

Mendel's Laws of Inheritance

- Genetics is the subject that deals with (**Pg. 69, E**)
 - inheritance
 - variation of characteristics
 - reproduction
 - both (a) and (b)
- The basis of heredity is (**Pg. 69, E**)
 - variation
 - inheritance
 - mutation
 - linkage
- Humans knew from as early as 8000–1000 BC that one of the causes of variation was hidden in (**Pg. 69, E**)
 - sexual reproduction
 - asexual reproduction
 - vegetative propagation
 - none of these
- Choose the incorrect statement from the following. (**Pg. 69, M**)
 - Humans knew from very early that sexual reproduction is one of the causes of variation.
 - They exploited the variation to obtain plants and animals of desirable characters through selective breeding.
 - Sahiwal cows were obtained through artificial selection and domestication from ancestral wild cows.
 - Our ancestors were very well aware about the scientific basis of inheritance of characters and variation.
- Which one from the following is the period for Mendel's hybridization experiments? (**Pg. 70, E**)
 - 1840–1850
 - 1857–1869
 - 1870–1877
 - 1856–1863
- Who proposed the 'Laws of Inheritance' in living organisms? (**Pg. 70, E**)
 - Mendel
 - Morgan
 - de Vries
 - Correns
- Match Column-I with Column-II and choose the correct answer from the codes given below. (**Pg. 70, M**)

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

- Mendel investigated characters in the garden pea plant that were manifested as two (**Pg. 70, E**)
 - linked traits
 - opposing traits
 - similar traits
 - none of these
- How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments? (**Pg. 70, E**)
 - Six
 - Eight
 - Seven
 - Four
- Which contrasting trait was not studied by Mendel during his experiments? (**Pg. 70, E**)
 - Seed colour
 - Leaf colour
 - Flower colour
 - Stem height
- Among the following, which one is not a dominating trait? (**Pg. 70, E**)
 - Axial position of flower
 - Green colour of pod
 - Violet colour of flower
 - Green colour of seed
- A true-breeding line is one that (**Pg. 70, E**)
 - has undergone continuous self-pollination
 - shows stable trait inheritance

C) shows expressions of trait for several generations

D) all of these

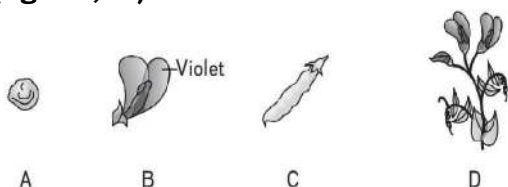
13. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 70, M)**

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

14. Refer to the given figures (A-D) showing traits of pea plant studied by Mendel. Among these, choose the dominant trait. **(Pg. 70, M)**



- A) B
C) D
B) A
D) C
15. Which technique was used by Mendel during his experiments on pea plant? **(Pg. 70, E)**
- A) Artificial pollination
B) Cross pollination
C) Self-pollination
D) All of these
16. Choose the correct statement(s) from the following. **(Pg. 70, M)**
- (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
C) I, II and III
B) III and IV
D) All of these

17. The contrasting trait(s) selected by Mendel was/were **(Pg. 70, E)**

- A) smooth or wrinkled seed
B) yellow or green seed
C) smooth or inflated pods
D) all of these

18. Assertion: Mendel conducted hybridization experiments on garden pea plant.

Reason: He proposed laws of inheritance in living organisms. **(Pg. 70, M)**

- 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.

19. Assertion: Mendel used contrasting traits for his studies.

Reason: He used *Ocimum* plant for his experiments. **(Pg. 70, M)**

- 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.

20. Assertion: Mendel used true-breeding pea lines for his experiments.

Reason: A true-breeding line is one that has undergone continuous self-pollination. **(Pg. 70, M)**

- 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

21. The first hybrid generation of Mendel's experiment is known as **(Pg. 71, E)**
 A) Filial₁ progeny
 B) F₁-generation
 C) Father generation
 D) Both (A) and (B)
22. 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 **(Pg. 71, E)**
 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
23. During the study of inheritance of one character in F₂ generation, Mendel obtained phenotype in **(Pg. 71, E)**
 A) 2 : 1 ratio B) 3 : 1 ratio
 C) 1 : 2 : 1 ratio D) 1 : 1 : 1 : 1 ratio
24. The 'factors' of Mendel are today known as **(Pg. 71, E)**
 A) genome B) gene
 C) DNA D) allele
25. The slightly different forms of the same genes are called **(Pg. 71, E)**
 A) genome B) DNA
 C) allele D) cistron
26. Alleles are **(Pg. 72, E)**
 A) true-breeding homozygotes
 B) different molecular forms of a gene
 C) heterozygotes
 D) different phenotype
27. What would be the phenotype of a plant that had a genotype 'Tt'? Here 'T' represent tall trait while 't' represents dwarf trait. **(Pg. 72, E)**
 A) Tall
 B) Intermediate height

