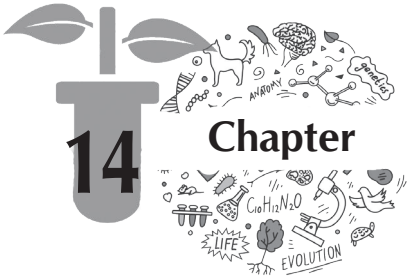


Principles of Inheritance and Variation

MULTIPLE CHOICE QUESTIONS

Topic 1 | Mendel's Laws of Inheritance

1. Which technique was used by Mendel during his experiments on pea plant?
(a) Artificial pollination
(b) Cross pollination
(c) Self-pollination
(d) All of these

2. Choose the correct statement(s) from the following.
(I) During Mendel's investigation, statistical analysis and mathematical logic were applied to problems in Biology.
(II) Mendel investigated characters in the garden pea plant that were manifested as two opposing traits.
(III) Mendel conducted artificial pollination experiments using several true-breeding pea lines.
(IV) Mendel selected eight true-breeding pea plant varieties as pairs.
(a) I and II (b) III and IV
(c) I, II and III (d) All of these

3. The contrasting trait(s) selected by Mendel was/were
(a) smooth or wrinkled seed
(b) yellow or green seed
(c) smooth or inflated pods
(d) all of these

4. Assertion: Mendel conducted hybridization experiments on garden pea plant.
Reason: He proposed laws of inheritance in living organisms.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not correct explanation of assertion.
(c) Assertion is true, but reason is false.
(d) Both assertion and reason are false.

5. Assertion: Mendel used contrasting traits for his studies. Reason:He used Ocimum plant for his experiments.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not correct explanation of assertion.
(c) Assertion is true, but reason is false.
(d) Both assertion and reason are false.

6. Assertion: Mendel used true-breeding pea lines for his experiments.
Reason: A true-breeding line is one that has undergone continuous self pollination**.**
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not correct explanation of assertion.
(c) Assertion is true, but reason is false.
(d) Both assertion and reason are false. Inheritance of one Gene

7. Genetics is the subject that deals with
(a) inheritance
(b) variation of characteristics
(c) reproduction
(d) both (a) and (b)

8. The basis of heredity is
(a) variation (b) inheritance
(c) mutation (d) linkage

9. Humans knew from as early as 8000–1000 BC that one of the causes of variation was hidden in
(a) sexual reproduction
(b) asexual reproduction
(c) vegetative propagation
(d) none of these

10. Choose the incorrect statement from the following.
(a) Humans knew from very early that sexual reproduction is one of the causes of variation.
(b) They exploited the variation to obtain plants and animals of desirable characters through selective breeding.
(c) Sahiwal cows were obtained through artificial selection and domestication from ancestral wild cows.
(d) Our ancestors were very well aware about the scientific basis of inheritance of characters and variation.

11. Which one from the following is the period for Mendel's hybridization experiments?
(a) 1840–1850 (b) 1857–1869
(c) 1870–1877 (d) 1856–1863

12. Who proposed the 'Laws of Inheritance' in living organisms?
(a) Mendel (b) Morgan
(c) de Vries (d) Correns

13. Match Column-I with Column-II and choose the correct answer from the codes given below.

Column-I		Column-II	
(a)	Genetics	(1)	Process of passing characters from parent to offspring
(b)	Inheritance	(2)	Laws of inheritance
(c)	Variation	(3)	A branch of Biology
(d)	Mendel	(4)	Degree of difference of progeny from their parents

Codes-

	A	B	C	D
(a)	1	4	2	3
(b)	4	2	3	1
(c)	3	1	4	2
(d)	2	3	1	4

14. Mendel investigated characters in the garden pea plant that were manifested as two
(a) linked traits (b) opposing traits
(c) similar traits (d) none of these

15. How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments?
(a) Six (b) Eight
(c) Seven (d) Four

16. Which contrasting trait was not studied by Mendel during his experiments?
(a) Seed colour (b) Leaf colour
(c) Flower colour (d) Stem height

17. Among the following, which one is not a dominating trait?
(a) Axial position of flower
(b) Green colour of pod
(c) Violet colour of flower
(d) Green colour of seed

18. A true-breeding line is one that
(a) has undergone continuous selfpollination
(b) shows stable trait inheritance
(c) shows expressions of trait for several generations
(d) all of these

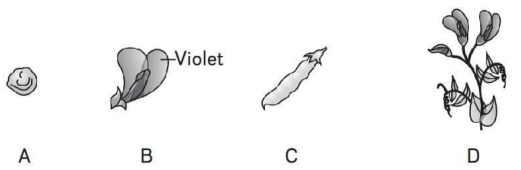
19. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	Column-II
(a) Axial flower	(1) Undergone continuous self-pollination
(b) Terminal flower	(2) Father of genetics
(c) Mendel	(3) Dominant trait
(d) True-breeding line	(4) Recessive trait

Codes-

	A	B	C	D
(a)	3	4	2	1
(b)	4	3	1	2
(c)	1	2	4	3
(d)	2	1	3	4

20. Refer to the given figures (A–d) showing traits of pea plant studied by Mendel. Among these, choose the dominant trait.



