

MULTIPLE CHOICE QUESTIONS

1. Mendel verified true-breeding pea plants for certain traits before undertaking his experiments. The term “true-breeding” refers to:
 - A. genetically pure lines.
 - B. organisms that have a high rate of reproduction.
 - C. organisms that will produce identical copies of themselves upon reproduction.
 - D. organisms that are heterozygous for a given trait.
 - E. organisms that are homozygous for all possible traits.
2. The physical appearance of an organism for a given trait is termed:
 - A. genetics.
 - B. dominance.
 - C. synapsis.
 - D. genotype.
 - E. phenotype.
3. The term “dominant” means that:
 - A. both alleles can be expressed in a hybrid.
 - B. all members of the F_2 generation of a hybrid cross exhibit the dominant phenotype.
 - C. one allele can mask the expression of another in a hybrid.
 - D. the dominant phenotype shows up in 100% of the offspring in all generations.
 - E. the dominant phenotype is more beneficial than the recessive phenotype.
4. _____ are alternative forms of a gene that govern the same feature, such as eye color, and occupy corresponding positions on homologous chromosomes.
 - A. Alleles
 - B. Loci
 - C. Homozygotes
 - D. Coupled traits
 - E. None of these.
5. Mendel’s principle of segregation states that:
 - A. alleles from one parent mask the expression of alleles from the other parent.
 - B. alleles separate from each other before forming gametes.
 - C. hybrids will express a phenotype intermediate between the two parental phenotypes.
 - D. true-breeding parents produce offspring of the same phenotype.
 - E. different loci separate from each other.
6. Using standard conventions for naming alleles, which of the following pairs is correct?
 - A. Tt—recessive phenotype
 - B. TT—heterozygous
 - C. tt—homozygous
 - D. tt—dominant phenotype
 - E. All of these are correct.
7. A pear plant with the genotype Aa can produce gametes containing:
 - A. either A or Aa.
 - B. only the dominant A.
 - C. only the recessive a.
 - D. either A or a.
 - E. either AA, Aa, or aa.

8. The separation of alleles of a gene takes place during:
- anaphase of mitosis.
 - cytokinesis of mitosis.
 - anaphase I of meiosis.
 - telophase II of meiosis.
 - cytokinesis of meiosis.
9. The physical location of a particular gene on a chromosome is called:
- an allele.
 - a locus.
 - a trait.
 - a chromatid.
 - None of these.
10. Which of the following represents the possible genotype(s) resulting from a cross between an individual homozygous (BB) and one heterozygous (Bb) individual?
- BB and Bb
 - BB, Bb, and bb
 - BB only
 - Bb only
 - bb only
11. Mating an individual expressing a dominant phenotype, but whose genotype is unknown, with an individual expressing the corresponding recessive phenotype is an example of:
- a heterozygous cross.
 - an F₁ cross.
 - an F₂ cross.
 - a parental cross.
 - a test cross.
12. The genotype for a pea plant that is homozygous recessive for both height and pea color would be:
- tt.
 - YY.
 - TtYy.
 - ttyy.
 - TTYy.
13. In peas, Mendel found that tall plants and yellow peas are dominant. The phenotype for a pea plant with the genotype TTYy would be:
- heterozygous.
 - Ty.
 - short with yellow peas.
 - tall with green peas.
 - tall with yellow peas.
14. The height of pea plants from a cross between parent plants heterozygous for height, in which tall is dominant, would be:
- all short.
 - all tall.
 - 1 tall : 3 short.
 - 2 short : 2 tall.
 - 3 tall : 1 short.

15. What is the probability that two lizards that are heterozygous for stripes on their tails (Ss) will produce an offspring that is homozygous for no stripes (ss)?
- A. 1
 - B. $1/2$
 - C. $1/4$
 - D. $1/8$
 - E. 0
16. In humans, assume that the allele for brown eyes is dominant and the allele for blue eyes is recessive. If two brown-eyed individuals have a child with blue eyes, that means:
- A. both parents are homozygous for brown eyes.
 - B. both parents are heterozygous for eye color.
 - C. there is a $1/4$ chance that their second child will have brown eyes.
 - D. there is a 50/50 chance that their second child will have blue eyes.
 - E. None of these.
17. If a couple is planning on having two children, what is the probability that both will be male?
- A. 0
 - B. $1/4$
 - C. $1/2$
 - D. $3/4$
 - E. 1
18. If a couple is planning on having three children, what is the probability that only one will be male?
- A. 0
 - B. $1/4$
 - C. $3/8$
 - D. $1/2$
 - E. $3/4$
19. A brown-eyed couple already has a child with blue eyes. What is the probability that their next child will have blue eyes, assuming that the brown eye allele is dominant and the blue eye allele is recessive?
- A. 0
 - B. $1/4$
 - C. $1/2$
 - D. $3/4$
 - E. 1
20. A brown-eyed couple heterozygous for eye color are planning on having two children. What is the probability that both children will have blue eyes, assuming brown eyes is dominant and blue eyes is recessive?
- A. 0
 - B. $1/32$
 - C. $1/16$
 - D. $1/4$
 - E. $1/2$