- C) Dwarf
 D) None of these

28. In homozygous condition, a particular gene has **(Pg. 72, E)**
 A) different alleles on homologous chromosomes.
 B) no alleles on homologous chromosomes.
 C) same alleles on homologous chromosomes.
 D) none of these
29. Tall and dwarf are the two alleles of gene of height. The dominant trait is **(Pg. 72, E)**
 A) dwarf
 B) tall
 C) both are equally dominant
 D) both are recessive
30. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 72, M)**

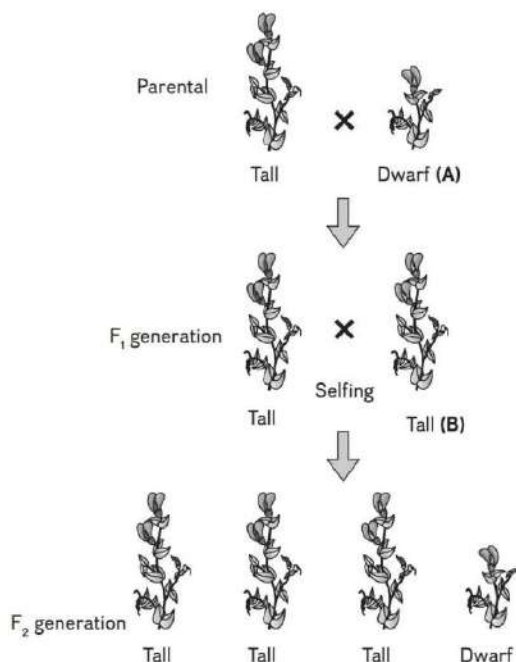
Column-I		Column-II	
(A)	Genes	(1)	Slightly different forms of the same gene
(B)	Alleles	(2)	Genetic composition of an organism
(C)	Genotype	(3)	Physical appearance of an organism
(D)	Phenotype	(4)	Unit of inheritance

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

31. A cross that is performed for the study of a single character is **(Pg. 72, E)**
 A) dihybrid cross
 B) test cross
 C) monohybrid cross
 D) back cross
32. 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? **(Pg. 72, E)**



- B) Punnett square was developed by a British scientist.
- C) Spliceosomes take part in translation.
- D) Transduction was discovered by S Altman.

36. In the test cross, organism whose genotype is to be determined, is crossed with the **(Pg. 74, E)**

- A) recessive parent
- B) dominant parent
- C) both parents one by one
- D) none of these

37. On crossing two tall plants, in F₁-generation few dwarf offspring were obtained. What would be the genotype of the both the parent? **(Pg. 74, E)**

- A) TT and Tt
- B) Tt and Tt
- C) TT and TT
- D) TT and tt

38. Based on his observations of monohybrid cross, Mendel proposed which law of inheritance? **(Pg. 74, E)**

- A) Law of dominance
- B) Law of segregation
- C) Law of independent assortment
- D) Both (A) and (B)

39. According to Mendel, characters are controlled by discrete units called **(Pg. 74, E)**

- A) genes
- B) factors
- C) alleles
- D) allelomorph

40. Choose the incorrect statement about law of dominance. **(Pg. 74, E)**

- 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.

41. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 73, M)**

Column-I		Column-II	
(A)	First law of inheritance	(1)	Law of segregation

- A) A – tt, B – Tt
- B) A – Tt, B – tt
- C) A – TT, B – TT
- D) A – Tt, B – Tt

33. Choose the incorrect statement about Mendel's monohybrid cross. **(Pg. 73, E)**

- 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.

34. The production of gametes by the parents the formation of zygotes, the F₁ and F₂ plants, can be understood by using **(Pg. 73, E)**

- A) Wenn diagram
- B) Pie diagram
- C) A pyramid diagram
- D) Punnett square

35. Select the correct statement. **(Pg. 73, E)**

- A) Franklin Stahl coined the term 'linkage'.