(a) B (b) A
(c) D (d) C

Topic 2 | Inheritance of One Gene

21. Choose the incorrect statement about law of dominance.
(a) It is used to explain the expression of only one of the parental characters in a monohybrid cross in F1-generation.
(b) It does not explain the expression of both parental characters in F2-generation.
(c) It also explains the proportion of 3: 1 obtained in F2-generation.
(d) It states that characters are controlled by discrete units called factors.

22. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I		Column-II	
(a)	First law of inheritance	(1)	Law of segregation
(b)	Second law of inheritance	(2)	3: 1
(c)	Monohybrid cross	(3)	Law of dominance
(d)	Test cross	(4)	1: 1

Codes-

	A	B	C	D
(a)	3	1	2	4
(b)	1	3	4	2
(c)	2	3	1	4
(d)	4	2	3	1

23. The second law of inheritance, i.e., law of segregation is based on the fact that
(a) alleles do not show any blending.
(b) both characters are recovered as such in F2 generation.
(c) one allele dominates the other allele.
(d) Both (a) and (b)

24. The factor controlling any character is discrete and independent. It was concluded on the basis of
(a) results of F3-generation of a cross.
(b) observations of a cross made between the plants having two contrasting traits where offspring shows only one trait without any blending.
(c) self-pollination of F1-offspring.
(d) cross pollination of parental generations.

25. In Antirrhinum (Snapdragon), a red flower was crossed with a white flower and in F1 generation, pink flowers were obtained. When pink flowers were selfed, the F2 generation showed white, red and pink flowers. Choose the incorrect statement from the following.
(a) The experiment does not follow the principle of dominance.
(b) Pink colour in F1 is due to incomplete dominance.
(c) Ratio of F2 is ¼ (Red): 2/4 (Pink): ¼ (white).
(d) Law of segregation does not apply in this experiment.

26. It was being observed that sometimes, the F1 shows a phenotype that does not resemble either of the two parents and remains in between the two. It can be explained by
(a) Law of dominance

(b) Law of segregation
(c) Law of incomplete dominance
(d) None of these

27. The genotypic ratio obtained in incomplete dominance is
(a) 3 : 1 (b) 1 : 1 : 2
(c) 2 : 1 : 1 (d) 1 : 2 : 1

28. In case of co-dominance, the F1 progeny
(a) resembles either of the two parents
(b) is in between of parents
(c) resembles both the parents
(d) none of these

29. A person of AB blood group has IA and IB genes. It is an example of
(a) pleiotropy (b) segregation
(c) co-dominance (d) None of these

30. In a marriage between male with blood group A and female with blood group B, the progeny had either blood group AB or B. What could be the possible genotype of parents?
(a) IAi (Male); I^Bi (Female)
(b) IAi (Male); I^BI^B (Female)
(c) IAIA (Male); I^BI^B (Female)
(d) IAIA (Male); I^Bi (Female)

31. A person has 'O' blood group. His mother has 'A' while father has 'B' blood group. What would be the genotype of mother and father?
(a) Mother is homozygous for 'A' blood group and father is heterozygous for 'B' blood group.
(b) Mother is heterozygous for 'A' blood group and father is homozygous for 'B' blood group.
(c) Both mother and father are homozygous for 'A' and 'B' blood groups respectively.
(d) Both mother and father are heterozygous for 'A' and 'B' blood groups respectively.

32. Which of the following characteristics represent 'inheritance of blood groups' in humans?
(I) Dominance
(II) Co-dominance
(III) Multiple dominance
(IV) Incomplete dominance
(V) Polygenic inheritance
(a) II, III and V (b) I, II and III
(c) II, IV and V (d) I, III and V

33. A man with blood group 'A' marries a woman with blood 'B'. What are all possible blood groups of their offsprings?
(a) A, B and AB only
(b) A, B, AB and O
(c) O only
(d) A and B only

34. The genotypes of a husband and wife are IAIB and IAi. Among the blood types of their children, how many different genotypes and phenotypes are possible?
(a) 3 genotypes: 4 phenotypes
(b) 4 genotypes: 3 phenotypes
(c) 4 genotypes: 4 phenotypes
(d) 3 genotypes: 3 phenotypes

35. Multi alleles are present
(a) at different loci on the same chromosome
(b) at the same locus of the chromosome
(c) on non-sister chromatids
(d) on different chromosome

