

CHAPTER – 14
Principles of Inheritance and Variation

1. The basic unit of heredity is known as a:
 - a) Gene
 - b) Chromosome
 - Trait
 - d) Allele

2. Mendel's law stating that alleles for different traits are distributed independently of one another is called:
 - a) Law of Segregation
 - b) Law of Independent Assortment
 - c) Law of Dominance
 - d) Law of Uniformity

3. The physical appearance of an organism resulting from the interaction of its genotype with the environment is known as:
 - a) Phenotype
 - b) Genotype
 - c) Allele
 - d) Gene

4. In a monohybrid cross, if both parents are heterozygous (Bb), what is the probability of the offspring being homozygous recessive (bb)?
 - a) 25%
 - b) 50%
 - c) 75%
 - d) 100%

5. The genetic makeup of an organism is referred to as:

- a) Phenotype
- b) Genotype
- c) Trait
- d) Chromosome

6. The tool used to predict the probability of genetic outcomes in offspring is called a:

- a) Pedigree chart
- b) Punnett square
- c) Genetic map
- d) Karyotype

7. If an organism has two identical alleles for a particular gene, it is termed:

- a) Heterozygous
- b) Homozygous
- c) Dominant
- d) Recessive

8. Which term describes a genetic trait that is expressed only when two copies of the gene are present?

- a) Dominant
- b) Recessive
- c) Codominant
- d) Incomplete dominance

9. In a dihybrid cross, the phenotypic ratio of the F₂ generation is:

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

10. The concept that one gene can affect the expression of another gene is known as:

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

11. Which of the following is an example of a sex-linked trait in humans?

- a) Blood type
- b) Eye color
- c) Hemophilia
- d) Height

12. The principle that explains why the traits of parents are not always seen in their offspring is:

- a) Law of Segregation
- b) Law of Independent Assortment
- c) Law of Uniformity
- d) Law of Dominance

13. In a pedigree chart, a filled circle represents:

- a) A male with the trait
- b) A female with the trait
- c) A male without the trait
- d) A female without the trait

14. The genetic variation that arises from the recombination of genes during sexual reproduction is known as:

- a) Mutation
- b) Genetic drift
- c) Crossing over
- d) Independent assortment

15. If two heterozygous individuals (Aa) are crossed, what is the expected phenotypic ratio of their offspring?

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

16. Which genetic disorder is caused by a single recessive allele on the X chromosome?

- a) Color blindness
- b) Cystic fibrosis
- c) Sickle cell anemia
- d) Down syndrome

17. A genetic cross between two individuals with a homozygous dominant genotype and a homozygous recessive genotype will result in:

- a) 100% homozygous dominant offspring
- b) 100% heterozygous offspring
- c) 50% homozygous dominant and 50% heterozygous offspring
- d) 50% homozygous recessive and 50% heterozygous offspring

18. Which of the following is an example of incomplete dominance?

- a) Red and white flowers producing pink flowers
- b) AB blood type
- c) A person with both A and B antigens on their red blood cells
- d) Color blindness

19. The term for the exchange of genetic material between homologous chromosomes during meiosis is:

- a) Crossing over
- b) Mutation
- c) Independent assortment
- d) Gene flow

20. In a test cross, the individual with an unknown genotype is crossed with an:

- a) Heterozygous individual
- b) Homozygous dominant individual
- c) Homozygous recessive individual
- d) F1 generation individual

21. The genetic disorder caused by a dominant allele is:

- a) Cystic fibrosis
- b) Hemophilia
- c) Huntington's disease
- d) Sickle cell anemia

22. Which of the following is NOT a type of genetic mutation?

- a) Point mutation
- b) Insertion
- c) Deletion
- d) Crossing over

23. Which term describes the phenomenon where two different genes are located on the same chromosome and are inherited together?

- a) Gene linkage
- b) Genetic recombination
- c) Gene flow
- d) Independent assortment

24. In a dihybrid cross involving two heterozygous individuals, what is the probability of an offspring exhibiting both recessive traits?

