Bio12-Q2W1-Qs.Bank

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

____ 1. The tall allele, *T*, is dominant to the short allele, *t*, in Mendel's pea plants. You examine a pea plant which exhibits a phenotype of tallness. What is its genotype?
a. *Tt*
b. *TT*
c. *tt*
d. It cannot be determined from the information given.

____ 2. You perform a monohybrid cross between two true-breeding strains of organisms with genotypes *AA* and *aa*. What do you expect the ratio of genotypes to be in the F1 generation?
a. 3:1
b. 9:3:3:1
c. 1:2:1
d. 2:2

____ 3. You are given a sample of unknown human cells to examine. Analysis of their nuclei revealed that each cell contains 23 chromosomes. What type of cells might these be?
a. Ova
b. Skin cells
c. Liver cells
d. None of the above

____ 4. During which stage of cell division does the number of chromosomes decrease from diploid ($2n$) to haploid (n)?
a. Prophase I
b. Meiosis I
c. Meiosis II
d. Mitosis

____ 5. Which of the following was concluded by Mendel as a result of his genetic research?
a. Genes for different traits are inherited together in pairs.
b. Polyploidy can be beneficial in agriculture.
c. Genes for different traits are inherited independently of one another.
d. Meiosis occurs in two steps, meiosis I and meiosis II.

____ 6. Nondisjunction can result in the formation of a zygote with three copies of a chromosome. What is this condition called?
a. Triploidy
b. Trisomy
c. Turner's syndrome
d. None of the above

____ 7. After performing a monohybrid cross, it is important to analyze the results with a Punnett square. Each box of a Punnett square represents —
a. a possible phenotype.
b. a possible genotype.
c. one individual.
d. two possible genotypes.

____ 8. During which phase of meiosis do homologous chromosomes align as tetrads in the middle of the spindle?
a. Prophase I
b. Prophase II
c. Metaphase I
d. Metaphase II

____ 9. A pea is heterozygous for a given trait. Which of the following is NOT true?
a. The pea resembles at least one parent for this trait.
b. The pea has the dominant phenotype.
c. The pea has two different alleles.
d. The pea cannot resemble both parents.

____ 10. Pairs of chromosomes having genes for the same traits are said to be —
a. homologous.
b. analogous.
c. homozygous.
d. None of the above

____ 11. When an area of a chromatid is exchanged with the matching area on a chromatid of its homologous chromosome, _____ occurs.
a. crossing over
b. mutagenesis
c. hybridization
d. fertilization

____ 12. Crossing over results in a _____.
a. female genotype
b. male genotype
c. genetic recombination
d. phenotype replication

____ 13. The _____ produced by each parent are shown along the sides of a Punnett square.
a. zygotes
b. offspring
c. gametes
d. hybrids

____ 14. A useful device for predicting the possible offspring of crosses between different genotypes is the _____.
a. law of dominance
b. law of independent assortment
c. Punnett square
d. testcross

____ 15. Which of the following describes an organism that has the genotype Bb?
a. homozygous
b. heterozygous
c. inbreed
d. all of these

____ 16. Mendel's law of segregation states that during meiosis, the factors that control each trait separate, and only _____ from each pair is/are passed to the offspring.
a. one factor
b. the dominant trait
c. two factors
d. the recessive trait

____ 17. The law of independent assortment states that the inheritance of alleles for one trait is not affected by the inheritance of alleles for a different trait if the genes for the traits are on _____.
a. separate chromosomes
b. homologous chromosomes
c. the same chromosome
d. homozygous chromosomes

____ 18. The passing on of traits from parents to offspring is called _____.
a. genetics
b. heredity
c. inbreeding
d. gene splicing

____ 19. The statement: "In meiosis, the way in which a chromosome pair separates does not affect the way other pairs separate," is another way of expressing Mendel's law of _____.
a. dominance
b. first filial generations
c. independent assortment
d. Punnett squares

____ 20. Cells containing two alleles for each trait are described as _____.
a. haploid
b. gametes
c. diploid
d. homozygous

