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Practice questions on Unit 2 – Heredity

1. What is the function of the nucleus in a cell?
 - a) Synthesizing proteins
 - b) Controlling cell division
 - c) Storing genetic information
 - d) Producing energy

2. What is the genetic material contained in the nucleus?
 - a) Proteins
 - b) RNA
 - c) DNA
 - d) Carbohydrates

3. Which structure stores the genetic information passed on from parent to child?
 - a) Ribosome
 - b) Golgi apparatus
 - c) Chromosome
 - d) Endoplasmic reticulum

4. What is DNA made up of?
 - a) Nucleotides
 - b) Amino acids
 - c) Fatty acids
 - d) Simple sugars

5. How many chromosomes do humans typically have in their cells?
- a) 23
 - b) 46
 - c) 12
 - d) 56
6. What is the function of genes?
- a) Controlling cell division
 - b) Synthesizing DNA
 - c) Carrying genetic information
 - d) Producing energy
7. Which scientist is credited with discovering the structure of DNA?
- a) Gregor Mendel
 - b) James Watson
 - c) Rosalind Franklin
 - d) Maurice Wilkins
8. What is the process by which cells divide to form identical daughter cells?
- a) Meiosis
 - b) Mitosis
 - c) Gametogenesis
 - d) Fertilization
9. In which type of cells does mitosis occur?

- a) Somatic cells
 - b) Germ cells
 - c) Stem cells
 - d) Sex cells
10. How many daughter cells are produced in mitosis?
- a) One
 - b) Two
 - c) Four
 - d) Eight
11. During which stage of mitosis do the chromatids move to opposite ends of the cell?
- a) Prophase
 - b) Metaphase
 - c) Anaphase
 - d) Telophase
12. What is the function of meiosis?
- a) To produce identical daughter cells
 - b) To repair damaged tissue
 - c) To halve the chromosome number
 - d) To increase genetic variation
13. Where does meiosis take place in females?
- a) Ovaries

- b) Testes
- c) Uterus
- d) Fallopian tubes

14. What is gametogenesis?

- a) The process of cell division in somatic cells
- b) The process of cell division in germ cells
- c) The production of sex cells
- d) The formation of zygotes

15. How many chromosomes do gametes contain?

- a) The same number as the original cell
- b) Twice the number of the original cell
- c) Half the number of the original cell
- d) Three times the number of the original cell

16. What is the main difference between mitosis and meiosis?

- a) Mitosis produces haploid cells, while meiosis produces diploid cells.
- b) Mitosis produces genetically identical daughter cells, while meiosis produces genetically diverse daughter cells.
- c) Mitosis occurs in the reproductive organs, while meiosis occurs in somatic cells.
- d) Mitosis involves two cell divisions, while meiosis involves only one cell division.

17. Which stage of meiosis involves the pairing of homologous chromosomes?

- a) Prophase I
- b) Metaphase I

- c) Anaphase I
- d) Telophase I

18. What is the outcome of meiosis?

- a) Four diploid cells
- b) Two diploid cells
- c) Four haploid cells
- d) Two haploid cells

19. When does meiosis start in males?

- a) Before birth
- b) During puberty
- c) After fertilization
- d) During childhood

20. What is the term for the process of making models of meiosis to understand its movements?

- a) Gametogenesis
- b) Fertilization
- c) Oogenesis
- d) Spermatogenesis

21. Which cells undergo meiosis?

- a) Somatic cells
- b) Germ cells
- c) Stem cells



d) Muscle cells

22. What is the purpose of meiosis?

- a) To produce identical daughter cells
- b) To increase genetic variation
- c) To repair damaged tissue
- d) To produce energy

23. How many stages are there in meiosis?

- a) Three
- b) Four
- c) Five
- d) Six

24. Which of the following occurs during metaphase I of meiosis?

- a) The chromosomes condense
- b) The homologous chromosomes separate
- c) The chromosomes line up in the middle of the cell
- d) The nuclear membrane reforms

25. What is the primary function of mitosis in the human body?

- a) To produce gametes
- b) To increase genetic variation
- c) To repair damaged tissue
- d) To produce identical daughter cells



26. What is the significance of mitosis in tissue repair?

- a) It produces genetically diverse cells.
- b) It produces haploid cells.
- c) It produces diploid cells.
- d) It replaces damaged or worn-out cells with identical copies.

