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Biology Grade 10 — Chapter 7

Inheritance

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Independent practice MCQs from the supplied Class 10 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. What is the process by which traits are passed from parents to offspring called?

(A) Inheritance
(B) Variation
(C) Evolution
(D) Mutation

Correct Answer: A

Explanation: Inheritance is the process by which traits are passed from parents to offspring.

2. What is the study of heredity and variation called?

(A) Biology
(B) Genetics
(C) Ecology
(D) Evolution

Correct Answer: B

Explanation: The study of heredity and variation is called genetics.

3. Who is known as the Father of Genetics?

(A) Charles Darwin
(B) William Harvey
(C) Gregor Mendel
(D) Louis Pasteur

Correct Answer: C

Explanation: Gregor Mendel is known as the Father of Genetics for his work on pea plants.

4. What are thread-like structures made of DNA and proteins called?

(A) Genes
(B) Alleles
(C) Loci
(D) Chromosomes

Correct Answer: D

Explanation: Chromosomes are thread-like structures made of DNA and proteins found in the nucleus of cells.

5. What is the unit of inheritance called?

(A) Gene
(B) Chromosome
(C) Allele
(D) Locus

Correct Answer: A

Explanation: Gene — this correctly answers the question.

6. What are different forms of a gene called?

(A) Chromosomes
(B) Alleles
(C) Loci
(D) Genomes

Correct Answer: B

Explanation: Different forms or variations of a gene are called alleles.

7. What is the specific position of a gene on a chromosome called?

(A) Allele
(B) Genotype
(C) Locus
(D) Phenotype

Correct Answer: C

Explanation: The specific position of a gene on a chromosome is called a locus.

8. What is the genetic makeup of a trait called?

(A) Phenotype
(B) Allele
(C) Locus
(D) Genotype

Correct Answer: D

Explanation: The genetic makeup of a trait at each locus is called the genotype.

9. What is the physical appearance of a trait called?

(A) Phenotype
(B) Genotype
(C) Allele
(D) Locus

Correct Answer: A

Explanation: The physical appearance of a trait is called the phenotype.

10. What is an individual with two identical alleles called?

(A) Heterozygous
(B) Homozygous
(C) Dominant
(D) Recessive

Correct Answer: B

Explanation: If the genotype has two identical alleles (like EE or ee), it is called homozygous.

11. What is an individual with two different alleles called?

(A) Homozygous
(B) Dominant
(C) Heterozygous
(D) Recessive

Correct Answer: C

Explanation: If the genotype has two different alleles (like Ee), it is called heterozygous.

12. What is an allele that is expressed even with one copy called?

(A) Recessive
(B) Homozygous
(C) Heterozygous
(D) Dominant

Correct Answer: D

Explanation: A dominant allele is expressed even when paired with a different (recessive) allele.

13. What is an allele that is expressed only with two copies called?

(A) Recessive
(B) Dominant
(C) Homozygous
(D) Heterozygous

Correct Answer: A

Explanation: A recessive allele is expressed only in the homozygous state.

14. What is the complete set of an individual's genes called?

(A) Gene pool
(B) Genome
(C) Genotype
(D) Phenotype

Correct Answer: B

Explanation: The complete set of an individual's genes is called the genome.

15. What is the complete set of all genes and their alleles in a population called?

(A) Genome
(B) Genotype
(C) Gene pool
(D) Phenotype

Correct Answer: C

Explanation: A gene pool is the complete set of all the genes and their different alleles in all individuals of a population.

16. Which part of the chromosome protects it from degradation?

(A) Centromere
(B) Chromatid
(C) Kinetochore
(D) Telomere

Correct Answer: D

Explanation: Telomeres are repetitive nucleotide sequences at the ends of chromosomes that protect them from degradation.

17. What is the constricted region of a chromosome where chromatids are attached called?

(A) Centromere
(B) Telomere
(C) Chromatid
(D) Kinetochore

Correct Answer: A

Explanation: The centromere is the constricted region of a chromosome where the two chromatids are attached.