(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

42. The second law of inheritance, i.e., law of segregation is based on the fact that **(Pg. 74, E)**

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)

43. The factor controlling any character is discrete and independent. It was concluded on the basis of **(Pg. 75, E)**

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.

44. 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. **(Pg. 75, E)**

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 $\frac{1}{4}$ (Red): $\frac{2}{4}$ (Pink): $\frac{1}{4}$ (white).
 D) Law of segregation does not apply in this experiment.

45. 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 **(Pg. 75, E)**

A) Law of dominance
 B) Law of segregation
 C) Law of incomplete dominance
 D) None of these

46. The genotypic ratio obtained in incomplete dominance is **(Pg. 76, E)**

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

47. In case of co-dominance, the F₁ progeny **(Pg. 77, E)**

A) resembles either of the two parents
 B) is in between of parents
 C) resembles both the parents
 D) none of these

48. A person of AB blood group has I_A and I_B genes. It is an example of **(Pg. 77, E)**

A) pleiotropy
 B) segregation
 C) co-dominance
 D) None of these

49. 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? **(Pg. 77, E)**

A) I_Ai (Male); I_Bi (Female)
 B) I_Ai (Male); I_BI_B (Female)
 C) I_AI_A (Male); I_BI_B (Female)
 D) I_AI_A (Male); I_Bi (Female)

50. 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? **(Pg. 77, E)**

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.

51. Which of the following characteristics represent 'inheritance of blood groups' in humans? **(Pg. 77, E)**

- (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

52. A man with blood group 'A' marries a woman with blood 'B'. What are all possible blood groups of their offsprings? **(Pg. 77, E)**

- A) A, B and AB only
 B) A, B, AB and O
 C) O only
 D) A and B only

53. The genotypes of a husband and wife are $I_A I_B$ and $I_A i$. Among the blood types of their children, how many different genotypes and phenotypes are possible? **(Pg. 77, E)**

- A) 3 genotypes: 4 phenotypes
 B) 4 genotypes: 3 phenotypes
 C) 4 genotypes: 4 phenotypes
 D) 3 genotypes: 3 phenotypes

54. Multi alleles are present **(Pg. 77, E)**

- 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

55. Match Column-I with Column-II and choose the correct answer from the codes given below. **(Pg. 74-78, M)**

Column-I		Column-II	
(A)	Dominance	(1)	ABO blood group
(B)	Co-dominance	(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

56. ABO blood grouping is a good example of **(Pg. 77, E)**

- A) incomplete dominance
 B) mutation
 C) multiple alleles
 D) pleiotropy

57. Sometimes a single gene product may produce more than one effect. This phenomenon is known as **(Pg. 77, E)**

- A) mosaicism B) pleiotropy
 C) multiple allelism D) polygeny

58. Starch synthesis in pea seeds is an example of **(Pg. 77, E)**

- A) multiple allelism
 B) incomplete dominance
 C) co-dominance
 D) pleiotropy

59. Pea seeds having Bb genotype produce starch grains of **(Pg. 78, E)**

- A) large size
 B) small size
 C) intermediate size
 D) they do not produce starch.

60. Choose the incorrect statement from the following about pleiotropy. **(Pg. 78, E)**

- 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.

61. 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. **(Pg. 78, H)**

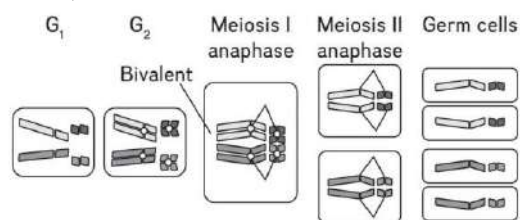
- A) Both assertion and reason are true and reason is the correct explanation of assertion.

- 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.
62. Assertion: The pink flower of dog plant show incomplete dominance.
 Reason: In pink flowers, both alleles are expressed equally. **(Pg. 78, E)**
 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.
63. Assertion: A person having $I_A I_B$ genotype has AB blood group.
 Reason: I_A and I_B alleles are co-dominant **(Pg. 78, E)**
 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

