

Mock Questions for Exit Exam (January 2023)

Questions #1-3 refer to the following situation:

In humans, detached earlobes (D) is dominant to attached earlobes (d). Hirut and her father have attached earlobes. Her mother has detached earlobes.

1. What is Hirut's phenotype?
a. Recessive b. dd c. Attached earlobes d. Homozygous
2. What is the father's genotype?
a. Recessive b. dd c. Attached earlobes d. Homozygous
3. What is a correct description of the mother, in terms of the earlobe gene?
a. She is heterozygous for the gene.
b. She expresses incomplete dominance for the gene.
c. She only has one allele for the gene.
d. It is an unlinked gene.
4. On chromosome 1 of fruit flies, the gene for yellow body is 27.5 map units away from the gene for tan body, 43 map units away from the gene for sable body, and 56.7 map units away from the gene for forked bristles. Which two genes have the highest recombination frequency?
a. Sable body and forked bristles
b. Yellow body and forked bristles
c. Yellow body and tan body
d. Tan body and sable body
5. Every organism has two alleles for each gene. During meiosis, however, these two alleles separate from each other into different gametes. What did Mendel call this phenomenon?
a. Law of independent assortment c. Law of separation
b. Law of causation d. Law of segregation
6. A new flower species is discovered in the rainforest. Back in the lab, a scientist crosses a red variety with a blue variety. The result includes some red flowers, some blue flowers, and some purple flowers. What type of dominance pattern do these plants display?
a. Complete dominance
b. Incomplete dominance
c. Epistasis
d. Codominance

Questions #7-10 refer to the following situation:

Blood type in humans is determined by the type of carbohydrate present on the red blood cells. A red blood cell may have carbohydrate A (I^A), carbohydrate B (I^B), or no carbohydrate (i).

Carbohydrate A and carbohydrate B are codominant to each other and both A and B are completely dominant to the allele for no carbohydrate.

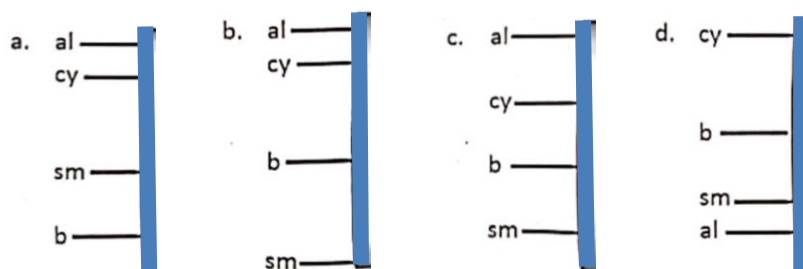
7. How many phenotypes are possible for this situation?
a. 2 b. 3 c. 4 d. 5
8. How many genotypes are possible for this situation?
a. 3 b. 4 c. 6 d. 8
9. Human blood type is an example of what type of inheritance pattern?
a. Incomplete dominance c. Epistasis
b. Linked genes d. Multiple alleles
10. If two recessive alleles are inherited by a person, they are said to have type "O" blood. If a type "O" mother and a homozygous type "A" father have a child, what will be the child's phenotype?
a. A b. O c. AB d. Not enough information
11. For two organisms to have a genetic relationship, which of the following must they share?
a. A common ancestor c. Phenotypes
b. Genotypes d. Linked genes
12. A blue-eyed (bb), blond haired (hh) female and a brown-eyed (Bb), brown haired (HH) male decide to have a baby. What rule would be used to determine the probability that the baby will have the genotype bbHh?
a. Addition rule c. Multiplication rule
b. Trihybrid rule d. Chi-squared rule

Questions #13-14 refer to the following scenario:

In the primula plant, flower color is the result of epistasis. The pigment malvidin (M) creates blue flowers. If this gene is homozygous recessive, the flower is not blue. Also, production of malvidin can be suppressed if there is a dominant allele at gene D.

13. What does it mean for a phenotype to be the result of epistasis?
- One gene controls more than one phenotype.
 - The phenotype is the result of unlinked genes.
 - More than one gene controls one phenotype.
 - The phenotype is the result of linked genes.
14. If two plants heterozygous for both genes are crossed, what will be the ratio of blue to nonblue flowers?
- 13 nonblue: 3 blue
 - 12 nonblue: 3 blue
 - 13 blue: 3 nonblue
 - 12 blue: 3 nonblue
15. What is the location of a sex-linked gene?
- The X chromosome.
 - The Y chromosome.
 - Any autosome.
 - Either the X or Y chromosome.
16. Based on his experiments with pea plants, Mendel came up with a model for inheritance. Which of the following is not part of his model?
- Alleles are alternate versions of genes.
 - All gametes have two alleles for each gene.
 - One allele is dominant to the other.
 - Alleles separate from each other during gamete formation
17. Recombination frequency applies to what type of genes?
- Unlinked
 - Homeobox
 - Codominant
 - Linked
18. Pod color in pea plants can be either green or yellow, with green (G) being dominant to yellow
- (g). What would be the alleles for the parental generation in a monohybrid cross for this trait?
- Gg x Gg
 - GG x gg
 - GG X GG
 - Gg x gg
19. In humans, having a cleft chin © is dominant to have a smooth chin, if two people heterozygous for the trait have children, what percentage of the children will be heterozygous?
- 25%.
 - 50%
 - 75%
 - 100%
20. The table below shows the recombination frequencies for four genes located on chromosome 2 of fruit flies. Using this information, choose the most accurate representation of chromosome 2.