18. What is the protein complex at the centromere called?

(A) Telomere
(B) Kinetochore
(C) Chromatid
(D) Chromatin

Correct Answer: B

Explanation: The kinetochore is a protein complex in the centromere which serves as the attachment site for spindle fibers.

19. What is the cross between parents differing in one trait called?

(A) Dihybrid cross
(B) Test cross
(C) Monohybrid cross
(D) Back cross

Correct Answer: C

Explanation: Monohybrid cross — this correctly answers the question.

20. What is the cross between parents differing in two traits called?

(A) Monohybrid cross
(B) Test cross

(C) Back cross
(D) Dihybrid cross

Correct Answer: D

Explanation: Dihybrid cross — this correctly answers the question.

21. What was the phenotypic ratio in the F□ generation of Mendel's monohybrid cross?

(A) 3:1
(B) 1:1
(C) 9:3:3:1
(D) 1:2:1

Correct Answer: A

Explanation: 3:1 — this correctly answers the question.

22. What was the phenotypic ratio in the F□ generation of Mendel's dihybrid cross?

(A) 3:1
(B) 9:3:3:1
(C) 1:1
(D) 1:2:1

Correct Answer: B

Explanation: 9:3:3:1 — this correctly answers the question.

23. What is the genotypic ratio in the F□ generation of a monohybrid cross?

(A) 3:1
(B) 9:3:3:1
(C) 1:2:1
(D) 1:1

Correct Answer: C

Explanation: The genotypic ratio in the F□ generation of a monohybrid cross is 1:2:1.

24. What is the law that states that alleles separate during gamete formation?

(A) Law of Independent Assortment
(B) Law of Dominance
(C) Law of Inheritance
(D) Law of Segregation

Correct Answer: D

Explanation: The Law of Segregation states that co-existing alleles segregate during gamete formation and recombine randomly during fertilization.

25. What is the law that states that alleles of different genes assort independently?

(A) Law of Independent Assortment
(B) Law of Segregation
(C) Law of Dominance
(D) Law of Inheritance

Correct Answer: A

Explanation: The Law of Independent Assortment states that the alleles for one trait are inherited independently of the alleles for another trait.

B. Less Important / Secondary Topics

26. What is an individual with a homozygous genotype called?

(A) True breed
(B) Non-true breed
(C) Hybrid
(D) Mutant

Correct Answer: A

Explanation: An individual with a homozygous genotype is considered a true breed.

27. What is an individual with a heterozygous genotype called?

(A) True breed
(B) Non-true breed
(C) Pure breed
(D) Mutant

Correct Answer: B

Explanation: A heterozygous individual is non-true breed because it can produce offspring with either form of the trait.

28. What is the purpose of a test cross?

(A) To determine the phenotype
(B) To determine the mutation
(C) To determine the genotype
(D) To determine the gene pool

Correct Answer: C

Explanation: A test cross is used to determine whether an organism displaying a dominant trait is homozygous or heterozygous.

29. What is the phenotypic ratio of a monohybrid test cross?

(A) 3:1
(B) 9:3:3:1
(C) 1:2:1
(D) 1:1

Correct Answer: D

Explanation: 1:1 — this correctly answers the question.

30. Which of the following is a dominant trait in pea plants?

(A) Round seeds
(B) Wrinkled seeds
(C) Green seeds
(D) Short stem

Correct Answer: A

Explanation: Round seeds are dominant over wrinkled seeds in pea plants.

31. Which of the following is a recessive trait in pea plants?

(A) Round seeds
(B) Wrinkled seeds
(C) Yellow seeds
(D) Purple flowers

Correct Answer: B

Explanation: Wrinkled seeds are recessive to round seeds in pea plants.

32. What is the symbol for the mean?

(A) tildex
(B) hatx
(C) barx
(D) x

Correct Answer: C

Explanation: Barx — this correctly answers the question.

33. What is the symbol for the median?

(A) barx
(B) hatx
(C) x
(D) tildex

Correct Answer: D

Explanation: The median is denoted by tildex (x tilde).

34. What is the symbol for the mode?

(A) hatx
(B) barx
(C) tildex
(D) x

Correct Answer: A

Explanation: The mode is denoted by hatx (x-hat).