36. Match Column-I with Column-II and choose the correct answer from the codes given below.

Column-I		Column-II	
(a)	Dominance	(1)	ABO blood group
(b)	Codominance	(2)	Appearance of pink flowers in snapdragon in F1 generation
(c)	Incomplete dominance	(3)	Starch synthesis in pea seeds
(d)	Pleiotropy	(4)	Appearance of violet flowers in F1 generation in garden pea

Codes-

	A	B	C	D
(a)	4	1	2	3

(b)	1	4	3	2
(c)	3	2	4	1
(d)	2	3	1	4

37. ABO blood grouping is a good example of
(a) incomplete dominance
(b) mutation
(c) multiple alleles
(d) pleiotropy

38. Sometimes a single gene product may produce more than one effect. This phenomenon is known as
(a) mosaicism (b) pleiotropy
(c) multiple allelism (d) polygeny

39. Starch synthesis in pea seeds is an example of
(a) multiple allelism
(b) incomplete dominance
(c) co-dominance
(d) pleiotropy

40. Pea seeds having Bb genotype produce starch grains of
(a) large size
(b) small size
(c) intermediate size
(d) they do not produce starch.

41. Choose the incorrect statement from the following about pleiotropy.
(a) In pleiotropy, a single gene produces more than one effect.
(b) Starch synthesis in pea seeds is controlled by one gene.
(c) Pea seeds having BB genotypes, produce small starch grains.
(d) bb homozygotes of pea produce wrinkled seeds.

42. Assertion: The law of dominance is used to explain the expression of only one of the parental characters in a monohybrid cross. Reason: It also explains the proportion of 3: 1 obtained at F2 generation**.**
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not correct explanation of assertion.
(c) Assertion is true, but reason is false.
(d) Both assertion and reason are false.

43. Assertion: The pink flower of dog plant show incomplete dominance. Reason: In pink flowers, both alleles are expressed equally.
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not correct explanation of assertion.
(c) Assertion is true, but reason is false.
(d) Both assertion and reason are false.

44. Assertion: A person having IAIB genotype has AB blood group. Reason: IA and IB alleles are co-dominant
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not correct explanation of assertion.
(c) Assertion is true, but reason is false.
(d) Both assertion and reason are false. Inheritance of two Genes

45. The first hybrid generation of Mendel's experiment is known as
(a) Filial1 progeny
(b) F1-generation
(c) Father generation
(d) Both (a) and (b)

46. When Mendel crossed true-breeding tall and dwarf plants, in F1-generation all tall plants were obtained. On self-crossing in the F2 generation, he obtained
(a) 1/4th dwarf and 3/4th tall plants
(b) 3/4th dwarf and 1/4th tall plants
(c) 2/4th dwarf and 2/4th tall plants
(d) All dwarf plants

47. During the study of inheritance of one character in F2 generation, Mendel obtained phenotype in
(a) 2 : 1 ratio (b) 3 : 1 ratio
(c) 1 : 2 : 1 ratio (d) 1 : 1 : 1 : 1 ratio

48. The 'factors' of Mendel are today known as
(a) genome (b) gene
(c) DNA (d) allele

49. The slightly different forms of the same genes are called
(a) genome (b) DNA
(c) allele (d) cistron

50. Alleles are
(a) true-breeding homozygotes
(b) different molecular forms of a gene
(c) heterozygotes
(d) different phenotype

51. What would be the phenotype of a plant that had a genotype 'Tt'? Here 'T' represent tall trait while 't' represents dwarf trait.
(a) Tall
(b) Intermediate height
(c) Dwarf
(d) None of these

52. In homozygous condition, a particular gene has
(a) different alleles on homologous chromosomes.
(b) no alleles on homologous chromosomes.
(c) same alleles on homologous chromosomes.
(d) none of these

53. Tall and dwarf are the two alleles of gene of height. The dominant trait is
(a) dwarf
(b) tall
(c) both are equally dominant
(d) both are recessive

54. Match Column-I with Column-II and choose the correct option from the code given below.

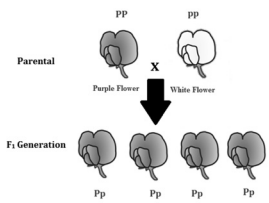
Column-I		Column-II	
(a)	Genes	(1)	Slightly different forms of the same gene
(b)	Alleles	(2)	Genetic composition of an organism
(c)	Genotype	(3)	Physical appearance of an organism
(d)	Phenotype	(4)	Unit of inheritance

Codes–

	A	B	C	D
(a)	4	1	2	3
(b)	1	4	3	2
(c)	3	2	4	1
(d)	2	3	1	4

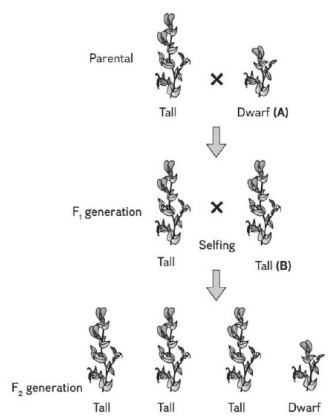
55. A cross that is performed for the study of a single character is
(a) dihybrid cross (b) test cross
(c) monohybrid cross (d) back cross

56. The given figure is the diagrammatic representation of a monohybrid cross. In the figure, some plants are mentioned as A and B. What will be the genotype of these plants?