27. Which of the following statements is true about chromosomes?

- a) They contain DNA.
- b) They are found only in somatic cells.
- c) They are only present during cell division.
- d) They are made up of lipids.

28. What is the role of the centrioles during cell division?

- a) To produce energy
- b) To anchor the cell membrane
- c) To form the spindle fibers
- d) To synthesize proteins

29. How does cytokinesis differ between plant and animal cells?

- a) Plant cells form a cleavage furrow, while animal cells form a cell plate.
- b) Animal cells form a cell plate, while plant cells form a cleavage furrow.
- c) Plant cells undergo binary fission, while animal cells undergo mitosis.
- d) Animal cells undergo binary fission, while plant cells undergo mitosis.

30. What is the significance of cell division in multicellular organisms?

- a) It allows for growth and development.
- b) It is necessary for producing energy.
- c) It maintains genetic stability.
- d) It is involved in the synthesis of proteins.

31. Chromosomes are made up of:

- a) RNA
- b) protein
- c) DNA
- d) acetic orcein

32. How many chromosomes would you expect to find in a normal human body cell?

- a) 23
- b) 50
- c) 84
- d) 46

33. Which combination of chromosomes would result in a human male?

- a) XXX
- b) XY
- c) XX
- d) YY

34. Which of the following statements is not true of mitosis?

- a) In the initial stages of cell division, the chromosomes divide to form daughter chromatids.
- b) Mitosis is used to replace old, worn-out cells.
- c) Two identical daughter cells, known as clones, are formed.
- d) Genetic variety is introduced during the process.

35. Which of the following statements is true of meiosis?

- a) Genetic variety is introduced during the process.
- b) Meiosis is used to replace old, worn-out cells.
- c) Two identical daughter cells, known as clones, are formed.
- d) Meiosis is involved in asexual reproduction

36. Which scientist is credited with the pioneering work on garden peas, laying the foundation for modern genetics?

- a) Charles Darwin
- b) Gregor Mendel
- c) Louis Pasteur
- d) Thomas Hunt Morgan

37. What did Gregor Mendel use for his breeding experiments?

- a) Wheat
- b) Garden peas
- c) Apples
- d) Roses

38. How did Mendel ensure controlled crosses in his pea plants?

- a) By allowing random pollination
- b) By isolating the flowers from insects
- c) By manually pollinating the flowers
- d) By using genetically modified plants

39. What term refers to an allele that is expressed in the phenotype only if two copies of the allele are present?

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

40. Which of the following accurately describes a homozygous individual?

- a) Having two different alleles for a particular gene
- b) Having no alleles for a particular gene
- c) Having two identical alleles for a particular gene
- d) Having only dominant alleles for a particular gene

41. What characteristic did Mendel study in his monohybrid inheritance experiments?

- a) Flower color
- b) Leaf shape
- c) Stem length
- d) Root structure

42. What term refers to a hybrid between two parents that have a difference of only one gene?

- a) Monohybrid

- b) Dihybrid
- c) Polygenic
- d) Homozygous

43. How did Mendel ensure true breeding in his experiments?

- a) By crossing heterozygous plants
- b) By crossing homozygous plants
- c) By using genetically modified plants
- d) By exposing plants to specific environmental conditions

44. In Mendel's experiments, what were the characteristics of the F1 generation?

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

45. Which term refers to the physical appearance of an individual relating to a given genetic trait?

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

46. How did Mendel represent the possible genotypes and phenotypes of offspring in his genetic crosses?

- a) Punnett squares

- b) Pedigree charts
- c) DNA sequencing
- d) Gel electrophoresis

47. What term describes a cross used to determine the genotype of an individual showing the effect of a dominant allele?

- a) Test cross
- b) Hybrid cross
- c) Backcross
- d) Reciprocal cross

48. In human genetics, which blood group is considered to be codominant?

- a) Blood group A
- b) Blood group B
- c) Blood group AB
- d) Blood group O

49. How are alleles represented in a genetic diagram such as a Punnett square?

- a) By colors
- b) By letters
- c) By shapes
- d) By numbers

50. What is the possible phenotype ratio of offspring resulting from a cross between two heterozygous parents for a single trait with complete dominance?

