Final Exam: Genetics Review

Modified True/False
*Indicate whether the sentence or statement is true or false. If false, change the identified word or phrase to make the sentence or statement true.*

___ 1. When Mendel crossed purebred short plants with purebred tall plants, all of the offspring were _short._

___ 2. A hybrid is the offspring of parents that have _different_ alleles for a trait.

___ 3. A pea plant that is _heterozygous_ for tall stems has the alleles Tt.

___ 4. A Punnett square shows all the possible combinations of alleles in _parents._

___ 5. An organism’s physical appearance is its _phenotype._

___ 6. The sex cells produced by meiosis have _twice_ the number of chromosomes as the parent cells.

___ 7. Chromosomes carry _genes_ from parents to offspring.

Multiple Choice
*Identify the letter of the choice that best completes the statement or answers the question.*

___ 8. What did Gregor Mendel do to study different characteristics in his genetics experiments?
   a. He studied only asexual animals.
   b. He studied only self-pollinating plants.
   c. He cross-pollinated plants.
   d. He cross-pollinated animals.
9. In Mendel’s experiments, what proportion of the plants in the F₂ generation had a trait that had been absent in the F₁ generation?
   a. none
   b. one fourth
   c. half
   d. three fourths

10. Factors that control traits are called
   a. genes.
   b. purebreds.
   c. recessives.
   d. parents.

11. Scientists call an organism that has two different alleles for a trait a
   a. hybrid.
   b. trait.
   c. purebred.
   d. factor.

12. What does the notation TT mean to geneticists?
   a. two dominant alleles
   b. two recessive alleles
   c. at least one dominant allele
   d. one dominant and one recessive allele

13. What does the notation Tt mean to geneticists?
   a. two dominant alleles
   b. two recessive alleles
   c. at least one recessive allele
   d. one dominant allele and one recessive allele

14. What is probability?
   a. the actual results from a series of events
   b. the likelihood that a particular event will occur
   c. the way the results of one event affect the next event
   d. the number of times a coin lands heads up

15. What did Mendel predict was the probability of producing a tall plant from a genetic cross of two hybrid tall plants?
   a. one in four
   b. two in four
   c. three in four
   d. four in four

16. What does a Punnett square show?
   a. all the possible outcomes of a genetic cross
   b. only the dominant alleles in a genetic cross
   c. only the recessive alleles in a genetic cross
   d. all of Mendel’s discoveries about genetic crosses
17. If a homozygous black guinea pig \((BB)\) is crossed with a homozygous white guinea pig \((bb)\), what is the probability that an offspring will have black fur?
   a. 25 percent
   b. 50 percent
   c. 75 percent
   d. 100 percent

18. An organism’s physical appearance is its
   a. genotype.
   b. phenotype.
   c. codominance.
   d. heterozygous.

19. What does codominance mean in genetics?
   a. Both alleles are dominant.
   b. Both alleles are recessive.
   c. The alleles are neither dominant nor recessive.
   d. Each allele is both dominant and recessive.

20. What is a mutation?
   a. any change that is harmful to an organism
   b. any change in a gene or chromosome
   c. any change that is helpful to an organism
   d. any change in the phenotype of a cell

21. Which term refers to physical characteristics that are studied in genetics?
   a. traits
   b. offspring
   c. generations
   d. hybrids

22. The different forms of a gene are called
   a. alleles.
   b. factors.
   c. masks.
   d. traits.

23. Where does protein synthesis take place?
   a. in the ribosomes in the nucleus of the cell
   b. on the ribosomes in the cytoplasm of the cell
   c. in the chromosomes in the nucleus of the cell
   d. on the chromosomes in the cytoplasm of the cell

24. What does the notation \(tt\) mean to geneticists?
   a. two dominant alleles
   b. two recessive alleles
   c. at least one dominant allele
   d. one dominant and one recessive allele
25. An organism’s genotype is its
   a. genetic makeup
   b. feather color
   c. physical appearance
   d. stem height

26. An organism that has two identical alleles for a trait is
   a. codominant.
   b. tall.
   c. homozygous.
   d. heterozygous.

27. A heterozygous organism has
   a. three different alleles for a trait.
   b. two identical alleles for a trait.
   c. only one allele for a trait.
   d. two different alleles for a trait.

Completion

Complete each sentence or statement.

28. The offspring of a ____________________ plant will always have the same alleles for a trait as the parent.

29. Mendel used ____________________-pollination to produce purebred plants.

30. If a ____________________ allele is present, its trait will appear in the organism.

31. In pea plants, the tall-stem allele and the short-stem allele are different forms of the same
    ____________________.

32. If $D$ represents the dominant allele of a gene, then ____________________ represents the recessive allele.

33. Mendel used the principles of ____________________ to predict what percent of offspring would show a
    particular trait.

34. If each of ten events is equally likely to occur, the probability of each individual event occurring is
    ____________________ percent.

35. A chart used to predict results of genetic crosses is known as a(n) ____________________.

36. In a cross between two hybrid $Tt$ pea plants, ____________________ percent of the offspring will be $Tt$.

37. An organism that has two dominant or two recessive alleles is said to be ____________________ for that
    trait.

38. Alleles that are neither dominant nor recessive produce an inheritance pattern known as
    ____________________.
39. Genes are located on structures called ________________.

40. If all of the sex cells of an organism have the \( T \) allele, the genotype of that organism must be ________________.
Final Exam: Genetics Review
Answer Section

MODIFIED TRUE/FALSE

1. F, tall
2. T
3. T
4. F, offspring
5. T
6. F, half
7. T

MULTIPLE CHOICE

8. C
9. B
10. A
11. A
12. A
13. D
14. B
15. C
16. A
17. D
18. B
19. C
20. B
21. A
22. A
23. B
24. B
25. A
26. C
27. D

COMPLETION

28. purebred
29. self
30. dominant
31. gene
32. d
33. probability
34. 10
35. Punnett square
36. 50
37. homozygous
38. codominance
39. chromosomes
40. TT