(a) A – tt, B – Tt
(b) A – Tt, B – tt
(c) A – TT, B – TT
(d) A – Tt, B – Tt

57. Choose the incorrect statement about Mendel's monohybrid cross.



(a) The recessive parental trait is expressed without any blending in F2 generation.

(b) The alleles of parental pair segregate from each other and both alleles are transmitted to a gamete.
(c) The segregation of alleles is a random process.
(d) There is a 50% chance of a gamete containing either allele.

58. The production of gametes by the parents the formation of zygotes, the F1 and F2 plants, can be understood by using
(a) Wenn diagram
(b) Pie diagram
(c) A pyramid diagram
(d) Punnett square

59. Select the correct statement.
(a) Franklin Stahl coined the term 'linkage'.
(b) Punnett square was developed by a British scientist.
(c) Spliceosomes take part in translation.
(d) Transduction was discovered by S Altman.

60. In the test cross, organism whose genotype is to be determined, is crossed with the
(a) recessive parent
(b) dominant parent
(c) both parents one by one
(d) none of these

61. On crossing two tall plants, in F1-generation few dwarf offspring were obtained. What would be the genotype of the both the parent? a)
(a) TT and Tt (b) Tt and Tt
(c) TT and TT (d) TT and tt

62. Based on his observations of monohybrid cross, Mendel proposed which law of inheritance?
(a) Law of dominance
(b) Law of segregation
(c) Law of independent assortment
(d) Both (a) and (b)

63. According to Mendel, characters are controlled by discrete units called
(a) genes (b) factors
(c) alleles (d) allelomorph

Topic 3 | Inheritance of Two Genes

64. Crosses that are performed to study two contrasting characters at a time are called
(a) monohybrid cross
(b) dihybrid cross
(c) test cross
(d) back cross

65. The phenotypic ratio obtained by Mendel in his dihybrid cross was
(a) 1 : 2 : 1 : 2 (b) 3 : 2 : 2 : 1
(c) 9 : 3 : 3 : 1 (d) 2 : 3 : 1 : 2

66. The third law of inheritance proposed by Mendel is
(a) Law of dominance
(b) Law of independent assortment
(c) Law of incomplete dominance
(d) Law of segregation

67. The ratio 9: 3: 3: 1 of a dihybrid cross denotes that
(a) it is a multigenic inheritance.
(b) the alleles of two genes are interacting with each other.
(c) it is a case of multiple allelism.
(d) the alleles of two genes are segregating independently.

68. The numbers of phenotypes and genotypes in F2 generation of a Mendelian dihybrid cross are
(a) phenotypes 4: genotypes 16
(b) phenotypes 4: genotypes 8
(c) phenotypes 9: genotypes 4
(d) phenotypes 4: genotypes 9

69. Mendel's law of independent assortment is true for the genes situated on the
(a) same chromosome
(b) non-homologous chromosomes
(c) homologous chromosomes
(d) extra nuclear genetic element

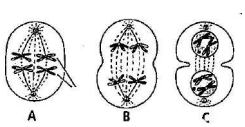
70. Genes A and B are linked. The F1 heterozygote of a dihybrid cross involving these genes is crossed with homozygous recessive parental type (aabb). What would be the ratio of offspring in the next generation?
(a) 1: 1 (b) 1: 1: 1: 1
(c) 9: 3: 3: 1 (d) 3: 1

71. Mendel's work remained unrecognized for many years. Find out the true reason for the same.
(I) Mendel's concept of genes was not accepted by his contemporaries as an explanation for the continuous variation seen in nature.
(II) The approach of using mathematics was new and unacceptable by other biologists.
(III) He could not provide any physical proof for the existence of factors.
(IV) Communication was not easy in those days and his work could not be widely published.
(a) I and IV
(b) II and III
(c) III and IV
(d) All of these

72. Mendel's results on the inheritance of characters were rediscovered by:
(a) de Vries (b) Correns
(c) von Tschermak (d) all of these

73. Among the following, who noted that the behaviour of chromosomes was parallel to the behavior of genes?
(a) Walter Sutton (b) Theodore Boveri
(c) Von Tschermak (d) Both (a) and (b)

74. Identify the given figures showing meiotic phases and select the correct option.



(a) A- Metaphase, B-Anaphase, C- Telephase
(b) A-Metaphase I, B-Anaphase I,C-Telophase I
(c) A-Metaphase II, B-Anaphase I, C-Telophase I
(d) A- Anaphase I, B-Metaphase I, C-Telophase I