- a) 3:1

b) 1:2:1

c) 9:3:3:1

d) 1:1

51. What phenomenon occurs when neither allele in a gene pair is dominant over the other?

a) Codominance

b) Incomplete dominance

c) Complete dominance

d) Recessive dominance

52. What condition results from the absence of melanin pigment in the skin, hair, and eyes?

a) Sickle cell anemia

b) Albinism

c) Down syndrome

d) Huntington's disease

53. Which term describes a genetic condition where a single gene has multiple effects on an individual's phenotype?

a) Polygenic inheritance

b) Pleiotropy

c) Codominance

d) Epistasis

54. In a family pedigree, how are affected individuals typically represented?

a) Circles

b) Squares

- c) Triangles
- d) Diamonds

55. What is the probability of two heterozygous parents having an albino child?

- a) 25%
- b) 50%
- c) 75%
- d) 100%

56. How are heterozygous individuals represented in genetic diagrams?

- a) By filled shapes
- b) By empty shapes
- c) By diagonal lines
- d) By shaded areas

57. What is the term for a genetic condition caused by the interaction of multiple genes?

- a) Monogenic
- b) Polygenic
- c) Homozygous
- d) Heterozygous

58. What type of cross is used to determine the genotype of an individual showing the effect of a dominant allele?

- a) Dihybrid cross
- b) Test cross
- c) Reciprocal cross

d) Self-cross

59. What tool is used to represent the possible genotypes and phenotypes of offspring in genetic crosses?

- a) Pedigree chart
- b) Punnett square
- c) Gel electrophoresis
- d) PCR analysis

60. What term refers to the phenomenon where one gene masks the effect of another gene at a different locus?

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

61. What is the ratio of phenotypes resulting from a cross between two individuals heterozygous for two traits with complete dominance?

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

62. Which genetic disorder results from the presence of an extra chromosome 21?

- a) Sickle cell anemia
- b) Albinism
- c) Down syndrome

d) Huntington's disease

63. What type of inheritance pattern results in the blending of phenotypes in heterozygous individuals?

- a) Codominance
- b) Incomplete dominance
- c) Complete dominance
- d) Recessive dominance

64. How are recessive alleles represented in a genetic diagram such as a Punnett square?

- a) By capital letters
- b) By lowercase letters
- c) By shaded areas
- d) By empty shapes

65. What is the probability of two carriers for a recessive genetic disorder having an affected child?

- a) 25%
- b) 50%
- c) 75%
- d) 100%

66. The basic unit of inheritance is:

- a) DNA
- b) a chromosome
- c) the nucleus

d) a gene

67. Bekele has dangly earlobes. He has inherited one allele for dangly lobes from his mother, and one for attached lobes from his father. Which of the following terms best describes Bekele's genotype for his earlobes?

a) homozygous

b) heterozygous

c) homologous

d) autosomal

68. Which of the following statements is a definition of a recessive allele?

a) An allele that controls the development of a characteristic even when it is only present on one of your chromosomes.

b) An allele that controls the development of characteristics alongside another different allele that is also expressed in the phenotype.

c) An allele that only controls the development of a characteristic if it is present on both chromosomes.

d) An allele that only occurs on the sex chromosomes.

69. Which of the following conditions is inherited?

a) TB

b) albinism

c) anaemia

d) HIV/AIDS

70. Which method involves selecting the best possible individuals of a crop plant or domestic animal to improve its performance?

a) Cross-breeding

- b) Selective breeding
- c) Hybridization
- d) Genetic engineering

71. Selective breeding is primarily used to breed for:

- a) Random traits
- b) Unpredictable characteristics
- c) Specific traits
- d) All traits equally

72. How can one ensure true-breeding plants or animals for selective breeding?

- a) By selecting individuals with diverse traits
- b) By using genetically modified organisms
- c) By ensuring known ancestry and homozygosity
- d) By exposing organisms to various environmental conditions

73. In selective breeding, if the desired trait is recessive, it is important that the parents are:

- a) Heterozygous
- b) Mutated
- c) Homozygous
- d) Hybrid

74. What is the significance of using a test cross in selective breeding?

- a) To ensure the dominance of a trait
- b) To identify homozygous recessive individuals