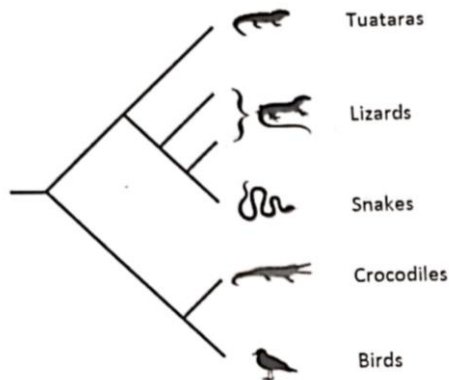
Rf	al	cy	b	sm
al	X	6.1%	48%	91%
cy	X	X	42.4%	84.4%
b	X	X	X	
sm	X	X	X	X



21. In pea plants, round seed is dominant to wrinkled seed. What rule would be used to determine the probability that an F_1 plant resulting from the cross of an Rr plant and an rr plant would be heterozygous for the trait?

- a. Addition rule
- b. Multiplication rule
- c. Trihybrid rule
- d. Chi-squared rule

22. The diagram below shows the relationship between animals in the order Crocodilian. Each branch of the cladogram indicates a common ancestor. Which two animals would have the strongest genetic relationship?



- a. Snakes and tuataras
- b. Crocodiles and snakes
- c. Birds and crocodiles
- d. Lizards and tuataras

Questions #23-25 refer to the following scenario:

Pod shape in pea plants can be inflated or constricted, with inflated (I) being dominant over constricted (i)

23. A pea plant displays inflated pods but has an unknown genotype. What possible genotypes could the plant have?

- a. II
- b. Ii
- c. ii
- d. either "a" or "b"

24. With what plant should it be crossed in order to determine the correct genotype?

- a. II
- b. Ii
- c. ii
- d. either "a" or "b"

25. What is this type of procure called?

- a. Test cross
- b. Dihybrid cross
- c. Epistasis
- d. Mendelian cross

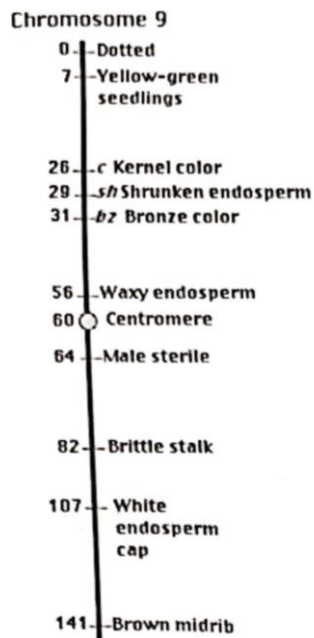
26. If a person is heterozygous *for* both brown eyes (Bb) and a widow's peak (Ww), the resulting gamete could have any one of the following combinations of alleles: BW , Bw , bW , or bw . Mendel referred to this as what?

- a. Law of independence
- b. Law of segregation
- c. Law of independent assortment
- d. Law of recombination

27. You are working with a white rat in the lab. When you cross the white rat with a gray rat, half of the offspring are white and half of the offspring gray. When the F_1 gray rats are interbred, all of the F_2 rats are gray. What can you conclude from this experiment?

- a. Gray is dominant to white coat color in this species of rat.
- b. The gray parental rat was heterozygous *for* the gene.
- c. White is dominant to gray coat color in this species of rat.
- d. The white rat was homozygous for the gene.

28. The image below shows the genetic map for chromosome 9 of the corn plant. Which gene pair below would have the highest frequency of recombination?



- a. Yellow –green seedlings and brittle stalk
- b. Male sterile and brown midrib
- c. Kernel colour and bronz colour
- d. Dotted and brown midrib

Questions #29-30 refer to colour blindness, a recessive sex-linked disorder carried on the X chromosome.

29. If a male is colour blind, from whom did he receive the recessive allele?

- a. Mother
- b. Father
- c. Either mother or father
- d. Not enough information

30. If a female is colour blind, which of the following is not true?

- a. Her father is also colour blind
- b. Both parents are colour blind
- c. Is she has a son, he will be colour blind
- d. Her father was a carrier.

Questions #31-34 refer to the following scenario:

In cats, one of the alleles responsible for coat color is located on the X chromosome. There are two alleles for coat color, orange and black. Orange coat color (X^B) is completely dominant to black coat color (X^b). However, there are tortoiseshell cats who have a mixture of black and orange fur. This occurs because, in gametes with two X chromosomes, one X chromosome is randomly inactivated in each cell. If the chromosome with a black allele is inactivated, that cell will display orange coloring, and vice versa. This results in a mixture of coloring on these cats.

31. Upon first glance, a cat with a mixture of black and orange fur appears to follow what dominance pattern?

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

32. What type of cats typically display the tortoiseshell coloring?

- a. Males
- b. Females
- c. Homozygous X^B
- d. Homozygous X^b

33. If a black male mated with an orange female, what percentage of the female offspring will be tortoiseshell?

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

34. If an F_1 male from the cross in #33 is crossed with a tortoiseshell female, what percentage of the offspring will be orange?