75. The chromosomal theory of inheritance was proposed by
(a) Sutton (b) Boveri
(c) Morgan (d) Both (a) and (b)

76. Match Column-I with Column-II and choose the correct option from the codes given below.

	Column-I		Column-II
(a)	Mendel	(1)	Rediscovery of Mendel's law
(b)	Correns, Tschermak and Vries	(2)	Worked on Drosophila melanogaster
(c)	Sutton and Boveri	(3)	Law of independent assortment
(d)	T.H. Morgan	(4)	Chromosomal theory of inheritance

Codes-

	A	B	C	D
(a)	3	1	4	2
(b)	1	4	3	2
(c)	2	3	1	4
(d)	4	2	3	1

77. Morgan performed his experiments on
(a) Garden pea (b) Drosophila
(c) Snapdragon (d) None of these

78. When two genes are located on the same chromosome, the proportion of parental gene combination is
(a) higher than non-parental
(b) lower than non-parental
(c) equal to non-parental
(d) None of these

79. Genes which are present on the same chromosome
(a) do not form any linkage group.
(b) affect the phenotype by forming interactive groups.
(c) form a linkage group.
(d) form different groups depending upon their relative distance.

80. The term used to describe the generation of

nonparental gene combination is
(a) linkage (b) recombination
(c) mutation (d) none of these

81. Which type of relationship is found between the distance of genes and percentage of recombination?
(a) Inverse (b) Parallel
(c) Direct (d) None of these

82. Among the following which will not cause variations among siblings?
(a) Linkage
(b) Independent assortment of genes
(c) Crossing over
(d) Mutation

83. Match Column-I with Column-II and choose the correct answer from the codes given below.

	Column-I		Column-II
(a)	Linkage	(1)	Non-parallel gene combination
(b)	Recombination	(2)	Genetic map
(c)	Sturtevant	(3)	Unit of distance between gene
(d)	Centimorgan	(4)	Physical association of genes

Codes-

	A	B	C	D
(a)	3	2	4	1
(b)	2	3	1	4
(c)	4	1	2	3
(d)	1	4	3	2

84. What map unit (centimorgan) is adopted in the construction of genetic maps?
(a) A unit distance between two expressed genes, representing 10% cross over.
(b) A unit distance between two expressed genes, representing 100% cross over.
(c) A unit distance between genes on chromosomes, representing 1% cross over.
(d) A unit distance between genes on chromosomes, representing 50% cross over.

85. The concept of genetic map was given by
(a) de Vries (b) Morgan
(c) Sturtevant (d) Mendel

86. Assertion: Mendel proposed the law of independent assortment on the basis of results of dihybrid cross.

Reason: When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters.
(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

87. Assertion: The chromosomal theory of inheritance was proposed by T. H. Morgan.

Reason: Morgan worked on garden pea plants to give this theory.
(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

88. Assertion: Morgan coined the term linkage to describe the physical association of genes on a chromosome.

Reason: Linkage shows more non-parental type combination of genes.
(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Topic 4 Sex Determination

89. X-body was discovered by
(a) Mendel (b) Morgan
(c) Henking (d) de Vries

90. In XO type of sex determination, who does possess the X chromosome?
(a) Female
(b) Male
(c) Sometimes female and sometimes male
(d) None of these

91. X-chromosome is designated as
(a) autosome
(b) sex chromosome
(c) somatic chromosome
(d) none of these

92. Which type of sex determination is found in grasshoppers?
(a) XX – XY type (b) XX – XO type
(c) ZZ – ZW type (d) None of these

93. In a specific taxon of insects, some possess 17 chromosomes while others have 18 chromosomes. These 17 and 18 chromosomes bearing organisms are
(a) All males
(b) All females
(c) Females and males, respectively
(d) Males and females, respectively

94. In Drosophila, males possess
(a) XO chromosomes
(b) XX chromosomes
(c) XY chromosomes
(d) YY chromosomes

95. Match Column-I with Column-II and choose the correct option from the codes given below.

Column-I	Column-II		
(a)	X-body	(1)	Autosomes
(b)	X and Y chromosome	(2)	Henking
(c)	Somatic chromosome	(3)	Grasshopper
(d)	XO-types of sex determination	(4)	Allosomes

Codes-

	A	B	C	D
(a)	2	4	1	3
(b)	4	2	1	3
(c)	3	1	4	2
(d)	1	3	2	4

96. XY type of sex determination is found in
(a) Drosophila (b) humans
(c) grasshopper (d) both (a) and (b)

97. Choose the incorrect statement about XY type of sex determination**.**
(a) Both males and females have same number of chromosomes.
(b) The counter part of X chromosome is distinctly smaller and called Y chromosome.
(c) Males and females possess different number of autosomes.
(d) This type of sex determination is found in Drosophila.

