 alleles, 4 genotypes, and 6 phenotypes.
- c) 3 alleles, 4 genotypes and 4 phenotypes.
- d) 3 alleles, 6 genotypes, and 6 phenotypes.
- e) 3 alleles, 6 genotypes, and 4 phenotypes.

Question 6/ 10 pts

A blood type A person could receive a transfusion from someone with type

- a) A only.
- b) AB only.
- c) O only
- d) A or O.
- e) A, AB, or O.

Question 7/10 pts

As discussed in class, AB individuals have ____ types of blood glycolipid antigens.

- a) 0
- b) 1 (A or B)
- c) 2 (A and B)
- d) 3 (A, B, and H; since some H antigens remain unmodified)

Question 8/10 pts

Which mode of inheritance results in the phenotype of a heterozygote being indistinguishable from that of an organism homozygous for the dominant allele?

- a) Complete dominance
- b) Incomplete dominance
- c) Codominance
- d) Epistasis

Question 9/10 pts

What nucleotide sequences contain 7-100 bp repeats and are not distributed widely in humans? (Abbreviation OK)

Question 10/10 pts

Name a real-life example (not the definition) of a quantitative trait.

Question 11/10 pts

In U.S., O+ is the most common blood type. The “+” indicates the presence of

Question 12/10 pts

Define “Epistasis”.

Question 13/40 pts

In doodlewags, the dominant allele *S* causes a solid coat color; the recessive allele *s* results in white spots on a colored background. The black coat color allele *B* is dominant to the brown allele *b*, but these genes are expressed only in the genotype *a/a*. Individuals that are *A/-* are yellow regardless of *B* alleles. Six pups are produced in a mating between a solid yellow male and a solid brown female. Their phenotypes are 2 solid black, 1 spotted yellow, 1 spotted black, and 2 solid brown.

Taking into account the pup phenotypes, you have deduced the genotypes of the parents:

Male parent (solid yellow) = *Ss Aa Bb*

Female parent (solid brown) = *Ss aa bb*

- a) Provide the genotypes of the pups (use - for alleles that cannot be determined).

Solid black pups = *S- aa Bb*

Spotted yellow pup = *ss Aa -b*

Spotted black pup = *S- aa Bb*

Solid brown pups = *S- aa bb*

- b) What is the probability that the next pup will be solid brown?

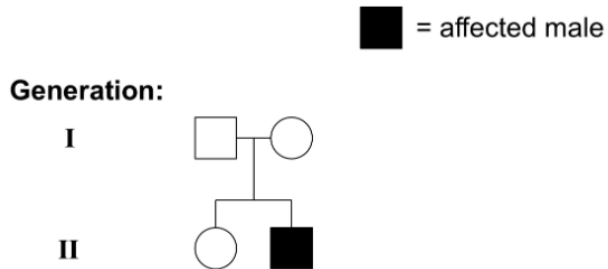
Question 14/30 pts

A woman (blood group A) marries a man (group B). They each have a father of group O. What is the probability that:

a) the first child will be of group O?

b) the first child will be a son of group AB and the second child a son of group B?

Question 15/48 pts



For each mode of inheritance, using the logic of our class exercise, state (yes/no) if transmission of the trait can be accounted for.

a) X-linked recessive no

b) X-linked dominant no

c) Y-linked yes