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

Questions #35-38 refer to the following scenario:

In pea plants, yellow seeds (Y) are dominant to green seed (y) and round seeds (R) are dominant to wrinkled seeds (r).

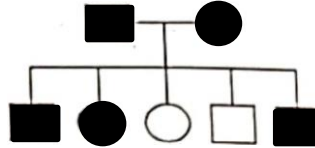
35. In a YyRr x yyrr cross with 1,000 offspring, what are the expected phenotypic results?
- 250 yellow round; 250 yellow wrinkled; 250 green wrinkled; 250 green round
 - 500 yellow round; 500 green wrinkled
 - 750 yellow round; 250 green wrinkled
 - 375 yellow round; 375 green wrinkled; 125 yellow wrinkled; 125 green round
35. The actual results for the cross are as follows:
- 296 yellow round
 - 241 yellow wrinkled
 - 201 green wrinkled
 - 262 green round
37. What is the recombination frequency between these two traits?
- 49.7%
 - 53.7%
 - 50.3%
 - 46.3%
38. What does this recombination frequency reveal about the traits?
- The traits are close to each other on the same chromosome.
 - The traits are considered to be unlinked.
 - The traits have a low degree of crossing over.
 - The traits are sex-linked.
39. The experimental results differed from the expected results. Use the chi-squared value chart below, using 0.05 as the p value, to decide how to interpret the results from the cross.
- | df | P value | | | | | | | | | | | |
|----|---------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|
| | 0.25 | 0.2 | 0.15 | 0.1 | 0.05 | 0.025 | 0.02 | 0.01 | 0.005 | 0.0025 | 0.001 | 0.0005 |
| | 25% | 20% | 15% | 10% | 5% | 2.5% | 2% | 1% | 0.5% | 0.25% | 0.1% | 0.05% |
| 1 | 1.32 | 1.64 | 2.07 | 2.71 | 3.84 | 5.02 | 5.41 | 6.63 | 7.88 | 9.14 | 10.83 | 12.12 |
| 2 | 2.77 | 3.22 | 3.79 | 4.61 | 5.99 | 7.38 | 7.82 | 9.21 | 10.6 | 11.98 | 13.82 | 15.20 |
| 3 | 4.11 | 4.46 | 5.23 | 6.25 | 7.81 | 9.35 | 9.84 | 11.34 | 12.84 | 14.32 | 16.27 | 17.73 |
| 4 | 5.39 | 5.59 | 6.74 | 7.78 | 9.49 | 11.14 | 11.67 | 13.23 | 14.86 | 16.42 | 18.47 | 20.00 |
| 5 | 6.63 | 7.29 | 8.12 | 9.24 | 11.07 | 12.83 | 13.33 | 15.09 | 16.75 | 18.39 | 20.51 | 22.11 |
| 6 | 7.84 | 8.56 | 9.45 | 10.64 | 12.53 | 14.45 | 15.03 | 16.81 | 18.55 | 20.25 | 22.46 | 24.10 |
| 7 | 9.04 | 9.80 | 10.75 | 12.02 | 14.07 | 16.01 | 16.62 | 18.47 | 20.28 | 22.04 | 24.32 | 26.02 |
| 8 | 10.22 | 11.03 | 12.03 | 13.36 | 15.51 | 17.53 | 18.17 | 20.09 | 21.59 | 23.77 | 26.12 | 27.87 |
| 9 | 11.39 | 12.24 | 13.29 | 14.68 | 16.92 | 19.02 | 19.63 | 21.67 | 23.59 | 25.46 | 27.83 | 29.67 |
| 10 | 12.55 | 13.44 | 14.53 | 15.99 | 18.31 | 20.48 | 21.16 | 23.21 | 25.19 | 27.11 | 29.59 | 31.42 |
- Accept the results as being statistical insignificant.
 - Accept the null hypothesis.
 - The difference between the expected results and the observed results were due to random chance.
 - Reject the null hypothesis.
40. The "father of modern genetics" is:
- Charles Darwin
 - Gregor Mendel
 - Francis Crick
 - James Watson
41. If an offspring is said to be homozygous recessive, which of the following could be its genotype?
- Rr
 - Tt
 - SS
 - ss
42. Genotype refers to:
- The genetic make-up of an organism
 - The physical make-up of an organism
 - The genetic and physical make-up of an organism
43. If fur colour in mice is caused by the following: B= black and b= brown, choose the genotype for the organism which will have brown fur. (Assume black is dominant)
- BB
 - Bb
 - bb
 - A or B
44. A specific form of a characteristic that can be inherited is referred to as:
- Gene
 - Chromosome
 - Hybrid
 - Trait
45. Assume that in mice, B=black fur, b = brown fur. If a heterozygous black mouse mates with a homozygous brown mouse, what percent of their offspring will have black fur?
- 25%
 - 50%
 - 75%
 - 100%
46. What characteristic describes an Individual that carries two different alleles for a given characteristic?
- Homozygous
 - Heterozygous
 - Dominant allele
 - Recessive allele

47. Which one of the following would have a different phenotype from the others?
 a. Rr b. rR c. RR d. rr

The next first three questions are based on the pedigree to the right:

48. The characteristic indicated by the blackened figures is probably:

- a. Dominant.
 b. Recessive.
 c. Non-dominant.
 d. Sex-linked recessive.



