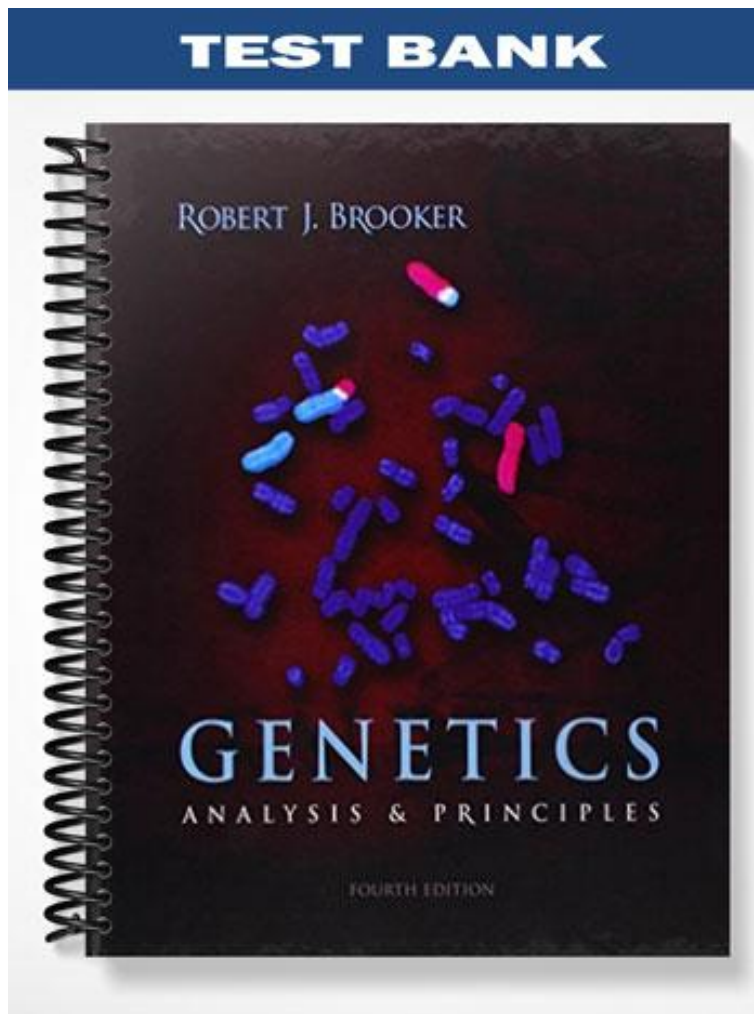ROBERT J. BROOKER

GENETICS

ANALYSIS & PRINCIPLES

FOURTH EDITION

Chapter 02 Mendelian Inheritance

Student: _____

1. The theory of pangenesis was first proposed by _____.

   A. Aristotle
   B. Galen
   C. Mendel
   D. Hippocrates
   E. None of the above

2. Which of the following is correct regarding the blending theory of inheritance?

   A. It believed that hereditary traits blended from one generation to the next
   B. It was possible for the blending to change the trait from one generation to the next
   C. It was supported by early research by Joseph Kölreuter
   D. It was the prevailing theory of inheritance prior to Mendel
   E. All of the answers are correct

3. Mendel's work was rediscoved in 1900 by which of the following individual(s)?

   A. Carl Correns
   B. Erich von Tschermak
   C. Hugh de Vries
   D. All of the answers are correct

4. Mendel's work on inheritance had an immediate influence on the scientific community and theories of inheritance.

   True   False

5. Which of the following characteristics made the pea plant *Pisum sativum* an ideal organism for Mendel's studies?

   A. It has the ability to self-fertilize
   B. It was easy to cross-fertilize one plant with another
   C. It has easily identifiable traits
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6. The stamen represents the _____ portion of the plant, while the ovules represent the _____ portion of the plant.