64. Crosses that are performed to study two contrasting characters at a time are called **(Pg. 78, E)**
 A) monohybrid cross
 B) dihybrid cross
 C) test cross
 D) back cross
65. The phenotypic ratio obtained by Mendel in his dihybrid cross was **(Pg. 79, E)**
 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 **(Pg. 79, E)**
 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 **(Pg. 79, E)**
 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 F_2 generation of a Mendelian dihybrid cross are **(Pg. 79, E)**
 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 **(Pg. 79, E)**
 A) same chromosome
 B) non-homologous chromosomes
 C) homologous chromosomes
 D) extra nuclear genetic element
70. Genes A and B are linked. The F_1 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? **(Pg. 80, E)**
 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. **(Pg. 81, H)**
 (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 II
 B) II and III
 C) III and IV

- D) All of these
72. Mendel's results on the inheritance of characters were rediscovered by: **(Pg. 81, E)**
- 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. Refer to the given figure showing meiosis and germ cell formation in a cell with four chromosomes. Which law of Mendel can be effectively explained by this figure? **(Pg. 81, M)**



- A) Law of dominance
B) Law of segregation
C) Law of independent assortment
D) All of these
75. The chromosomal theory of inheritance was proposed by **(Pg. 83, E)**
- 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. **(Pg. 83, M)**

	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 **(Pg. 83, E)**
- 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 **(Pg. 83, E)**
- 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 **(Pg. 83, E)**
- 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 **(Pg. 83, E)**
- 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? **(Pg. 83, E)**
- A) Inverse B) Parallel
C) Direct D) None of these
82. Among the following which will not cause variations among siblings? **(Pg. 83, H)**
- 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. **(Pg. 83, H)**

	Column-I		Column-II
(A)	Linkage	(1)	Non-parallel gene combination
(B)	Recombination	(2)	Genetic map
(C)	Sturtevant	(3)	Unit of distance between genes

(D)	Centimorgan	(4)	Physical association of genes
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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? **(Pg. 85, E)**

- 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 **(Pg. 85, E)**

- 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. **(Pg. 85, H)**

- 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. **(Pg. 85, H)**

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. **(Pg. 85, H)**

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.

Sex Determination

89. X-body was discovered by **(Pg. 85, E)**

- A) Mendel
- B) Morgan
- C) Henking
- D) de Vries

90. In XO type of sex determination, who does possess the X chromosome? **(Pg. 86, E)**

- A) Female
- B) Male
- C) Sometimes female and sometimes male
- D) None of these

91. X-chromosome is designated as **(Pg. 86, E)**

- A) autosome
- B) sex chromosome
- C) somatic chromosome
- D) none of these

92. Which type of sex determination is found in grasshoppers? **(Pg. 86, E)**

- 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 [NCERT Exemplar]

- A) All males
- B) All females

- C) Females and males, respectively
D) Males and females, respectively
94. In *Drosophila*, males possess (**Pg. 86, E**)
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. (**Pg. 86, M**)

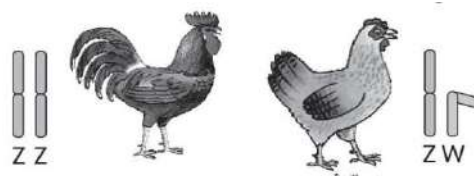
	Column-I		Column-II
(A)	X-body	(1)	Autosomes
(B)	X and Y chromosome	(2)	Henking
(C)	Somatic chromosome	(3)	Grasshopper
(D)	XO-types of sex determination	(4)	Allosomes

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 (**Pg. 86, E**)
A) *Drosophila* B) humans
C) grasshopper D) both (A) and (B)
97. Choose the incorrect statement about XY type of sex determination. (**Pg. 86, E**)
A) Both males and females have same number of chromosomes.
B) The smaller 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 (**Pg. 86, E**)
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 characteristic feature of [NCERT Exemplar]
A) platypus B) snails
C) peacock D) cockroach
101. Among the following, which has a different mechanism of sex determination? (**Pg. 87, E**)
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 (**Pg. 87, E**)
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. (**Pg. 86-87, E**)

	Column-I		Column-II
(A)	XO-type	(1)	<i>Drosophila</i>
(B)	XY-type	(2)	Grasshopper
(C)	ZZ-ZW type	(3)	Birds
		(4)	Humans progeny from their parents

Codes-

	A	B	C
(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. **(Pg. 87, E)**

	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. **(Pg. 87, M)**

- 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. **(Pg. 87, H)**

- 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. **(Pg. 87, H)**

- 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. **(Pg. 87, H)**

- 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.