- c) To introduce genetic mutations
- d) To assess environmental factors

75. In selective breeding, which individuals should be allowed to mate?

- a) Those with undesirable traits
- b) Those with unknown ancestry
- c) Those with the desired characteristics
- d) Those with hybrid traits

76. What can result from negative selection in selective breeding?

- a) Enhanced traits
- b) Increased genetic diversity
- c) Weakening of desired traits
- d) Accelerated evolution

77. In selective breeding, what can be a consequence of using close relatives for breeding?

- a) Increased genetic diversity
- b) Improved resistance to diseases
- c) Genetic weakness
- d) Enhanced fertility

78. What term describes the process of combining good traits from two different breeds?

- a) Inbreeding
- b) Selective breeding
- c) Cross-breeding

d) Hybridization

79. How do F1 generations behave in terms of breeding true?

- a) They always breed true
- b) They never breed true
- c) They occasionally breed true
- d) They breed true after several generations

80. What is a potential disadvantage of the Belgian Blue cattle breed?

- a) Low meat yield
- b) High susceptibility to diseases
- c) Difficulty in delivering calves
- d) Poor adaptability to various climates

81. The Borena breed of cattle originated from which region of Ethiopia?

- a) North
- b) South
- c) East
- d) West

82. How are Borene cattle adapted to their environment?

- a) By producing large amounts of fat
- b) By resisting cold temperatures
- c) By delivering calves surgically
- d) By being hardy and suited to African climates



83. What is the primary source of food and personal wealth for many people in Ethiopia?

- a) Mining
- b) Fishing
- c) Agriculture and livestock
- d) Manufacturing

84. Why is maintaining genetic diversity important for Ethiopia and the world?

- a) To increase economic inequality
- b) To overcome changes in the world climate
- c) To promote monoculture farming
- d) To reduce international cooperation

85. What is the main benefit of cross-breeding between different breeds?

- a) Reduction in genetic diversity
- b) Production of genetically identical offspring
- c) Combining desirable traits from different breeds
- d) Preservation of purebred characteristics

86. Which activity involves studying the characteristics of local breeds of animals and plants?

- a) Activity 2.7: Ethiopian breeds
- b) Activity 2.8: Selective breeding
- c) Activity 2.9: Genetic engineering
- d) Activity 2.10: Hybridization experiments

87. How do selective breeding and cross-breeding contribute to societal well-being?

- a) By reducing agricultural productivity
- b) By increasing genetic disorders
- c) By maximizing resource utilization
- d) By promoting environmental degradation

88. What is the ultimate goal of breeding animals and plants?

- a) To eliminate genetic diversity
- b) To create genetically identical organisms
- c) To develop the best possible characteristics
- d) To prevent adaptation to changing environments

89. Which term refers to the process of developing a new breed through repeated selection of offspring?

- a) Genetic engineering
- b) Inbreeding
- c) Hybridization
- d) Breeding true

90. Which of the following is not an Ethiopian breed of cattle?

- a) Borena
- b) Zebu
- c) Holstein Friesian
- d) Raya

91. Cross-breeding is also known as:

- a) selective breeding
- b) genetic engineering
- c) horticulture
- d) combination of traits

92. Selective breeding involves:

- a) choosing a weak characteristic and selecting for it
- b) choosing a strong characteristic and selecting for it
- c) mating your animals with a different breed
- d) none of the above

93. Which of the following is NOT true of crossbreeding?

- a) The offspring immediately form a new breed of animal or plant.
- b) The offspring are the F1 generation.
- c) The offspring do not breed true.
- d) The offspring may combine the best traits of both breeds

Answer Key

1. c) Storing genetic information

Explanation: The nucleus of a cell contains the genetic material, which is in the form of DNA molecules. This DNA carries the instructions for the cell's activities and functions, thus storing genetic information.

2. c) DNA

Explanation: DNA, or deoxyribonucleic acid, is the genetic material contained in the nucleus of cells. It carries the genetic instructions for the development, functioning, growth, and reproduction of all known organisms.

3. c) Chromosome

Explanation: Chromosomes are structures that store the genetic information passed from parent to child. They are made up of DNA tightly coiled around proteins called histones.