49. What are the genotypes of the parents?

- a. Both are homozygous dominant.
 b. Both are heterozygous dominant.
 c. Both are homozygous recessive.
 d. The male is homozygous dominant; the female is homozygous recessive.

50. If one parent has type A blood and the other parent has type B blood, what blood type will the offspring denoted by the white square and circle have?

- a. Type A. b. Type B. c. Type AB. D. Type O.

51. Mitotic cell division results in two cells that have:

- a. n chromosomes and are genetically identical.
 b. n chromosomes and are genetically different.
 c. 2n chromosomes and are genetically identical.
 d. 2n chromosomes and are genetically different.

52. In tobacco, if the diploid number of chromosomes is 48, how many chromosomes will be found in a pollen grain?

- a. 96 b. 48 C. 24 d. 12

53. The four cells produced in meiosis will have a:

- a. 2n number- of chromosomes and will differ genetically from each other.
 b. 2n number of chromosomes and will be genetically identical to each other.
 c. n number of chromosomes and will be genetically identical to each other.
 d. n number of chromosomes and will differ genetically from each other.

54. In the F₂ generation of a monohybrid cross, the phenotypic ratio would be:

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

55. Hemophilia is a sex-linked recessive trait in humans. If a father and a son are both hemophiliacs. But the mother is normal, her genotype must be:

- a. X^hX^h b. X^HX^h c. X^HX^H d. X^hY

56. Mitosis involves separation of only sister chromatids while meiosis involves?

- a. Also separation of only sister chromatids.
 b. Separation of only homologous chromosomes.
 c. Separation of homologous chromosomes as well as sister chromatids.
 d. Separation of sister chromatids twice.

57. The cytoplasm of an animal cell is divided by means of:

- a. A cleavage furrow. c. A cell membrane formed within the cytoplasm.
 b. A cell plate. d. Mitosis.

58. The step of mitosis in which chromosomes line up along the equatorial plane of the cell is called:

- a. Prophase. b. Metaphase. c. Anaphase. d. Telophase.

59. An example of alleles is:

- a. AB and Tt. b. TT and Tt. c. T and t. d. X and Y.

60. An example of a genotype is:

- a. A tall pea plant. b. R and r. c. TtHH. d. Hemophiliac.

61. Which of the following gives information about the phenotype but not the genotype?

- a. X^HY . c. Tall pea plant.
 b. Hemophiliac man. d. Female carrier for colour-blindness.

62. Which blood type would not be possible for children of a type AB mother and a type A father?

- a. O. b. A. c. B. d. AB.

63. Long radishes crossed with round radishes result in all oval radishes. This type of inheritance is:

- a. Multiple alleles. c. Co-dominance.
 b. Complete dominance. d. Incomplete dominance.

64. If two white sheep produce a black offspring, the parent's genotypes for colour must be:
 a. Heterozygous. c. Homozygous black.
 b. Homozygous white. d. Not enough information was given.
65. An extra finger in humans is rare but is due to a dominant gene. When one parent is normal and the other parent has an extra finger but is heterozygous for the trait, what is the probability that the first child will be normal?
 a. 0% b. 25% c. 50% d. 75%
66. In drosophila (fruit flies), eye colour is sex-linked and red eye colour is dominant to white eye colour. Which of the following are not possible in a cross between a red-eyed male and a heterozygous female?
 a. Red-eyed male. c. Carrier female.
 b. White-eyed male. d. Homozygous white-eyed female.
67. Which statement concerning a pair of alleles for a gene controlling a single characteristic in humans is true?
 a. Both genes come from the father.
 b. Both genes come from the mother.
 c. One gene comes from the mother and one gene comes from the father.
 d. The genes come randomly in pairs from either the mother or father.
68. Which of the following factors could lead to variations in the offspring of asexually reproducing organisms?
 a. Crossing over. c. Mutations.
 b. Fertilization. d. Independent assortment.

Genetic traits of seeds are noted as follows:

L = long, l = short

W = wrinkled, w = smooth

Y = yellow, y = white

R = ribbed, r = grooved

69. Which of the following is the genotype for a short, wrinkled, yellow, grooved seed?
 a. llWwyyrr b. LLWwYRr c. LlWwYYRr d. llWwYYrr
70. Mendel discovered principles of inheritance because he:
 a. Observed simultaneously all of the many characteristics in which the parents differed.
 b. Believed that the hereditary characteristics of two individuals became thoroughly blended in the offspring.
 c. Ignored all characteristics except a few markedly contrasting ones in which he studied.
 d. Studied only the offspring obtained from a single mating.
- For the next three questions, use the following key to indicate how many different kinds of gametes (with respect to the traits listed) could be produced by each of the individuals described.
 KEY: a = 1, b = 2, c = 4, d = 8
71. An individual with the genotype BBFF.
72. An individual with the genotype ddffMm.
73. An individual with the genotype BbffMm.
74. Carriers of the colour-blindness trait include:
 a. Men who are heterozygous for the trait.
 b. Men who are homozygous for the trait.
 c. Women who are heterozygous for the trait.
 d. Women who are homozygous for the trait.
75. Normal human eggs have:
 a. 22 autosomes and an X chromosome.
 b. 22 autosomes and a Y chromosome.
 c. 23 autosomes.
 d. 46 chromosomes.
76. A strand of DNA with the sequence A ACTTG will have a complementary strand with the following sequence:
 a. CCAGGT b. AACTTG c. TTCAAG d. TTGAAC
77. A pedigree chart shows:
 a. The genotypic ratios of the offspring.
 b. The types of gametes produced by the parents.