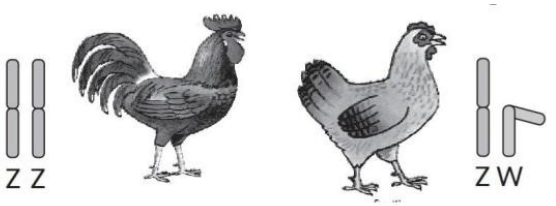
98. Male heterogamety is found in
(a) grasshopper (b) Drosophila
(c) humans (d) all of these

99. In female heterogamety, females
(a) one type of gametes
(b) two types of gametes
(c) three types of gametes
(d) none of these

100. ZZ/ZW type of sex determination is the characteristics feature of
(a) platypus (b) snails
(c) peacock (d) cockroach

101. Among the following, which has a different mechanism of sex determination?
(a) Birds (b) Humans
(c) Drosophila (d) None of these

102. Refer to the given figure which is followed by few statements. Choose the incorrect statement about it.



(a) It shows male heterogamety.
(b) Both possess same types of autosomes.
(c) The sex of progeny is determined by females.
(d) This type of sex determination is different from humans.

103. In humans, sex is determined by
(a) females
(b) males
(c) environmental factors
(d) none of these

104. Match Column-I with Column-II and choose the correct option from the codes given below.

	Column-I		Column-II
(a)	XO-type	(1)	Drosophila
(b)	XY-type	(2)	Grasshopper
(c)	ZZ-ZW type	(3)	Birds
		(4)	Humans progeny from their parents

Codes-

	A	B	C	D
(a)	1	4	2	3
(b)	2	1	4	3
(c)	3	2	1	4
(d)	4	3	2	1

105. Match the items of Column I with Column II.

	Column-I		Column-II
(a)	XX-XO method of sex determination	(1)	Turner's syndrome
(b)	XX-XY method of sex determination	(2)	Female heterogametic
(c)	Karyotype-45	(3)	Grasshopper
(d)	ZW-ZZ method of sex determination	(4)	Female homogametic

Codes-

	A	B	C	D
(a)	4	2	1	3
(b)	2	4	1	3
(c)	1	4	2	3
(d)	3	4	1	2

106. Select the incorrect statement.
(a) Male fruit fly is heterogametic.
(b) In male grasshoppers, 50% of sperms have no sex chromosome.
(c) In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.
(d) Human males have one of their sex chromosome much shorter than the other.

107. Assertion: Grasshoppers show male heterogamety.
Reason: Male grasshoppers produce two types of gametes.
(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

108. Assertion: In fruitfly, sex of progeny is decided by females.

Reason: Females produce two types of gametes.
(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

109. Assertion: Birds show female heterogamety.

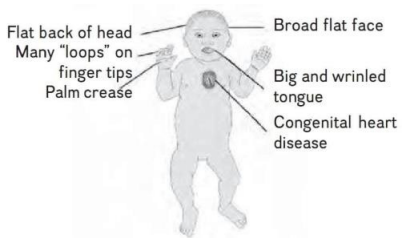
Reason: In birds, the sex of progeny is

determined by males.

(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

Topic 5 | Mutation and Genetic Disorders

110. Refer to the given figure. It is showing the characteristic features of



(a) Down's syndrome
(b) Turner's syndrome
(c) Klinefelter's syndrome
(d) None of these

111. The disease caused by the trisomy of chromosome number 21 is

(a) Turner's syndrome
(b) Haemophilia
(c) Klinefelter's syndrome
(d) Down's syndrome

112. An abnormal human baby with 'XXX' sex chromosomes was born due to

(a) formation of abnormal ova in the mother.
(b) fusion of two ova and one sperm.
(c) fusion of two sperms and one ovum.
(d) formation of abnormal sperms in the father.

113. What is the genetic disorder in which an individual has an overall masculine development, gynaecomastia and is sterile?

(a) Turner's syndrome
(b) Klinefelter's syndrome
(c) Edward's syndrome
(d) Down's syndrome

114. In which genetic condition, each cell in the affected person, has three sex chromosomes XXY?

(a) Turner's syndrome
(b) Thalassemia
(c) Kleinfelter's syndrome
(d) Phenylketonuria

115. A disorder caused due to the absence of one of the X chromosomes is

(a) Turner's syndrome
(b) Down's syndrome
(c) Klinefelter's syndrome
(d) Edward's syndrome

116. Assertion: The possibility of a female becoming a haemophilic is extremely rare. Reason: For being haemophilic, the mother of such a female has to be at least carrier and the father should be haemophilic.

(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

117. Assertion: Aneuploidy is the gain or loss of chromosomes. Reason: It is caused due to the failure of cytokinesis after telophase stage of cell division.