4. a) Nucleotides

Explanation: DNA is made up of nucleotides, which consist of a phosphate group, a sugar molecule (deoxyribose in DNA), and a nitrogenous base (adenine, thymine, cytosine, or guanine).

5. b) 46

Explanation: Humans typically have 46 chromosomes in their cells, organized into 23 pairs. Each pair includes one chromosome inherited from the mother and one from the father.

6. c) Carrying genetic information

Explanation: Genes are segments of DNA that carry genetic information and serve as the instructions for building and maintaining an organism's cells and for transmitting traits from parents to offspring.

7. b) James Watson

Explanation: James Watson, along with Francis Crick, is credited with discovering the double helix structure of DNA in 1953. Their work revolutionized the field of genetics and molecular biology.

8. b) Mitosis

Explanation: Mitosis is the process by which a cell divides to form two identical daughter cells. It is responsible for growth, repair, and maintenance of multicellular organisms.

9. a) Somatic cells

Explanation: Mitosis occurs in somatic cells, which are all the cells of the body except for the reproductive cells (sperm and egg cells).

10. b) Two

Explanation: Mitosis produces two daughter cells that are genetically identical to the parent cell.

11. c) Anaphase

Explanation: During anaphase of mitosis, the sister chromatids (duplicated chromosomes) separate and move to opposite ends of the cell.

12. d) To increase genetic variation

Explanation: Meiosis is a type of cell division that produces gametes (sperm and egg cells) with half the number of chromosomes of the parent cell. Its primary function is to generate genetic diversity among offspring.

13. a) Ovaries

Explanation: In females, meiosis takes place in the ovaries, where it produces egg cells (ova).

14. c) The production of sex cells

Explanation: Gametogenesis is the process by which sex cells (gametes) are produced. In males, it is called spermatogenesis, and in females, it is called oogenesis.

15. c) Half the number of the original cell

Explanation: Gametes contain half the number of chromosomes found in somatic cells, which ensures that when fertilization occurs, the resulting zygote has the correct chromosome number.

16. b) Mitosis produces genetically identical daughter cells, while meiosis produces genetically diverse daughter cells.

Explanation: Mitosis results in the production of two genetically identical daughter cells, whereas meiosis produces four daughter cells, each with half the number of chromosomes as the parent cell, leading to genetic diversity.

17. a) Prophase I

Explanation: Prophase I of meiosis involves the pairing of homologous chromosomes, which is called synapsis.

18. c) Four haploid cells

Explanation: The outcome of meiosis is the production of four haploid cells (gametes), each with half the number of chromosomes as the parent cell.

19. a) Before birth

Explanation: Meiosis starts in males before birth and continues throughout their reproductive years.

20. d) Spermatogenesis

Explanation: Spermatogenesis is the process of making models of meiosis in males to understand its movements. It occurs in the testes and produces sperm cells.

21. b) Germ cells

Explanation: Germ cells, which include sperm and egg cells, undergo meiosis to produce gametes with half the number of chromosomes as the parent cell.

22. b) To increase genetic variation

Explanation: The purpose of meiosis is to increase genetic variation by producing gametes with different combinations of genes through processes such as crossing over and independent assortment.

23. b) Four

Explanation: Meiosis consists of four stages: prophase I, metaphase I, anaphase I, and telophase I, followed by a second round of division called meiosis II, which is similar to mitosis.

24. b) The homologous chromosomes separate

Explanation: During metaphase I of meiosis, homologous chromosomes line up in pairs at the cell's equator.

25. d) To produce identical daughter cells

Explanation: The primary function of mitosis in the human body is to produce identical daughter cells for growth, repair, and maintenance of tissues.

26. d) It replaces damaged or worn-out cells with identical copies.

Explanation: Mitosis is crucial for tissue repair because it replaces damaged or worn-out cells with identical copies, ensuring the maintenance of tissue structure and function.

27. a) They contain DNA.

Explanation: Chromosomes are thread-like structures made of DNA and proteins. They carry genetic information in the form of genes.

28. c) To form the spindle fibers

Explanation: The centrioles play a crucial role in cell division by organizing the spindle fibers, which help separate the chromosomes during mitosis and meiosis.