21. Two Martians fall in love and marry. One Martian is homozygous for red eyes and the other is heterozygous. The recessive eye color is purple. What is the probability that they will have a child with purple eyes?
- A. 1/1 B. 1/2 C. 1/4 D. 3/4 E. 0
22. Two Martians fall in love and marry. One Martian is homozygous for red eyes and the other is heterozygous. The recessive eye color is purple. What are the chances that the alien couple will have a child with red eyes?
- A. 1
B. 1/2
C. 1/4
D. 3/4
E. 0
23. Two Martians fall in love and marry. One Martian is homozygous for red eyes and the other is heterozygous. The recessive eye color is purple. What is the probability that the alien couple will have a child that is heterozygous for eye color?
- A. 1
B. 1/2
C. 1/4
D. 3/4
E. 0
24. The principle of independent assortment is not true for:
- A. incomplete dominance.
B. mutations.
C. heterozygotes.
D. homozygotes.
E. linked genes.
25. Genes that tend to be inherited together are said to be:
- A. associated.
B. related.
C. similar.
D. linked.
E. alleles.
26. A _____ is best used to demonstrate the linkage of two genes.
- A. monohybrid cross
B. dihybrid cross
C. monohybrid test cross
D. two-allele test cross
E. two-point test cross
27. An organism with the genotype of AaXx can produce gametes containing _____ if the two genes are unlinked.
- A. either Aa or Xx
B. either AX, Ax, aX, ax
C. AaXx
D. AX or ax
E. None of these.

28. The offspring of two heterozygous gray-bodied, normal-winged flies should be 50% gray-bodied/normal wings (BbRr) and 50% black-bodied/vestigial wings (bbrr) because these alleles are linked. If a small number, say 15%, of the offspring are instead black-bodied with normal wings, this is *most likely* the result of:
- crossing-over.
 - incomplete dominance.
 - codominance.
 - an error in meiosis.
 - mutation.
29. The probability that two genes will be separated by crossing-over is related to:
- the phenotype that they control.
 - how far the two genes are from the centromere.
 - the distance between the two genes on the chromosome.
 - whether the two genes are located on a sex chromosome.
 - how far the genes are from the kinetochore.
30. In a two-point test cross, 36 of the offspring were recombinant types. The remaining 64 offspring were parental types. How many map units separate the two loci?
- 28
 - 36
 - 64
 - 78
 - 100
31. A lizard with a striped tail is crossed with one having a spotted head, producing normal looking (no stripes or spots) lizard progeny. What progeny would be expected to be produced by mating these progeny with each other, if the genes conferring stripes and spots were on different chromosomes?
- equal numbers of normal, striped, spotted and striped, and spotted
 - 3 striped : 1 spotted
 - 9 striped and spotted : 3 spotted : 3 striped : 1 normal
 - 9 striped : 3 spotted : 1 striped or spotted
 - 9 normal : 3 striped : 3 spotted : 1 striped and spotted
32. A lizard with striped tails is crossed with one having a spotted head, producing normal looking (no stripes or spots) progeny. What progeny would be expected to be produced by mating one of these lizards with another that had a striped tail and spotted head, if the genes conferring stripes and spots were close together on the same chromosome?
- equal numbers of normal, striped, spotted and striped, and spotted
 - 3 striped : 1 spotted
 - mostly progeny that are striped or spotted
 - mostly progeny that are normal or striped and spotted
 - 9 normal : 3 striped : 3 spotted : 1 striped and spotted
33. In genetics, map units express the distance between:
- chromosomes during metaphase.
 - two loci on a chromosome.
 - alleles.
 - polar bodies.
 - homologous chromosomes.