- c. The pattern of inheritance of a specific gene.
- d. Which genes are co-dominant.
- e. The genotypes of any parents.

For the next four questions, use the following key:

KEY: a = All the offspring will exhibit the dominant trait.

b = All the offspring will exhibit the recessive trait.

c = The recessive trait will show up in about 50% of the offspring.

d = The dominant trait will show up in about 75% of the offspring.

What will be the result if:

78. Bb mates with bb?

79. BB mates with bb?

80. bb mates with bb?

81. Bb mates with Bb?

82. Which of the following statements about genes is **false**?

- a. genes are made up of DNA
- b. genes are found on chromosomes
- c. Gene are transmitted during sexual reproduction, but not during asexual reproduction.
- d. Every individual inherits thousands of genes from each of his or her parents
- e. genes can program cells to make enzymes or other proteins

83. Sexual and asexual reproduction are alike in that _____.

- a. they both give rise to genetically distinct offspring
- b. they both involve two parents
- c. they both require meiosis to complete the reproductive cycle
- d. they can both occur in multicellular organisms
- e. in both cases, every parent transmits all of its genes to its progeny

84. Which of the following statements is false?

- a. Diploid cells can divide by mitosis
- b. Diploid cells can divide by meiosis
- c. Haploid cells can divide by mitosis
- d. Haploid cells can divide by meiosis
- e) All of these statements are true.

85. In sexually reproducing species, the chromosome number remains stable over time because _____ and _____ are always alternate.

- a. meiosis, fertilization
- b. meiosis, mitosis
- c. mitosis, fertilization
- d. meiosis, interphase
- e. meiosis I, meiosis II

86. Humans possess:

- a. 22 pairs of sex chromosomes and 1 pair of autosomes
- b. 23 pairs of mitochondria
- c. equal numbers of autosomes and sex chromosomes
- d. 22 pairs of autosomes and 1 pair of sex chromosomes
- e) none of the above

87. What is the result when a diploid cell undergoes meiosis?

- a. Two diploid cells
- b. two haploid cells
- c. four diploid cells
- d. four haploid cells
- e. two haploid cells and two diploid cells

88. Synapsis occurs during _____

- a. Anaphase I
- b. Prophase I
- c. Cytokinesis
- d. Prophase II
- e. Metaphase I

89. During anaphase I _____

- a. Homologous chromosomes separate and migrate toward opposite poles.
- b. Sister chromatids separate and migrate toward opposite poles.
- c. Nuclei reform.
- d. Chromosomes line up in one plane
- e. The cell is haploid

90. A tetrad is made up of:
- two chromatids from one chromosome
 - one chromatid from two homologous chromosomes
 - four chromatids from two homologous chromosome
 - one chromatid from one chromosome
 - none of the above
91. The major contribution of sex to evolution is _____
- It is the only mechanism for species to reproduce.
 - It provides a method to increase genetic variation.
 - It provides a way in which somatic mutations can be inherited
 - a and b are correct
 - a and c are correct
92. The law of independent assortment _____
- States that the alleles at different loci segregate independently from one another during a dihybrid cross.
 - Can account for a 9: 3:3: 1 ratio seen in the F₂ generation.
 - Applies only to genes that are present on different chromosomes.
 - a** and **b** are correct
 - All of the above are correct.
93. *Drosophila* is a useful organism for genetic studies for all of the following reasons except:
- They have a long generation time
 - A single mating can produce many offspring
 - They have a small number of chromosomes.
 - Drosophila* chromosomes can be easily distinguishable under a light microscope.
 - All of the above.
94. Wild type is referred to as:
- The most common phenotype in the natural population.
 - The most extreme mutant phenotype observed in an experiment.
 - Any mutant genotype.
 - A kind of chromosomal deletion
 - Extra-nuclear genes
95. What is the probability that a male will inherit an X-linked recessive allele from his father?
- 0%
 - 25%
 - 50%
 - 75%
 - 100%
96. Karyotypes are useful for:
- Determining whether or not the chromosomes are normal in number
 - Determining whether or not the chromosomes are normal in structure
 - Determining the sex of an individual
 - All of the above
 - None of the above
97. Which type of chromosomal alteration is responsible for the disorder Cri Du chat?
- Inversion
 - Duplication
 - Genetic imprinting
 - deletion
 - Translocation
98. Which one of the following is the only known variable human monosomy?
- XYY
 - XO
 - YO
 - XY
 - XX
99. A woman is red-green color-blind. What can we conclude if anything about her father?
- We have too little information to tell
 - There is a 50% probability that he has normal vision
 - He is red-green colour-blind.
 - He has two Y chromosomes.
 - None of the above.
100. Cystic fibrosis, which is usually lethal before the age of reproduction, is a homozygous recessive trait. Why do cases continue to arise even though people with the disease rarely live to reproduce?
- Because new mutations continually introduce this harmful condition into the population
 - Because the harmful allele "hide" within heterozygous individuals, one fourth of the offspring of two heterozygous will be affected.
 - Because mosquitoes can transfer the disease from person to person.
 - Because people continue to make inappropriate lifestyle choices.

e. None of the above.