   A. Female ; male
   B. Male ; female
   C. Female ; female
   D. Male ; male

7. Differences in plant flower color or plant height are called a variant of a trait.

   True   False

8. Which of the following traits was not studied by Mendel?

   A. Flower color
   B. Seed color
   C. Pod color
   D. Pollen color
   E. Plant height

9. When studying a genetic cross, the second generation following the initial cross is identified by which of the following?

   A. P generation
   B. F_1 generation
   C. F_2 generation
   D. F_3 generation
   E. P_3 generation

10. A true breeding line of green pod pea plants is crossed with a true-breeding line of yellow pod plants. All of their offspring have green pods. From this information, it can be stated that the green color is _____ to the yellow color.

    A. Recessive
    B. Dominant
    C. Subservient
    D. Blended
    E. None of the answers are correct

11. Mendel's work with monohybrid crosses provided proof of which of the following?

    A. Blending theory of inheritance
    B. Particulate theory of inheritance
    C. Chromosomal theory of inheritance
    D. Pangenesis
    E. None of the answers are correct

12. Mendel's work with single-factor crosses resulted in the development of which of the following?

    A. Law of segregation
    B. Law of independent assortment
    C. Theory of natural selection
    D. Law of biological evolution
    E. All of the answers are correct

13. When Mendel crossed two plants that were heterozygous for a single trait, what was the phenotypic ratio of their offspring?

    A. 1:2:1
    B. 9:3:3:1
    C. 3:1
    D. 7:4
    E. Varied depending on the trait

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15. An individual who has two identical alleles for a trait is said to be _____.

    A. Homozygous
    B. Heterozygous
    C. Isozygous
    D. A variant

16. The genetic composition of an individual is called its _____.

    A. Phenotype
    B. Genotype
    C. Hybrid
    D. Dominance
    E. None of the answers are correct

17. The observable characteristics of an organism are called its _____.

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    B. Genotype
    C. Dominance
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    E. None of the answers are correct

18. An individual who has two different alleles for a trait is called _____.

    A. Haploid
    B. Homozygous
    C. Heterozygous
    D. Isozygous
    E. True-breeding

19. In a Punnett square diagram, the outside of the box represents the _____.

    A. Diploid offspring
    B. Haploid offspring
    C. Diploid gametes
    D. Haploid gametes

20. Mendel's work with two-factor (dihybrid) crosses led directly to which of the following?

    A. Chromosomal theory of inheritance
    B. Particulate theory of inheritance
    C. Law of segregation
    D. Law of independent assortment
    E. Theory of biological evolution

21. In a dihybrid cross using Mendelian inheritance, if both parents are heterozygous for both traits, what will be the phenotypic ratio of their offspring?

    A. 3:1
    B. 1:2:1
    C. 1:1
    D. 9:3:3:1

22. If a Punnett square is used to visualize a three-factor cross, how many boxes would be inside of the square?

A. 3
B. 8
C. 48
D. 64
E. Can't be determined

23. In a dihybrid testcross, the individual being examined is crossed to which of the following?

A. An individual who is homozygous dominant for one trait but not the other
B. Self-fertilized
C. An individual who is homozygous recessive for both traits
D. An individual who is heterozygous for both traits

24. In humans, patterns of inheritance are often studied using which of the following?

A. Dihybrid testcrosses
B. Production of true-breeding lines
C. Pedigree analysis
D. Self-fertilization
E. None of the answers are correct

25. The chance that a future event will occur is called _____.

A. Probability
B. Goodness of fit
C. Degrees of freedom
D. Random selection
E. All of the answers are correct

26. A coin is flipped 100 times, with a result of 53 heads and 47 tails. The deviation between the observed numbers and the expected 50-50 results is called _____.

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D. Random sampling error
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27. Which of the following would be used to determine the probability of three independent events in order?

   A. Sum rule
   B. Product rule
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28. A couple would like to know what the probability is that out of five children, three will be girls. This is solved using which of the following?

   A. Sum rule
   B. Product rule
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29. The probability that one event or another will occur is based on which of the following?