29. a) Plant cells form a cleavage furrow, while animal cells form a cell plate.

Explanation: During cytokinesis in plant cells, a cell plate forms between the two daughter nuclei, eventually developing into a cell wall, while in animal cells, a cleavage furrow forms and pinches the cell into two daughter cells.

30. a) It allows for growth and development.

Explanation: Cell division is essential in multicellular organisms for growth, development, tissue repair, and maintenance of homeostasis.

Let me know if you want to continue with the rest of the answers!

31. Answer: C) DNA

Explanation: Chromosomes are structures within cells that are made up of DNA and proteins. DNA is the genetic material that carries the instructions for the development, functioning, growth, and reproduction of all known organisms.

32. Answer: D) 46

Explanation: A normal human body cell typically contains 46 chromosomes arranged in 23 pairs. These chromosomes carry the genetic information passed from parents to offspring.

33. Answer: B) XY

Explanation: In humans, males typically have XY chromosomes, where X and Y are the sex chromosomes. Females have XX chromosomes. This combination of chromosomes results in a human male.

34. Answer: D) Genetic variety is introduced during the process.

Explanation: Mitosis is a type of cell division where genetic variety is not introduced. Instead, mitosis results in the production of genetically identical daughter cells, known as clones.

35. Answer: A) Genetic variety is introduced during the process.

Explanation: Meiosis is a type of cell division that results in the production of gametes (sperm and egg cells) with genetic variety. This genetic variety is introduced through processes such as crossing over and independent assortment.

36. Answer: B) Gregor Mendel

Explanation: Gregor Mendel, an Austrian scientist, is credited with the pioneering work on garden peas, which laid the foundation for modern genetics. His experiments with pea plants led to the discovery of the basic principles of heredity.

37. Answer: B) Garden peas

Explanation: Gregor Mendel used garden peas (*Pisum sativum*) for his breeding experiments. He chose pea plants because they were easy to grow, had distinct characteristics, and could self-pollinate or cross-pollinate.

38. Answer: C) By manually pollinating the flowers

Explanation: Mendel ensured controlled crosses in his pea plants by manually pollinating the flowers. He removed the anthers from the flowers to prevent self-pollination and then transferred pollen from one plant to another.

39. Answer: A) Recessive

Explanation: An allele that is expressed in the phenotype only if two copies of the allele are present is called a recessive allele. It is masked by a dominant allele when present in a heterozygous genotype.

40. Answer: C) Having two identical alleles for a particular gene

Explanation: A homozygous individual has two identical alleles for a particular gene. This can be either two dominant alleles or two recessive alleles.



41. Answer: A) Flower color

Explanation: Mendel studied the inheritance of various traits in pea plants, including flower color, seed color, seed shape, pod color, pod shape, flower position, and stem length.

42. Answer: A) Monohybrid

Explanation: A monohybrid cross involves the hybridization of two parents that differ in only one characteristic or gene.

43. Answer: B) By crossing homozygous plants

Explanation: Mendel ensured true breeding in his experiments by crossing homozygous plants. This ensured that all offspring would have the same genotype and phenotype as the parents.

44. Answer: C) Heterozygous

Explanation: The F1 generation resulting from Mendel's experiments were heterozygous for the traits he studied. They carried one dominant allele and one recessive allele for each trait.

45. Answer: B) Phenotype

Explanation: Phenotype refers to the physical appearance of an individual relating to a given genetic trait. It is determined by the genotype (genetic makeup) and environmental influences.

46. Answer: A) Punnett squares

Explanation: Mendel represented the possible genotypes and phenotypes of offspring in his genetic crosses using Punnett squares, which are diagrams that predict the outcomes of genetic crosses based on probability.

47. Answer: A) Test cross

Explanation: A test cross is used to determine the genotype of an individual showing the effect of a dominant allele. It involves crossing the individual with a homozygous recessive individual.

48. Answer: C) Blood group AB

Explanation: Blood group AB is considered to be codominant, meaning that both the A and B alleles are expressed in the phenotype.

49. Answer: B) By letters

Explanation: Alleles are represented in genetic diagrams such as Punnett squares using letters, where uppercase letters typically represent dominant alleles and lowercase letters represent recessive alleles.