101. Fill in the following chart

Trait	Mitosis	Meiosis
Number of times the cell divided		
Number of daughter cells		
Type of parent cell		
Type of daughter cell		
Number of chromosomes in daughter cell		
Do homologous chromosomes pair? Yes or No?		

102. Which of the following substances carries all the information needed to direct and control a cell's activities?

- a. DNA b. lipids c. RNA d. enzymes

103. What must happen before a cell divides?

- a. Proteins must be stored. c. RNA must be copied.
b. Carbohydrates must be broken down. d. DNA must be copied.

104. Traits are passed from parents to offspring

- a. by mitosis
b. in unpredictable patterns
c. during spontaneous generation
d. through genes located on chromosomes

105. What produces genetic variation in humans?

- a. the genes that code for RNA and proteins
b. the nearly 6 billion base pairs in DNA
c. a gene pair in which one gene is not working
d. changes in the noncoding region of DNA

106. What is a genetic disorder?

- a. a mutation that has no effect on the organism
b. change in the noncoding region of DNA
c. a disease or condition that results from mutations
d. a change in the order of genes in DNA

107. A cancer is a type of genetic mutation that

- a. produces cancer proteins c. is always inherited
b. affects a person's appearance d. uncontrolled growth of cells

108. DNA contains a code for:

- a. changing organisms c. making RNA and protein
b. making mutations d. selective breeding

109. The relationships of family members can be shown with a

- a. DNA replication chart c. making RNA and proteins
b. genetic engineering table d. selective breeding

110. Genetic engineering involves

- a. profiling DNA c. mapping genomes
b. re-sequencing proteins d. changing an organism's genes

111. A clone is an organism that

- a. is genetically identical to its parent c. has no DNA
b. can't reproduce d. has half the number of chromosomes its parents has.

112. All of the cells in your hand have

- a. has no DNA
b. has half the number of chromosomes its parent
c. half the normal amount of DNA
d. double the normal amount of DNA

113. When a cell prepares to divide, its genetic information condenses from a mass of loose strands into tightly wound structures called

- a. Chromosomes c. Centromeres
b. Chromatids d. Chromatin

114. The offspring produced during asexual reproduction are
 - a. always larger than their parents
 - b. always smaller than their parents
 - c. genetically identical to their parents
 - d. genetically different from their parents
115. Dwarf pea plants (tt) are crossed with pea plants of regular height (TT). Which of these describes the first generation plants?
 - a. All are regular height.
 - b. All are dwarf height.
 - c. Half are regular height.
 - d. One-quarter are dwarf height.
116. One parent has one dominant allele for tall (T) and one for short (t). The other parent has a tt genotype. What is the probability of the offspring's being tall?
 - a. 0 percent
 - b. 25 percent
 - c. 50 percent
 - d. 100 percent
117. Each box in a Punnett square shows
 - a. one possible allele from one parent
 - b. one possible allele from each parent
 - c. two possible alleles from one parent
 - d. two possible alleles from each parent
120. A pedigree is a diagram that can be used to
 - c. predict the number of offspring through several generations
 - d. show the inheritance pattern of a trait through two or more generations
 - e. predict the sex of offspring through several generations
 - f. show how to treat a genetic condition
121. How are RNA and DNA involved in making proteins?
 - a. DNA transcribes and transfers the genetic code to rRNA.
 - b. RNA translates and replicates the genetic code for DNA.
 - c. mRNA replicates and transfers information to tRNA
 - d. DNA is transcribed and translated by RNA.
122. Crossing corn plants known to produce large yields is an example of
 - a. cross breeding
 - b. selective breeding
 - c. cloning
 - d. genetic engineering
123. Gregor Mendel used pea plants to study
 - a. flowering.
 - b. gamete formation.
 - c. the inheritance of traits.
 - d. cross-pollination.
124. Offspring that result from crosses between true-breeding parents with different traits
 - a. are true-breeding.
 - b. make up the F₂ generation.
 - c. make up the parental generation.
 - d. are called hybrids.
125. The chemical factors that determine traits are called
 - b. alleles.
 - b. traits.
 - c. genes.
 - d. characters.
126. Gregor Mendel concluded that traits are
 - a. not inherited by offspring.
 - b. inherited through the passing of factors from parents to offspring.
 - c. determined by dominant factors only.
 - d. determined by recessive factors only.
127. When Gregor Mendel crossed a tall plant with a short plant, the F₁ plants inherited
 - a. an allele for tallness from each parent.
 - b. an allele for tallness from the tall parent and an allele for shortness from the short parent.
 - c. an allele for shortness from each parent.
 - d. an allele from only the tall parent.
128. The principle of dominance states that
 - a. all alleles are dominant.
 - b. all alleles are recessive.
 - c. some alleles are dominant and others are recessive.
 - d. alleles are neither dominant nor recessive.
129. If coupled individuals who are both carriers for a genetically inherited fatal recessive disease decide to become parents, what will be the odds that their children will also be carriers?
 - a. 1 out of 4
 - b. 2 out of 4
 - c. 3 out of 4
 - d. 4 out of 4
130. If a woman is homozygous normal and her husband is heterozygous for a genetically inherited recessive disease and they decide to become parents, what is the probability that they will have a healthy child?
 - a. 1 out of 4
 - b. 2 out of 4
 - c. 3 out of 4
 - d. 4 out of 4