(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

118. Assertion: Klinefelter's syndrome is caused due to the presence of an additional copy of X-chromosome.
Reason: Such individuals are sterile.

(a) Both assertion and reason are true and the reason is the correct explanation of assertion.
(b) Both assertion and reason are true but the reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

119. The phenomenon which results in alteration of DNA sequences is
(a) mutation (b) transpiration
(c) transcription (d) translation

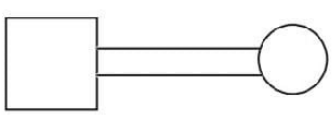
120. Chromosomal aberrations are commonly observed in
(a) cardiac cells (b) cancer cells
(c) skeletal cells (d) none of these

121. A classical example of point mutation is
(a) gout
(b) night blindness
(c) sickle cell anaemia
(d) Turner's syndrome

122. The factors that cause mutations are called
(a) mutagens (b) teratogens
(c) allergens (d) none of these

123. An analysis of traits in several of generations of a family is called
(a) mutation
(b) pedigree analysis
(c) genetic map formation
(d) none of these

124. In a pedigree analysis, the given symbol represents



(a) affected individuals
(b) mating
(c) consanguineous mating
(d) unspecified sex

125. Pedigree analysis is used to study the inheritance pattern of a gene over generations. The character that is studied in the pedigree analysis is equivalent to
(a) Mendelian trait (b) Maternal trait
(c) Polygamic trait (d) Quantitative trait

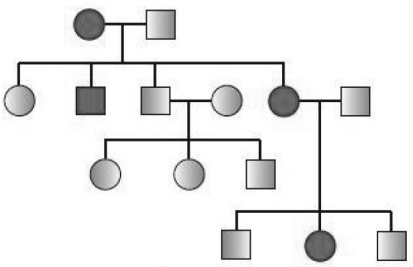
126. Mendelian disorders are mainly determined by alteration or mutation in the
(a) chromosomes
(b) single gene
(c) array of genes
(d) none of these

127. Among the following which one is a Mendelian disorder?
(a) Haemophilia
(b) Sickle cell anaemia
(c) Cystic fibrosis
(d) All of these

128. Choose the incorrect statement about Mendelian disorders.
(a) These are usually caused by mutation in a single gene.
(b) These disorders are transmitted to the offspring according to the laws of inheritance.
(c) Mendelian disorders are always sex linked.
(d) The trait in question can be dominant or recessive.

129. A genetic disease transmitted from a carrier female that is phenotypically normal to only some male progeny is [NCERT Exemplar]
(a) sex-linked dominant
(b) sex-linked recessive
(c) autosomal dominant
(d) autosomal recessive

130. Refer to the given pedigree analysis. It is related to the analysis of



(a) autosomal dominant trait
(b) autosomal recessive trait
(c) sex-linked dominant trait
(d) sex-linked recessive trait

131. Haemophilia is a/an
(a) sex-linked recessive disease
(b) sex-linked dominant disease
(c) autosomal recessive disease
(d) autosomal dominant disease

132. The possibility of a female becoming a haemophilic is
(a) extremely high (b) extremely rare
(c) equal to a male (d) none of these

133. Haemophilia A and B are due to deficiencies of respectively clotting factor
(a) VIII and IX (b) IX and VIII
(c) VII and IX (d) X and VII

134. Sickle cell anaemia is a/an
(a) sex-linked recessive disease
(b) sex-linked dominant disease
(c) autosomal recessive disease
(d) autosomal dominant disease

135. In sickle cell anaemia, valine replaces glutamic acid. This valine is coded by the triplet
(a) AAG (b) GGG
(c) GUG (d) GAA

136. Sickle Cell Anaemia (SCa) is transferred from parents to offspring when
(a) father is affected and mother is normal.
(b) father is normal and mother is carrier.
(c) father is normal and mother is affected.
(d) both mother and father are carrier.

137. Match Column-I with Column-II and choose the correct option from the code given below.

	Column-I		Column-II
(a)	Myotonic dystrophy	(1)	Autosomal recessive
(b)	Sickle cell anaemia	(2)	Sex-linked recessive
(c)	Haemophilia	(3)	Sex-linked dominant
(d)	Rett syndrome	(4)	Autosomal dominant

Codes-

	A	B	C	D
(a)	4	2	1	3
(b)	2	4	1	3
(c)	1	4	2	3
(d)	3	4	1	2

138. Thalassemia and sickle cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement.
(a) Both are due to a quantitative defect in globin chain synthesis.
(b) Thalassemia is due to less synthesis of globin molecules.
(c) Sickle cell anaemia is due to quantitative problem of globin molecules.
(d) Both are due to qualitative defect in globin chain synthesis.