50. Answer: B) 1:2:1

Explanation: For a cross between two heterozygous parents for a single trait with complete dominance, the phenotypic ratio of the offspring is 1:2:1, meaning one homozygous dominant, two heterozygous, and one homozygous recessive.

That concludes the next batch of answers. Let me know if you want to continue!

51. Answer: A) Codominance

Explanation: Codominance occurs when neither allele in a gene pair is dominant over the other, resulting in both alleles being expressed equally in the phenotype of the heterozygote.

52. Answer: B) Albinism

Explanation: Albinism is a genetic condition characterized by the absence of melanin pigment in the skin, hair, and eyes. It is caused by mutations in genes involved in the production of melanin.

53. Answer: B) Pleiotropy



Explanation: Pleiotropy refers to a genetic condition where a single gene has multiple effects on an individual's phenotype. Examples include sickle cell anemia and cystic fibrosis.

54. Answer: A) Circles

Explanation: In a family pedigree, affected individuals are typically represented by circles (for females) or squares (for males), with shading or other markings indicating the presence of the trait or disorder.

55. Answer: A) 25%

Explanation: If both parents are carriers for a recessive genetic disorder, there is a 25% probability that their child will inherit two copies of the mutant allele and be affected by the disorder.

56. Answer: C) By diagonal lines

Explanation: Heterozygous individuals are represented in genetic diagrams by diagonal lines within the symbol, indicating that they carry two different alleles for a particular gene.

57. Answer: B) Polygenic

Explanation: Polygenic inheritance occurs when a trait is influenced by multiple genes, often resulting in a wide range of phenotypic variation. Examples include height, skin color, and intelligence.

58. Answer: A) Test cross

Explanation: A test cross is used to determine the genotype of an individual showing the effect of a dominant allele. It involves crossing the individual with a homozygous recessive individual.

59. Answer: B) Punnett square

Explanation: Punnett squares are used to represent the possible genotypes and phenotypes of offspring resulting from genetic crosses. They provide a visual tool for predicting the outcomes of genetic experiments.



60. Answer: C) Epistasis

Explanation: Epistasis is the phenomenon where one gene masks the effect of another gene at a different locus. It involves the interaction between different genes to produce a particular phenotype.

61. Answer: A) 9:3:3:1

Explanation: For a dihybrid cross between two individuals heterozygous for two traits with complete dominance, the phenotypic ratio of the offspring is 9:3:3:1, representing the four possible combinations of traits.

62. Answer: C) Down syndrome

Explanation: Down syndrome is a genetic disorder caused by the presence of an extra copy of chromosome 21. It is characterized by intellectual disability, distinctive facial features, and various medical conditions.

63. Answer: B) Incomplete dominance

Explanation: Incomplete dominance occurs when the phenotype of the heterozygote is intermediate between the phenotypes of the two homozygotes. This results in a blending of phenotypes in heterozygous individuals.

64. Answer: B) By lowercase letters

Explanation: Recessive alleles are represented in genetic diagrams such as Punnett squares using lowercase letters to differentiate them from dominant alleles, which are typically represented by uppercase letters.

65. Answer: B) 50%

Explanation: If both parents are carriers for a recessive genetic disorder, there is a 50% probability that their child will inherit one copy of the mutant allele and be a carrier like the parents.

That covers the next batch of answers. Let me know if you'd like to continue!

66. Answer: D) a gene

Explanation: The basic unit of inheritance is a gene. Genes are segments of DNA that contain the instructions for building proteins, which ultimately determine an organism's traits.

67. Answer: B) heterozygous

Explanation: Bekele's genotype for his earlobes, having one allele for dangly lobes from his mother and one for attached lobes from his father, is heterozygous.

68. Answer: C) An allele that only controls the development of a characteristic if it is present on both chromosomes.

Explanation: A recessive allele is only expressed in the phenotype if it is present on both chromosomes of a homologous pair.

69. Answer: B) albinism

Explanation: Albinism is an inherited genetic condition characterized by the absence of melanin pigment in the skin, hair, and eyes. It is caused by mutations in genes involved in melanin production.

70. Answer: B) Selective breeding

Explanation: Selective breeding involves selecting the best possible individuals of a crop plant or domestic animal to improve its performance by breeding them selectively.