34. Why is color-blindness more common in males than in females?

- A. Because females would have to receive two copies of the recessive color blindness gene to actually express the trait.
- B. Because a male only needs to receive the recessive gene from his mother to be color-blind.
- C. Because color-blindness is an X-linked trait.
- D. All of these.
- E. None of these.

35. What are the possible genotypes of a female child from the union of a woman who is heterozygous for hemophilia and a man who has normal blood clotting characteristics?

- A. $X^H X^H$ or $X^H X^h$
- B. $X^H X^h$
- C. $X^H Y^H$
- D. Hh
- E. HH

36. What are the predicted phenotypes of the male children from the union of a woman who is heterozygous for hemophilia and a man who has normal blood clotting characteristics? (Use the Punnett square to verify your answer.)

- A. all normal
- B. 3 normal : 1 hemophilia
- C. 1 hemophilia : 1 normal
- D. 1 hemophilia : 3 normal
- E. all hemophiliacs

37. What are the predicted phenotypes of the female children from the union of a woman who is heterozygous for hemophilia and a man who has normal blood clotting characteristics? (Use the Punnett square to verify your answer.)

- A. all carriers
- B. 3 homozygous normal : 1 carrier
- C. 1 homozygous normal : 1 carrier
- D. 1 hemophilia: 2 homozygous normal : 1 carrier
- E. all hemophiliacs

38. A Barr body in a mammalian female cell represents:

- A. an inactivated oocyte.
- B. a polar body.
- C. a degenerate nucleus.
- D. an inactivated X chromosome.
- E. an inactivated Y chromosome.

39. Calico cats are never male because:

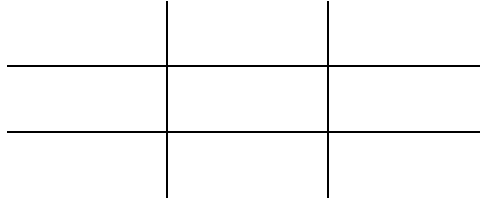
- A. recessive genes are not usually expressed on their X chromosome.
- B. male hormones prevent expression of the calico phenotype.
- C. two different X chromosomes are needed for the expression of the calico phenotype.
- D. two different Y chromosomes are needed for the expression of the calico phenotype.
- E. one X chromosome and one Y chromosome are needed for the expression of the calico phenotype.

40. When certain medium height hybrid plants were crossed, they produced offspring that were dwarf, medium, and tall in a ratio of 1 : 2 : 1. This is an example of:

- A. variegation.
- B. hybrid vigor.
- C. incomplete dominance.
- D. epistasis.
- E. a polygenic trait.

41. What are the possible phenotypes of the children if the mother's genotype is $I^A i$ for blood type and the father is $I^B i$? (Use the Punnett square to verify your answer.)

- A. all AB
- B. A, B
- C. A, AB
- D. A, B, O
- E. A, B, AB, O



42. A diploid individual has a maximum of _____ different alleles for a particular locus.

- A. one
- B. two
- C. three
- D. four
- E. more than four

43. A particular gene that controls seed coat color in peas also determines the susceptibility of these peas to a particular disease. This situation is referred to as:

- A. variegation.
- B. additive dominance.
- C. codominance.
- D. pleiotropy.
- E. incomplete dominance.

44. Breeding a yellow dog with a brown dog produced puppies with both yellow and brown hairs intermixed. This is an example of:
- A. variegation.
 - B. codominance.
 - C. incomplete dominance.
 - D. epistasis.
 - E. a polygenic trait.
45. A gene that affects, prevents, or masks the expression of a gene at another locus is a(n) _____ gene.
- A. recessive
 - B. dominant
 - C. epistatic
 - D. codominant
 - E. pleiotropic
46. _____ refers to multiple independent pairs of genes having similar and additive effects on the same characteristic.
- A. Codominance
 - B. Epistasis
 - C. Polygenic inheritance
 - D. Complete dominance
 - E. Additive dominance
47. The range of phenotypic possibilities that can develop from a certain dog genotype under different environmental conditions is called the:
- A. epistatic interaction.
 - B. norm of reaction.
 - C. nurture limit.
 - D. genotype range.
 - E. maximum phenotype.

48. On Thanksgiving I will enjoy the following the most:

- A. turkey
- B. stuffing
- C. mashed potatoes
- D. pumpkin pie
- E. cranberry relish

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