139. The person suffering from phenylketonuria disease lacks enzyme
(a) phenylalanine hydroxylase
(b) phosphates
(c) enolase
(d) none of these

140. Phenylketonuria is an inborn error in which affected individual lacks an enzyme that converts
(a) phenylalanine into tyrosine
(b) tyrosine into phenylalanine
(c) glutamic acid into valine
(d) valine into glutamic acid

141. Phenylketonuria is a/an
(a) autosomal dominant trait
(b) autosomal recessive trait

(c) sex-linked dominant trait
(d) sex-linked recessive trait

142. If a colourblind man marries a women who is homozygous for normal colour vision, the probability of their son being colour blind is
(a) 0.75 (b) 1
(c) 0 (d) 0.5 25.

143. The chromosomal disorders are
(a) absence of one or more chromosomes
(b) excess of one or more chromosomes
(c) abnormal arrangement of chromosomes
(d) all of these

144. Condition of having $2n \pm 1$ or $2n \pm 2$ chromosomes is called
(a) polyploidy (b) aneuploidy
(c) allopolyploidy (d) monosomy

145. An increase in a whole set of chromosomes in an organism is called
(a) aneuploidy (b) linkage
(c) polyploidy (d) none of these

146. Condition (2n + 1) of chromosomes isknown as
(a) trisomy (b) monosomy
(c) polyploidy (d) haploidy

147. Match Column-I with Column-II and choose the correct option from the codes given below.

	Column-I		Column-II
(a)	Deletion	(1)	Loss of a gene or a segment of chromosome
(b)	Duplication	(2)	A segment of chromosome is turned around 180° within a chromosome
(c)	Inversion	(3)	Presence of a gene or segment of chromosome more than once
(d)	Translocation	(4)	Exchange of segments between two homologous chromosomes

Codes-

	A	B	C	D
(a)	4	2	1	3
(b)	2	4	1	3
(c)	1	4	2	3
(d)	3	4	1	2

148. Match Column-I with Column-II and choose the correct option from the codes given below.

	Column-I		Column-II
(a)	Aneuploidy	(1)	An increase in whole set of chromosomes
(b)	Polyploidy	(2)	2n + 1
(c)	Trisomy	(3)	Gain or loss of a chromosome
(d)	Monosomy	(4)	2n − 1

Codes-

	A	B	C	D
(a)	1	3	4	2
(b)	2	1	2	4
(c)	4	2	3	1
(d)	2	4	1	3

149. A disease caused by an autosomal primary nondisjunction is
(a) Klinefelter's syndrome
(b) Turner's syndrome
(c) Sickle cell anaemia
(d) Down's syndrome

ANSWER KEY

1. (d)	2. (c)	3. (d)	4. (b)	5. (c)	6. (b)	7. (d)	8. (b)	9. (a)	10. (d)
11. (d)	12. (a)	13. (c)	14. (b)	15. (c)	16. (b)	17. (d)	18. (d)	19. (a)	20. (b)
21. (b)	22. (a)	23. (d)	24. (b)	25. (d)	26. (c)	27. (d)	28. (c)	29. (c)	30. (b)
31. (d)	32. (b)	33. (b)	34. (b)	35. (b)	36. (a)	37. (c)	38. (b)	39. (d)	40. (c)
41. (c)	42. (b)	43. (c)	44. (a)	45. (d)	46. (a)	47. (b)	48. (b)	49. (c)	50. (b)
51. (a)	52. (c)	53. (b)	54. (a)	55. (c)	56. (a)	57. (b)	58. (d)	59. (b)	60. (a)
61. (b)	62. (b)	63. (b)	64. (b)	65. (c)	66. (b)	67. (d)	68. (d)	69. (c)	70. (b)
71. (d)	72. (d)	73. (d)	74. (d)	75. (d)	76. (a)	77. (b)	78. (a)	79. (c)	80. (b)
81. (a)	82. (a)	83. (c)	84. (c)	85. (c)	86. (b)	87. (d)	88. (c)	89. (c)	90. (a)
91. (b)	92. (b)	93. (d)	94. (c)	95. (a)	96. (b)	97. (c)	98. (d)	99. (b)	100. (c)
101. (a)	102. (a)	103. (b)	104. (b)	105. (d)	106. (c)	107. (a)	108. (d)	109. (c)	110. (a)
111. (d)	112. (a)	113. (b)	114. (c)	115. (a)	116. (a)	117. (a)	118. (b)	119. (a)	120. (b)
121. (c)	122. (a)	123. (b)	124. (c)	125. (a)	126. (b)	127. (d)	128. (c)	129. (b)	130. (a)
131. (a)	132. (b)	133. (a)	134. (c)	135. (c)	136. (d)	137. (a)	138. (b)	139. (a)	140. (a)
141. (b)	142. (c)	143. (d)	144. (b)	145. (c)	146. (a)	147. (a)	148. (b)	149. (d)	