71. Answer: C) Specific traits

Explanation: Selective breeding is primarily used to breed for specific traits desired by humans, such as increased yield, disease resistance, or certain physical characteristics.

72. Answer: C) By ensuring known ancestry and homozygosity

Explanation: True-breeding plants or animals for selective breeding are ensured by maintaining known ancestry and homozygosity for desired traits.

73. Answer: C) Homozygous

Explanation: If the desired trait in selective breeding is recessive, it is important that the parents are homozygous for that trait to ensure its expression in the offspring.

74. Answer: B) To identify homozygous recessive individuals

Explanation: The significance of using a test cross in selective breeding is to identify homozygous recessive individuals, which are desired for maintaining the purity of the recessive trait.

75. Answer: C) Those with the desired characteristics

Explanation: In selective breeding, individuals with the desired characteristics are allowed to mate to perpetuate those traits in the offspring.

76. Answer: C) Weakening of desired traits

Explanation: Negative selection in selective breeding can result in the weakening or loss of desired traits due to unintentional selection against them.

77. Answer: C) Genetic weakness

Explanation: Using close relatives for breeding in selective breeding can lead to genetic weakness due to the increased likelihood of inheriting harmful recessive alleles from common ancestors.

78. Answer: C) Cross-breeding

Explanation: Cross-breeding involves the process of combining good traits from two different breeds by mating individuals from different breeds.

79. Answer: D) They breed true after several generations

Explanation: F1 generations do not breed true, meaning they do not consistently produce offspring with the same traits as the parents. However, after several generations of selective breeding, true-breeding lines can be established.

80. Answer: C) Difficulty in delivering calves

Explanation: The Belgian Blue cattle breed is known for its high muscle mass, which can result in dystocia or difficulty in delivering calves due to the large size of the calves relative to the cow's pelvis.

81. Answer: B) South

Explanation: The Borena breed of cattle originated from the southern region of Ethiopia.

82. Answer: D) By being hardy and suited to African climates

Explanation: Borena cattle are adapted to their environment by being hardy and suited to African climates, which helps them thrive in harsh conditions.

83. Answer: C) Agriculture and livestock

Explanation: Agriculture and livestock farming are the primary sources of food and personal wealth for many people in Ethiopia, contributing significantly to the economy and livelihoods.

84. Answer: B) To overcome changes in the world climate

Explanation: Maintaining genetic diversity is important for Ethiopia and the world to overcome changes in the world climate, as diverse genetic resources provide resilience and adaptation to environmental changes.

85. Answer: C) Combining desirable traits from different breeds

Explanation: The main benefit of cross-breeding between different breeds is combining desirable traits from different breeds to produce offspring with improved characteristics.

86. Answer: A) Activity 2.7: Ethiopian breeds

Explanation: Studying the characteristics of local breeds of animals and plants is described as Activity 2.7: Ethiopian breeds.

87. Answer: C) By maximizing resource utilization

Explanation: Selective breeding and cross-breeding contribute to societal well-being by maximizing resource utilization through the development of more productive and resilient crops and livestock.

88. Answer: C) To develop the best possible characteristics

Explanation: The ultimate goal of breeding animals and plants is to develop the best possible characteristics, such as increased productivity, disease resistance, and adaptability to changing environments.

89. Answer: B) Inbreeding

Explanation: Inbreeding involves the process of developing a new breed through repeated selection of offspring within a closed population to maintain desired traits.

90. Answer: C) Holstein Friesian

Explanation: Holstein Friesian is not an Ethiopian breed of cattle. It is a breed of dairy cattle originating from the Netherlands and Germany.

91. Answer: C) horticulture

Explanation: Cross-breeding is also known as horticulture, which involves the selective breeding of plants to develop new varieties with desirable traits.

92. Answer: B) choosing a strong characteristic and selecting for it

Explanation: Selective breeding involves choosing a strong characteristic or trait and selecting for it through breeding to perpetuate that trait in the offspring.

93. Answer: A) The offspring immediately form a new breed of animal or plant.

Explanation: This statement is not true of crossbreeding. Crossbreeding does not immediately form a new breed; it involves breeding individuals from different breeds to combine desirable traits in the offspring.