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30. Using Mendel's flower color (purple is dominant, white is recessive), if a two heterozygous plants are crossed, what is the probability that the first two offspring will have purple flowers?

   A. 1/2
   B. 1/4
   C. 6/4
   D. 9/16
   E. 1/16

31. The Chi-square test is used to prove that a hypothesis is correct.

   True   False

32. In a genetic cross, there are *n* classes of data. What would the degrees of freedom be for a chi-square test on this data?

    A. n
    B. n + 1
    C. n - 1
    D. 2n + 1
    E. x(n) where x equals the number of individuals in the cross

33. The likelihood that the observation variation from the expected is due to random chance is called the _____.

    A. P value
    B. Goodness of fit
    C. Degrees of freedom
    D. Empirical approach
    E. None of the answers are correct

34. In the biological sciences, the hypothesis is usually rejected if the P value is _____.

    A. Greater than 1
    B. Less than 0.30
    C. Less than 0.95
    D. Less than 0.05
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35. _____ is the belief that seeds are produced by all parts of the body and transmitted to the next generation.

    A. Hippocrates
    B. Pangenesis
    C. Blending
    D. Particulate theory
    E. Homunculus

36. Mendel had experience in the fields of _____ and _____.

    A. Physics, mathematics
    B. English
    C. Psychology
    D. Biology
    E. None of the above

37. If two individuals with different distinct characteristics are mated, their offspring is called a
_____.

A. strain
B. true-breeding line
C. gamete
D. cross
E. hybrid

38. If over several generations a trait does not vary in a group of organisms, that group can be called
a _____.

A. dihybrid
B. hybrid
C. true-breeding line
D. variant
E. cross-fertilized line

39. A cross in which a research investigates the patterns of inheritance of a single trait is called a
_____.

A. monohybrid cross
B. dihybrid cross
C. two-factor cross
D. cross-fertilization
E. self-fertilization

40. A(an) _____ is a variation of a gene.

A. trait
B. character
C. gamete
D. allele
E. variant

41. The _____ refers to the genetic composition of an individual.

A. character
B. genotype
C. phenotype
D. dominant trait
E. recessive trait

42. The _____ is the observable characteristics of an individual.

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43. In a genetic cross, the _____ represent offspring with genetic combinations that were not found in the parental lines.

    A. P generation
    B. non-recombinates
    C. parentals
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    E. none of the above

44. The study of family trees in humans is called a _____ analysis.

    A. pedigree
    B. monohybrid
    C. dihybrid
    D. statistical
    E. probability

45. Statistical analysis determines the _____ between observed data and what was expected from the original hypothesis.

    A. testcross
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Chapter 02 Mendelian Inheritance Key

1. The theory of pangenesis was first proposed by _____.

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    Bloom's Level: 1. Remember
    Learning Outcome: 02.01: Recognize the importance of Mendel's work to the study of inheritance.
    Section: 02.01
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2. Which of the following is correct regarding the blending theory of inheritance?

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4. Mendel's work on inheritance had an immediate influence on the scientific community and theories of inheritance.

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Chapter 02 Mendelian Inheritance Summary

Category	# of Questions
Bloom's Level: 1. Remember	4
Bloom's Level: 2. Understand	23
Bloom's Level: 3. Apply	7
Bloom's Level: 4. Analyze	6
Bloom's Level: 5. Evaluate	4
Bloom's Level: 6. Create	1
Learning Outcome: 02.01: Recognize the importance of Mendel's work to the study of inheritance.	15
Learning Outcome: 02.02: Construct Punnett square diagrams of one- and two-factor crosses to predict phenotypic and genotypic ratios of offspring.	17
Learning Outcome: 02.03: Analyze pedigree diagrams for patterns of inheritance.	2
Learning Outcome: 02.04: Apply the rules of probability (sum, product, and binomial expansion) to the study of patterns of inheritance.	7
Learning Outcome: 02.05: Use the chi square test to examine the validity of a hypothesis.	4
Section: 02.01	34
Section: 02.02	11
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