131. If medical researchers discovered that there is a single human gene responsible for all of the various forms of physical deterioration commonly associated with diabetes, it would be referred to as:
- a modifying gene
 - pleiotropy
 - a regulator gene
 - polygeny
132. Test cross and the cross between F₁ and a pure dominant parent are the same.
- True
 - False
133. Among the pre-mendelian theories of inheritance the advanced or more scientifically accepted one is the theory of germplasm.
- True
 - False
134. When Gregor Mendel crossed true-breeding tall plants with true-breeding short plants, all the offspring were tall because
- the allele for tall plants is recessive.
 - the allele for short plants is dominant.
 - the allele for tall plants is dominant.
 - they were true-breeding like their parents.
135. A tall plant is crossed with a short plant. If the tall F₁ pea plants are allowed to self-pollinate.
- the offspring will be of medium height.
 - all of the offspring will be tall.
 - all of the offspring will be short.
 - some of the offspring will be tall, and some will be short.
136. The principles of probability can be used to
- predict the traits of the offspring produced by genetic crosses.
 - determine the actual outcomes of genetic crosses.
 - predict the traits of the parents used in genetic crosses.
 - decide which organisms are best to use in genetic crosses.
137. In the P generation, a tall plant is crossed with a short plant. The probability that an F₂ plant will be tall is:
- 50%.
 - 75%.
 - 25%.
 - 100%.
138. Organisms that have two identical alleles for a particular trait are said to be
- hybrid.
 - heterozygous.
 - homozygous.
 - dominant.

	Tt	
TT		
	T	T
	T	T
	TT	Tt

Figure 1

T = tall ; t = short

139. In the Punnett square shown in Figure 1, above which of the following is true about the offspring resulting from the cross? (Tt x TT)
- About half are expected to be short.
 - All are expected to be short.
 - About half are expected to be tall.
 - All are expected to be tall
140. The genotypic ratio of the offspring in Figure 1 is:
- 2TT:2Tt
 - 2tall:2short
 - 1TT:1Tt: 1t
 - 3tall:1short
141. The phenotypic ratio of the offspring in Figure 1 is:
- 2TT:2Tt
 - 2tall:2short
 - 1 TT:2Tt: 1t
 - 4 tall
142. A Punnett square shows all of the following, EXCEPT
- All possible results of a genetic cross.
 - The genotypes of the offspring.
 - The alleles in the gametes of each parent.
 - The actual results of a genetic cross.
143. If you made a Punnett square showing Gregor Mendel's cross between true-breeding tall plants and true-breeding short plants, the square would show that the offspring had
- the genotype of one of the parents.
 - a phenotype that was different from that of both parents.
 - a genotype that was different from that of both parents.
 - the genotype of both parents.

144. What principle states that during gamete formation genes for different traits separate without influencing each other's inheritance?
- principle of dominance
 - principle of independent assortment
 - principle of probabilities
 - principle of segregation
145. How many different allele combinations would be found in the gametes produced by a pea plant whose genotype was $RrTt$?
- 2
 - 4
 - 8
 - 16
146. If a pea plant that is heterozygous for round, yellow peas ($RrYy$) is crossed with a pea plant that is homozygous round peas but heterozygous for yellow peas ($RRYy$), how many different phenotypes are their offspring expected to show?
147. Situations in which one allele for a gene is not completely dominant over another allele for that gene are called
- multiple alleles.
 - polygenic inheritance.
 - incomplete dominance.
 - multiple genes.
148. A cross of a red cow (RR) with a white bull (WW) produces all roan offspring ($RRWW$). This type of inheritance is known as
- incomplete dominance.
 - codominance.
 - polygenic inheritance.
 - Multiple alleles
149. If an organism's diploid number is 12, its haploid number is
- 12
 - 6
 - 24
 - 3
150. Gametes have
- homologous chromosomes.
 - twice the number of chromosomes found in body cells.
 - two sets of chromosomes.
 - one allele for each gene.
151. Gametes are produced by the process of
- mitosis.
 - meiosis.
 - crossing-over.
 - replication.

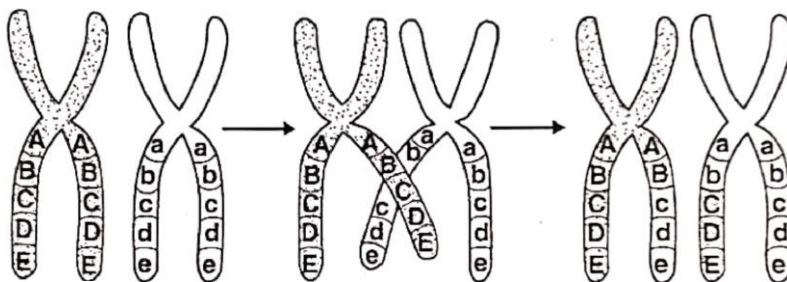


Figure 2.