____ 21. The gamete that contains genes contributed only by the mother is _____.
a. the sperm
b. an egg
c. a zygote
d. dominant

____ 22. Pollination can best be described as _____.
a. the fusing of the egg nucleus with the pollen nucleus
b. the transfer of the male pollen grain to the female organ
c. the formation of male and female sex cells
d. the type of cell division that produces diploid gametes

____ 23. A couple has two children, both of whom are boys. What is the chance that the parents' next child will be a boy?
a. 0%
b. 50%
c. 25%
d. 75%

____ 24. A dog's phenotype can be determined by _____.
a. looking at the dog's parents

b. examining the dog's chromosomes
c. mating the dog and examining its offspring
d. looking at the dog

____ 25. A female guinea pig homozygous dominant for black fur color is mated with a male homozygous for white fur color. In a litter of eight offspring, there would probably be _____.
a. 8 black guinea pigs
b. 4 black and 4 white guinea pigs
c. 2 black, 4 gray, and 2 white guinea pigs
d. 8 white guinea pigs

____ 26. The numbers in Figure 10-1 represent the chromosome number found in each of the dog cells shown. The processes that are occurring at A and B are _____.

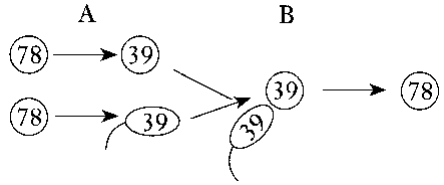


Figure 10-1

a. mitosis and fertilization
b. meiosis and fertilization
c. mitosis and pollination
d. meiosis and pollination

____ 27. Genes located on homologous chromosomes may have alternate forms that control different forms of a trait. These alternate forms of a gene are called _____.
a. alleles
b. centromeres
c. phenotypes
d. gametes

____ 28. A white mouse whose parents are both white produces only brown offspring when mated with a brown mouse. The white mouse is most probably _____.
a. homozygous recessive
b. heterozygous
c. homozygous dominant
d. haploid

____ 29. In chickens, rose comb (R) is dominant to single comb (r). A homozygous rose-combed rooster is mated with a single-combed hen. All of the chicks in the F_1 generation were kept together as a group for several years. They were allowed to mate only within their own group. What is the expected phenotype of the F_2 chicks?
a. 100% rose comb
b. 75% rose comb and 25% single comb
c. 100% single comb
d. 50% rose comb and 50% single comb

____ 30. In mink, brown fur color is dominant to silver-blue fur color. If a homozygous brown mink is mated with a silver-blue mink and 8 offspring are produced, how many would be expected to be silver-blue?
a. 0
b. 3
c. 6
d. 8

____ 31. The diagram in Figure 10-2 shows a diploid cell with two homologous pairs of chromosomes. Due to independent assortment, the possible allelic combinations that could be found in gametes produced by the meiotic division of this cell are _____.

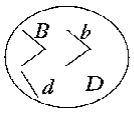


Figure 10-2

a. Bb, Dd, BB, and DD
b. BD, bD, Bd, and bd
c. BbDd and BDbd
d. Bd and bD only

____ 32. Using Figure 10-3, which process would result in the formation of chromosome C from chromosomes A and B?

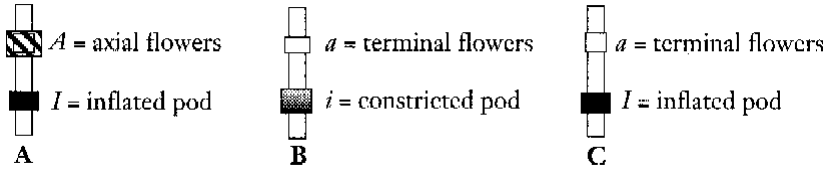


Figure 10-3

a. asexual reproduction
b. independent assortment
c. crossing over
d. segregation