35. Which of the following is a sex-linked trait?

(A) Height
(B) Colour blindness
(C) Blood type
(D) Skin colour

Correct Answer: B

Explanation: Colour blindness is a sex-linked trait.

36. A plant with genotype Rr is crossed with a plant with genotype rr. What is the phenotypic ratio?

(A) 3:1
(B) 9:3:3:1
(C) 1:1
(D) 1:2:1

Correct Answer: C

Explanation: 1:1 — this correctly answers the question.

37. A plant with genotype RrYy is self-fertilized. What is the probability of getting a round, yellow seed?

(A) 1/16
(B) 3/16
(C) 1/4
(D) 9/16

Correct Answer: D

Explanation: In a dihybrid cross, the probability of getting a round, yellow seed (R_Y_) is 9/16.

38. Which of the following genotypes is homozygous dominant?

(A) EE
(B) Ee
(C) ee
(D) E

Correct Answer: A

Explanation: Homozygous dominant means two identical dominant alleles (EE).

39. Which of the following genotypes is homozygous recessive?

(A) EE
(B) ee
(C) Ee
(D) E

Correct Answer: B

Explanation: Homozygous recessive means two identical recessive alleles (ee).

40. Which of the following genotypes is heterozygous?

(A) EE
(B) ee
(C) Ee
(D) E

Correct Answer: C

Explanation: Heterozygous means two different alleles (Ee).

41. A person with free earlobes (Ee) marries a person with attached earlobes (ee). What is the probability of having a child with attached earlobes?

(A) 0%
(B) 25%
(C) 100%
(D) 50%

Correct Answer: D

Explanation: 50% — this correctly answers the question.

42. Which of the following would be affected if the Law of Independent Assortment did not hold?

(A) Dihybrid cross
(B) Monohybrid cross
(C) Test cross
(D) Back cross

Correct Answer: A

Explanation: Dihybrid cross — this correctly answers the question.

43. A plant with genotype RRYY is crossed with a plant with genotype rryy. What is the genotype of the F□ generation?

(A) RRYY
(B) RrYy
(C) rryy
(D) RrYY

Correct Answer: B

Explanation: The F□ generation from a cross between RRYY and rryy will all be RrYy (round, yellow).

44. Which of the following is NOT a Mendelian trait in pea plants?

(A) Seed shape
(B) Seed color
(C) Leaf shape
(D) Flower color

Correct Answer: C

Explanation: Leaf shape — this correctly answers the question.

45. What is the probability of getting a homozygous recessive offspring from a cross between two heterozygous parents (Ee × Ee)?

(A) 0%
(B) 50%
(C) 75%
(D) 25%

Correct Answer: D

Explanation: A cross between Ee and Ee produces 25% EE, 50% Ee, and 25% ee. The probability of homozygous recessive (ee) is 25%.

46. A person has blood type AB. What are the possible genotypes?

(A) IAIB
(B) IAIA
(C) IBIB
(D) ii

Correct Answer: A

Explanation: IAIB — this correctly answers the question.

47. Which of the following is an example of a sex-linked disorder?

(A) Sickle cell anemia
(B) Colour blindness
(C) Cystic fibrosis
(D) Thalassemia

Correct Answer: B

Explanation: Colour blindness is an example of a sex-linked disorder.

48. What is the genotypic ratio of a dihybrid cross in the F□ generation?

(A) 1:2:1
(B) 1:1:1:1
(C) 9:3:3:1
(D) 3:1

Correct Answer: C

Explanation: The phenotypic ratio of a dihybrid cross is 9:3:3:1.

49. Which of the following statements about the Law of Segregation is correct?

(A) Alleles of different genes assort independently
(B) Dominant alleles are always expressed
(C) Recessive alleles are never expressed
(D) Alleles separate during gamete formation

Correct Answer: D

Explanation: The Law of Segregation states that co-existing alleles segregate during gamete formation.

50. A plant with genotype RrYy is crossed with a plant with genotype rryy. What is the probability of getting a wrinkled, green seed?

(A) 1/4
(B) 1/16
(C) 9/16
(D) 3/16

Correct Answer: A

Explanation: 1/4 — this correctly answers the question.