152. What is shown in Figure 11-3? (Figure 11-16 in your book)
- independent assortment
 - anaphase I of meiosis
 - crossing-over
 - replication
153. Chromosomes form tetrads during
- prophase of meiosis I.
 - metaphase of meiosis I.
 - interphase.
 - anaphase of meiosis II.
154. What happens between meiosis I and meiosis II that reduces the number of chromosomes?
- Crossing-over occurs.
 - Metaphase occurs.
 - Replication occurs twice
 - Replication does not occur
155. When you flip a coin, what is the probability that it will come up tails?
- $\frac{1}{2}$
 - $\frac{1}{4}$
 - $\frac{1}{8}$
 - 1
156. Human blood types are produced by alleles A, B, and O. Having more than 2 alleles control a trait is called:
- incomplete dominance
 - codominance
 - polygenic traits
 - multiple alleles
157. When the heterozygous phenotype is a combination or an intermediate of the two homozygous phenotypes, it is called
- incomplete dominance
 - codominance
 - polygenic traits
 - multiple alleles
158. If the sex cell of an organism has 20 chromosomes, then the body cells will have:
- 20 chromosomes
 - 10 chromosomes
 - 15 chromosomes
 - 40 chromosomes

159. The different forms of a gene are called:
 a. factors b. alleles c. . traits d. gametes
160. When two heterozygous tall pea plants are crossed, the expected genotype ratio of the offspring is:
 a. 3:1 b. 1:2:1 c. 2:2 d. 4:0
161. The principle of independent assortment states that _____ for different traits can segregate independently during the formation of gametes.
 a. sex cells c. characteristics
 b. chromosomes d. genes
162. If pea plants that are homozygous for round, yellow seeds (*RRYY*) were crossed with pea plants that are heterozygous for round, yellow seeds (*RrYy*), the expected phenotype(s) of the offspring would be:
 a. round, yellow c. round, green
 b. wrinkled, yellow d. wrinkled, green
163. Red, white, and pink phenotypes in flowers called four o'clocks are an example of:
 a. codominance c. incomplete dominance
 b. multiple alleles d. polygenic traits
164. An organism's _____ have half the number of chromosomes found in the organism's body cells.
 a. gametes b. genotype c. phenotype d. diploid cells
165. Genetics is:
 a. The study of genes c. the study of traits
 b. the study of hereditary d. study of Gregor Mendel
166. How many recessive alleles for a trait must an organism inherit in order to show that trait?
 a. none b. 1 c. 2 d. 4
167. The four cells produced in meiosis will have a:
 a. $2n$ number of chromosomes and will differ genetically from each other.
 b. $2n$ number of chromosomes and will be genetically identical to each other.
 c. n number of chromosomes and will be genetically identical to each other.
 d. n number of chromosomes and will differ genetically from each other.
168. In the F_1 generation of a monohybrid cross, the phenotypic ratio would be:
 a. 3:1 b. 1:2:1 c. 2:1:1 d. 1:1:2
169. Draw a diagram to illustrate the type of a non-disjunction that would cause a normal female and a normal male to produce an XYY offspring and X0 offspring and indicate the name of the resulting two genetic disorders. The names of the two genetic disorders are:
 a. XYY – Turner's syndrome and X0 – Klinefelter syndrome
 b. XYY – Klinefelter syndrome and X0 – Turner's syndrome
 c. XYY – Turner's syndrome and X0 – Down's syndrome
 d. XYY – Down's syndrome and X0 – Klinefelter syndrome
170. Colour blindness is an X-linked recessive trait and the coupled man and a woman both have normal vision. They have three offspring, all of whom marry people with normal vision. Three offspring and their children are as follows:
 a. A son with red-green colour blindness who has a daughter with normal vision.
 b. A daughter who has three sons with normal vision.
 c. A daughter who has one red-green colour blind son and one son with normal vision.
 Draw the pedigree for this family, indicate the affected, carrier, and normal people from the grandchildren. Which of the following statements is true about this genetic disorder from the pedigree you drawn?
 a. 1 carrier daughter, 4 normal sons, and 1 colour blind son.
 b. 4 carrier sons, 1 normal son, and 1 colour blind daughters.
 c. 1 colour blind daughter, 1 carrier son, and 4 normal sons.
 d. From the grandparents the man was carrier and the woman was free or normal.
171. Two couples had baby boys in the same hospital at the same time. There was a mix-up in the hospital nursery. Using the information given in the table below, explain which baby belongs to which family.

	Couple 1		Couple 2		Babies	
	Parent 1	Parent 1	Parent 2	Parent 2	Baby 1	Baby 2
Blood type	B	AB	B	A	A	O

Therefore:

- a. Baby 1 with A type blood belongs to couple 2 and Baby 2 with O type blood belongs to couple 1.
 b. Baby 1 with A type blood belongs to couple 1 and Baby 2 with O type blood belongs to couple 2.
 c. The two Babies can't belong to any of the couples.
 d. Baby 1 with A type blood belongs to couple 1 but Baby 2 with O type blood does not belong to neither couple 1 nor to couple 2.