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

25. The study of how traits are passed from parents to offspring is known as:

- a) Genetics
- b) Evolution
- c) Ecology
- d) Physiology

26. The concept that different traits are inherited independently of one another is known as:

- a) Law of Segregation
- b) Law of Independent Assortment
- c) Law of Dominance
- d) Law of Uniformity

27. Which of the following best describes the concept of genetic drift?

- a) Change in allele frequencies due to chance events
- b) Change in allele frequencies due to natural selection
- c) Change in allele frequencies due to migration
- d) Change in allele frequencies due to mutation

28. The term used for a gene that has more than two alleles in a population is:

- a) Multiple alleles
- b) Codominance
- c) Incomplete dominance
- d) Epistasis

29. In a cross between a homozygous dominant and a homozygous recessive individual, all offspring will be:

- a) Homozygous dominant
- b) Homozygous recessive
- c) Heterozygous

d) Phenotypically recessive

30. Which of the following represents a homozygous recessive genotype?

a) AA

b) Aa

c) aa

d) BB

31. The presence of both A and B antigens on red blood cells is an example of:

a) Codominance

b) Incomplete dominance

c) Complete dominance

d) Epistasis

32. The principle that the inheritance of one trait does not affect the inheritance of another trait is known as:

a) Law of Independent Assortment

b) Law of Segregation

c) Law of Dominance

d) Law of Uniformity

33. Which type of inheritance pattern is characterized by the expression of both alleles in a heterozygote?

a) Codominance

b) Incomplete dominance

c) Complete dominance

d) Polygenic inheritance

34. The process by which a single gene influences multiple traits is known as:

a) Pleiotropy

b) Epistasis

- c) Polygenic inheritance
- d) Gene linkage

35. In which type of inheritance do both alleles contribute equally to the phenotype of the organism?

- a) Codominance
- b) Incomplete dominance
- c) Complete dominance
- d) Polygenic inheritance

36. The genetic disorder characterized by a lack of enzyme needed to break down phenylalanine is:

- a) Cystic fibrosis
- b) Phenylketonuria (PKU)
- c) Huntington's disease
- d) Hemophilia

37. The observable traits of an organism are its:

- a) Phenotype
- b) Genotype
- c) Alleles
- d) Chromosomes

38. A cross between an organism with an unknown genotype and a homozygous recessive organism is used to determine the:

- a) Genotype
- b) Phenotype
- c) Pedigree
- d) Genetic linkage

39. The occurrence of multiple alleles for a single gene in a population is called:

- a) Multiple alleles
- b) Epistasis
- c) Codominance d) Incomplete dominance

40. Which inheritance pattern involves the blending of traits from both parents?

- a) Incomplete dominance
- b) Codominance
- c) Complete dominance
- d) Polygenic inheritance

41. A phenotype that results from the interaction of multiple genes is known as:

- a) Polygenic inheritance
- b) Pleiotropy
- c) Incomplete dominance
- d) Codominance

42. In a cross of a homozygous dominant individual with a heterozygous individual, what is the expected genotype ratio?

- a) 1:1
- b) 3:1
- c) 1:2:1
- d) 1:1:1:1

43. Which of the following describes a trait that is influenced by multiple genes?

- a) Polygenic inheritance
- b) Complete dominance
- c) Codominance
- d) Incomplete dominance

44. The genetic principle that alleles for a trait segregate independently during the formation of gametes is:

- a) Law of Segregation

- b) Law of Independent Assortment
- c) Law of Dominance
- d) Law of Uniformity

45. The gene that masks the expression of another gene is referred to as:

- a) Dominant
- b) Recessive
- c) Codominant
- d) Incomplete dominant

46. The probability of inheriting a recessive genetic disorder from two carrier parents is:

- a) 0%
- b) 25%
- c) 50%
- d) 75%

47. In Mendelian genetics, a trait that is expressed when at least one dominant allele is present is termed:

- a) Dominant
- b) Recessive
- c) Codominant
- d) Incomplete dominant

48. Which term describes the phenomenon where one gene's effect is suppressed by another gene?

- a) Epistasis
- b) Incomplete dominance
- c) Codominance
- d) Polygenic inheritance

49. The expected phenotypic ratio of a monohybrid cross between two heterozygous individuals is:

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

50. Which of the following represents a cross where both parents are heterozygous for two traits?

- a) Monohybrid cross
- b) Dihybrid cross
- c) Test cross
- d) Back cross

Answer Key for Chapter 14 (Principles of Inheritance and Variation)

1	2	3	4	5
A	B	A	A	B
6	7	8	9	10
B	B	B	B	A
11	12	13	14	15

C	A	B	C	B
16	17	18	19	20
C	B	A	A	C
21	22	23	24	25
C	D	A	A	A
26	27	28	29	30
B	A	A	C	C
31	32	33	34	35
A	A	A	A	A
36	37	38	39	40
B	A	A	A	A
41	42	43	44	45
A	A	A	A	A
46	47	48	49	50
B	A	A	B	B