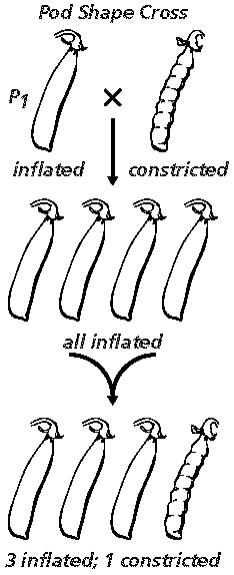


Figure 10-5

____ 33. According to Figure 10-5, the constricted pod shape is _____.
a. dominant
b. recessive
c. segregated
d. hybrid

____ 34. What is the genotype of generation 1 in Figure 10-5?
a. II
b. Ii
c. ii
d. I

____ 35. What is the phenotype of generation 1 in Figure 10-5?
a. II
b. Ii
c. inflated
d. constricted

____ 36. What is the genotype in the bottom left-hand quadrant in Figure 10-6?

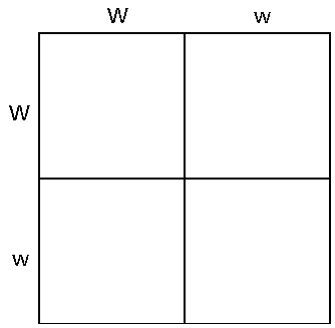


Figure 10-6

a. WW
b. Ww
c. wW
d. ww

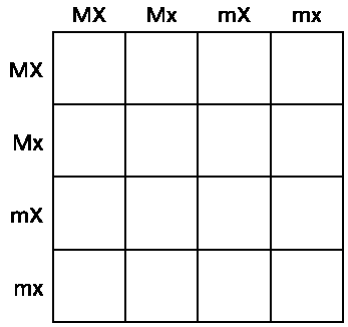


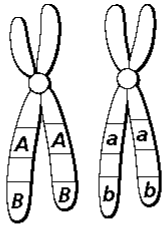
Figure 10-7

____ 37. How should the top row of Figure 10-7 read?

a. MMXX, MMXx, MmXX, MmXx
b. MMxX, MMxx, MmxX, Mmxx
c. mMXX, mMXx, mmXX, mmXx
d. mMxX, mMxx, mmxX, mmxx

____ 38. What fraction of this cross will be recessive for both traits?

a. 1/2
b. 1/4
c. 1/8
d. 1/16



Homologous chromosomes

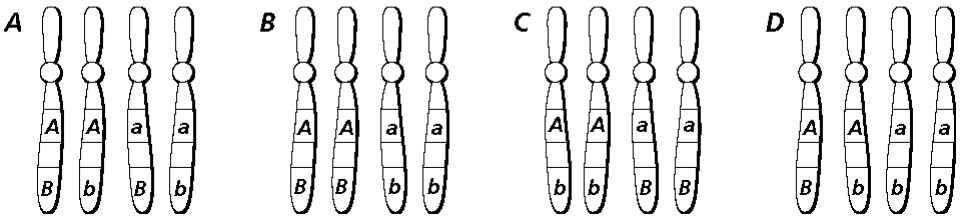


Figure 10-8

____ 39. In Figure 10-8, what gametes will result if there is only a single crossover?

a. A
b. B
c. C
d. D

____ 40. In Figure 10-8, what gamaetes will result if each chromatid crossed with a nonsister chromatid?

a. A
b. B
c. C
d. D

Matching

Match each item with the correct statement below.

a. crossing over
b. meiosis
c. dihybrid
d. heredity
e. haploid
f. homozygous
g. zygote
h. fertilization

____ 41. A cross involving two different traits
____ 42. The exchange of genetic material between homologous chromosomes
____ 43. The uniting of the male and female gametes
____ 44. The alleles present for a trait are the same
____ 45. The passing of characteristics from parents to offspring

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Answer Section

MULTIPLE CHOICE

1. ANS: D
   The tallness phenotype only indicates the presence of the dominant T allele. It is impossible to determine this plant's genotype by knowing its phenotype. It can either be Tt or TT.

   PTS: 1
2. ANS: C
   When a cross is performed between the genotypes AA and aa, the offspring will exhibit a 3:1 ratio of phenotypes. However, the genotypes will be in a 1:2:1 ratio (AA:Aa:aa). A Punnett square will aid in visualizing these results.