Mutation and Genetic Disorders

110. The phenomenon which results in alteration of DNA sequences is **(Pg. 88, E)**

- A) mutation
- B) transpiration
- C) transcription
- D) translation

111. Chromosomal aberrations are commonly observed in **(Pg. 88, E)**

- A) cardiac cells
- B) cancer cells
- C) skeletal cells
- D) none of these

112. A classical example of point mutation is **(Pg. 88, E)**

- A) gout
- B) night blindness
- C) sickle cell anaemia
- D) Turner's syndrome

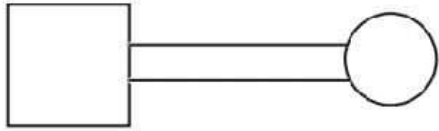
113. The factors that cause mutations are called **(Pg. 88, E)**

- A) mutagens
- B) teratogens
- C) allergens
- D) none of these

114. An analysis of traits in several of generations of a family is called **(Pg. 88, E)**

- A) mutation
- B) pedigree analysis
- C) genetic map formation
- D) none of these

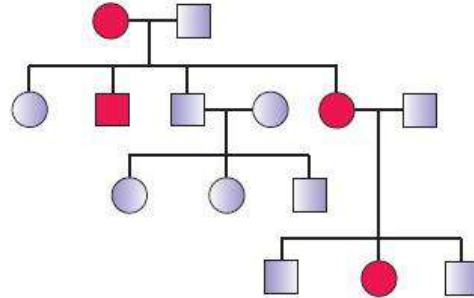
115. In a pedigree analysis, the given symbol represents **(Pg. 88, E)**



- A) affected individuals
B) mating
C) consanguineous mating
D) unspecified sex
116. 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 [NCERT Exemplar]
A) Mendelian trait
B) Maternal trait
C) Polygamic trait
D) Quantitative trait
117. Mendelian disorders are mainly determined by alteration or mutation in the (Pg. 89, E)
A) chromosomes
B) single gene
C) array of genes
D) none of these
118. Among the following which one is a Mendelian disorder? (Pg. 89, E)
A) Haemophilia
B) Sickle cell anaemia
C) Cystic fibrosis
D) All of these
119. Choose the incorrect statement about Mendelian disorders. (Pg. 89, E)
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.
120. 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

121. Refer to the given pedigree analysis. It is related to the analysis of (Pg. 89, E)



- A) autosomal dominant trait
B) autosomal recessive trait
C) sex-linked dominant trait
D) sex-linked recessive trait
122. Haemophilia is a/an (Pg. 90, E)
A) sex-linked recessive disease
B) sex-linked dominant disease
C) autosomal recessive disease
D) autosomal dominant disease
123. The possibility of a female becoming a haemophilic is (Pg. 90, E)
A) extremely high B) extremely rare
C) equal to a male D) none of these
124. Haemophilia A and B are due to deficiencies of respectively clotting factor (Pg. 90, E)
A) VIII and IX B) IX and VIII
C) VII and IX D) X and VII
125. Sickle cell anaemia is a/an (Pg. 90, E)
A) sex-linked recessive disease
B) sex-linked dominant disease
C) autosomal recessive disease
D) autosomal dominant disease
126. In sickle cell anaemia, valine replaces glutamic acid. This valine is coded by the triplet [NCERT Exemplar]
A) AAG B) GGG
C) GUG D) GAA
127. Sickle Cell Anaemia (SCA) is transferred from parents to offspring when (Pg. 90, E)
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.

128. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 90, E)**

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

129. Thalassaemia and sickle cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement. **(Pg. 90, E)**

- A) Both are due to a quantitative defect in globin chain synthesis.
- B) Thalassaemia 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.

130. The person suffering from phenylketonuria disease lacks enzyme **(Pg. 91, E)**

- A) phenylalanine hydroxylase
- B) phosphates
- C) enolase
- D) none of these

131. Phenylketonuria is an inborn error in which affected individual lacks an enzyme that converts **(Pg. 91, E)**

- A) phenylalanine into tyrosine
- B) tyrosine into phenylalanine
- C) glutamic acid into valine
- D) valine into glutamic acid

132. Phenylketonuria is a/an **(Pg. 91, E)**

- A) autosomal dominant trait
- B) autosomal recessive trait

- C) sex-linked dominant trait
- D) sex-linked recessive trait

133. If a colourblind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour blind is **(Pg. 89, E)**

- A) 0.75
- B) 1
- C) 0
- D) 0.5

134. 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

135. Condition of having $2n \pm 1$ or $2n \pm 2$ chromosomes is called [NCERT Exemplar]

- A) polyploidy
- B) aneuploidy
- C) allopolyploidy
- D) monosomy

136. An increase in a whole set of chromosomes in an organism is called **(Pg. 91, E)**

- A) aneuploidy
- B) linkage
- C) polyploidy
- D) none of these

137. Condition $(2n + 1)$ of chromosomes is known as **(Pg. 88, E)**

- A) trisomy
- B) monosomy
- C) polyploidy
- D) haploidy

138. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 88, E)**

	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)	1	3	2	4
B)	4	2	3	1
C)	3	1	4	2
D)	2	4	1	3

139. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 91, E)**

	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)	$2n - 1$

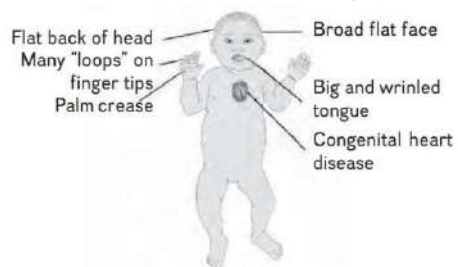
Codes-

	A	B	C	D
A)	1	3	4	2
B)	3	1	2	4
C)	4	2	3	1
D)	2	4	1	3

140. A disease caused by an autosomal primary nondisjunction is **[(Pg. 91, E)]**

- A) Klinefelter's syndrome
- B) Turner's syndrome
- C) Sickle cell anaemia
- D) Down's syndrome

141. Refer to the given figure. It is showing the characteristic features of **(Pg. 92, E)**



- A) Down's syndrome
- B) Turner's syndrome
- C) Klinefelter's syndrome
- D) None of these

142. The disease caused by the trisomy of chromosome number 21 is **(Pg. 92, E)**

- A) Turner's syndrome
- B) Haemophilia
- C) Klinefelter's syndrome
- D) Down's syndrome

143. An abnormal human baby with 'XXX' sex chromosomes was born due to **(Pg. 92, E)**

- 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.

144. What is the genetic disorder in which an individual has an overall masculine development, gynaecomastia and is sterile? **(Pg. 92, E)**

- A) Turner's syndrome
- B) Klinefelter's syndrome
- C) Edward's syndrome
- D) Down's syndrome

145. In which genetic condition, each cell in the affected person, has three sex chromosomes XXY? **(Pg. 92, E)**

- A) Turner's syndrome
- B) Thalassemia
- C) Klinefelter's syndrome
- D) Phenylketonuria

146. A disorder caused due to the absence of one of the X chromosomes is **(Pg. 92, E)**

- A) Turner's syndrome
- B) Down's syndrome
- C) Klinefelter's syndrome
- D) Edward's syndrome

147. 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. **(Pg. 92, H)**

- 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.

148. 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. **(Pg. 92, H)**

- 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.
149. Assertion: Klinefelter's syndrome is caused due to the presence of an additional copy of X-chromosome.

Reason: Such individuals are sterile. (**Pg. 92, H**)

- 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.

NEET MBBS DOCTORS

Answer Key

PRINCIPLE OF INHERITANCE AND VARIATION

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	B	A	D	D	A	C	B	C	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	D	A	A	D	C	D	B	C	B
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	A	B	B	C	B	A	C	B	A
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	A	B	D	B	A	B	D	B	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	A	D	B	D	C	D	C	C	B	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	B	B	B	B	A	C	B	D	C	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	B	C	A	B	C	B	D	D	C	B
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	D	D	D	D	A	B	A	C	B
Q	81	82	83	84	85	86	87	88	89	90
Ans	C	A	C	C	C	B	D	C	C	A
Q	91	92	93	94	95	96	97	98	99	100
Ans	B	B	D	C	A	D	C	D	B	C
Q	101	102	103	104	105	106	107	108	109	110
Ans	A	A	B	B	D	C	A	D	C	A
Q	111	112	113	114	115	116	117	118	119	120
Ans	B	C	A	B	C	A	B	D	C	D
Q	121	122	123	124	125	126	127	128	129	130
Ans	A	A	B	A	C	C	D	A	B	A
Q	131	132	133	134	135	136	137	138	139	140
Ans	A	B	C	D	B	C	A	A	B	D
Q	141	142	143	144	145	146	147	148	149	
Ans	A	D	A	B	C	A	A	C	B	

NEET MBBS DOCTORS