   PTS: 1
3. ANS: A
   The diploid (2n) number of chromosomes for human cells is 46. Because each of the cells had only 23 chromosomes, they must be haploid. Human gametes, such as ova or sperm, are haploid, while other cells, which have two copies of each chromosome, are diploid.

   PTS: 1
4. ANS: C
   Meiosis II begins with the diploid cells that resulted from meiosis I. At the end of meiosis II, each diploid cell has given rise to four haploid cells. This is a reduction division.

   PTS: 1
5. ANS: C
   This is the law of independent assortment. Mendel used the results of his dihybrid crosses to justify this conclusion.

   PTS: 1
6. ANS: B
   Trisomy describes the condition of having three copies of a chromosome. It results when a gamete with an extra chromosome combines with a normal gamete.

   PTS: 1
7. ANS: B
   Punnett squares illustrate all possible allele combinations that could result from a particular cross. Each box represents a possible genotype.

   PTS: 1
8. ANS: C
   During metaphase I, homologous chromosomes line up on the spindle as tetrads. In metaphase II, homologous chromosomes line up randomly on the spindle.

   PTS: 1
9. ANS: D

Both of the pea's parents could have had a dominant phenotype, so as long as at least one parent possesses a recessive allele, the pea could resemble both parents.

PTS: 1

10. ANS: A
Homologous chromosomes possess the same genes for a trait, but may have different alleles of each gene.

PTS: 1

11. ANS: A PTS: 1 DIF: B OBJ: 10-4
NAT: G1 | G2 | G3

12. ANS: C PTS: 1 DIF: B OBJ: 10-4
NAT: G1 | G2 | G3

13. ANS: C PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

14. ANS: C PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

15. ANS: B PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

16. ANS: A PTS: 1 DIF: B OBJ: 10-5
NAT: F6 | G1 | G2

17. ANS: A PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

18. ANS: B PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

19. ANS: C PTS: 1 DIF: B OBJ: 10-5
NAT: F6 | G1 | G2

20. ANS: C PTS: 1 DIF: B OBJ: 10-3
NAT: G1 | G2 | G3

21. ANS: B PTS: 1 DIF: B OBJ: 10-3
NAT: G1 | G2 | G3

22. ANS: B PTS: 1 DIF: B OBJ: 10-3
NAT: G1 | G2 | G3

23. ANS: B PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

24. ANS: D PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

25. ANS: A PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

26. ANS: B PTS: 1 DIF: B OBJ: 10-3
NAT: G1 | G2 | G3

27. ANS: A PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

28. ANS: A PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

29. ANS: B PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

30. ANS: A PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

31. ANS: B PTS: 1 DIF: B OBJ: 10-5

NAT: F6 | G1 | G2

32. ANS: C PTS: 1 DIF: B OBJ: 10-3
NAT: G1 | G2 | G3

33. ANS: B PTS: 1 DIF: A OBJ: 10-1
NAT: G1 | G2 | G3

34. ANS: B PTS: 1 DIF: A OBJ: 10-2
NAT: G1 | G2 | G3

35. ANS: C PTS: 1 DIF: B OBJ: 10-2
NAT: G1 | G2 | G3

36. ANS: B PTS: 1 DIF: A OBJ: 10-2
NAT: G1 | G2 | G3

37. ANS: A PTS: 1 DIF: A OBJ: 10-2
NAT: G1 | G2 | G3

38. ANS: D PTS: 1 DIF: A OBJ: 10-2
NAT: G1 | G2 | G3

39. ANS: A PTS: 1 DIF: A OBJ: 10-4
NAT: G1 | G2 | G3

40. ANS: C PTS: 1 DIF: A OBJ: 10-4
NAT: G1 | G2 | G3

MATCHING

41. ANS: C PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

42. ANS: A PTS: 1 DIF: B OBJ: 10-4
NAT: G1 | G2 | G3

43. ANS: H PTS: 1 DIF: B OBJ: 10-3
NAT: G1 | G2 | G3

44. ANS: F PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3

45. ANS: D PTS: 1 DIF: B OBJ: 10-1
NAT: G1 | G2 | G3