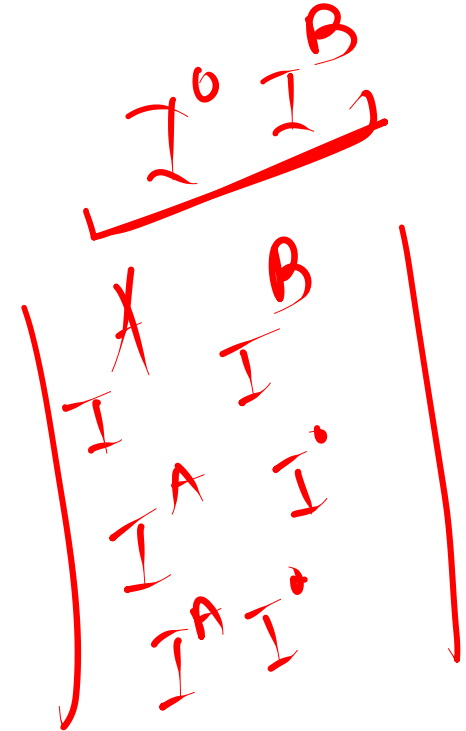


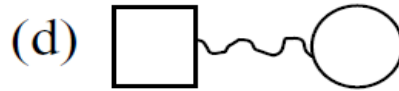
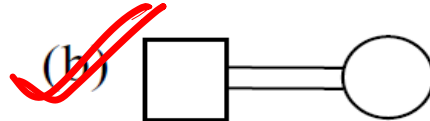
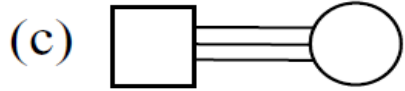
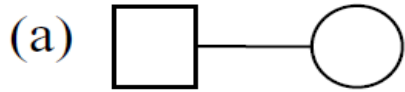
If a child has O type of blood group and the father has B type, then the genotype of the father will be

- (a)  $I^O I^O$
- (c)  $I^O I^B$

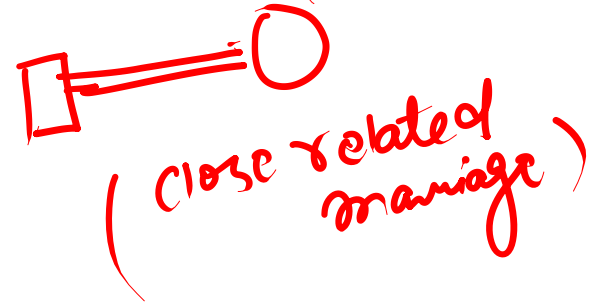
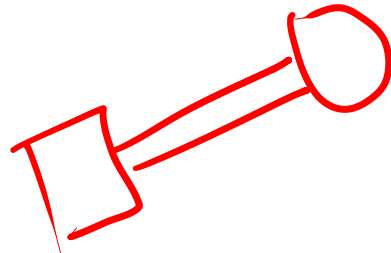
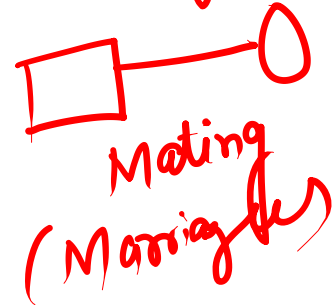
- (b)  $I^A I^B$
- (d)  $I^B I^B$






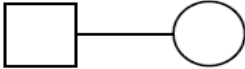
The standard symbol used for consanguineous mating in pedigree analysis is



*(close related marriage)*



Select the correct matching regarding standard symbol of pedigree analysis

Column-I	Column-II
(A) 	(1) Female
(B) 	(2) Male
(C) 	(3) Mating (Marriage)
(D) 	(4) Sex unspecified

(a) A : 2, B : 1, C : 4, D : ~~2~~ 3

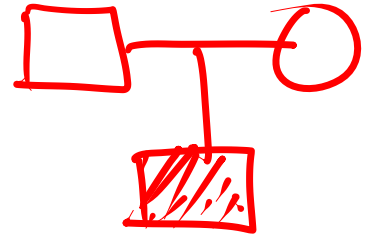
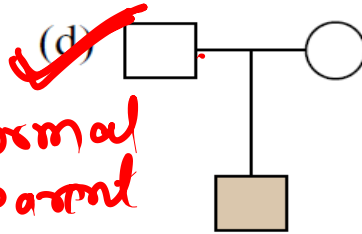
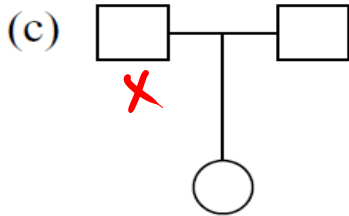
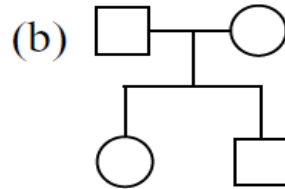
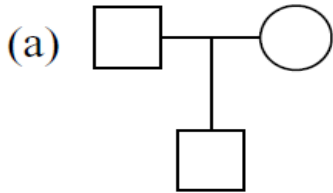
(c) A : 1, B : 2, C : 2, D : 4

(b) A : 2, B : 1, C : 2, D : 4

(d) A : 1, B : 2, C : 4, D : 2

$A \rightarrow 2 \quad B \rightarrow 1 \quad C \rightarrow 4 \quad D \rightarrow 3$

Which symbol represents parents with male child affected with diseases?



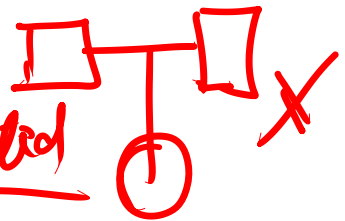
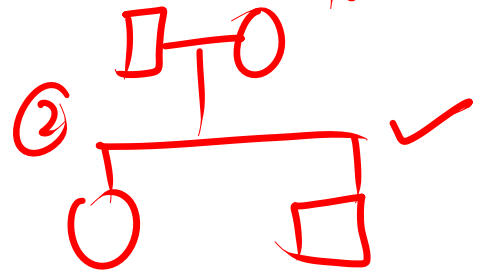
Normal

①

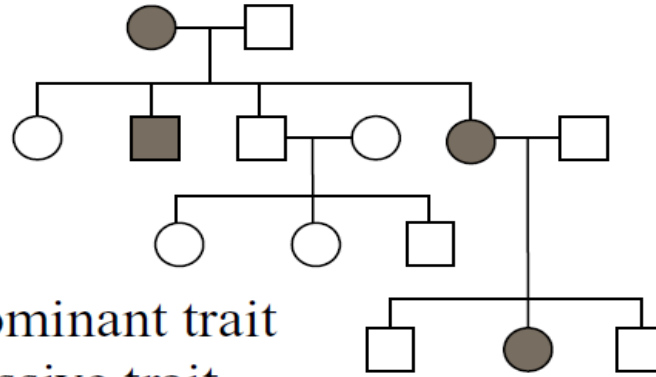
F M ⇒ Normal parent

Normal child

F M child affected

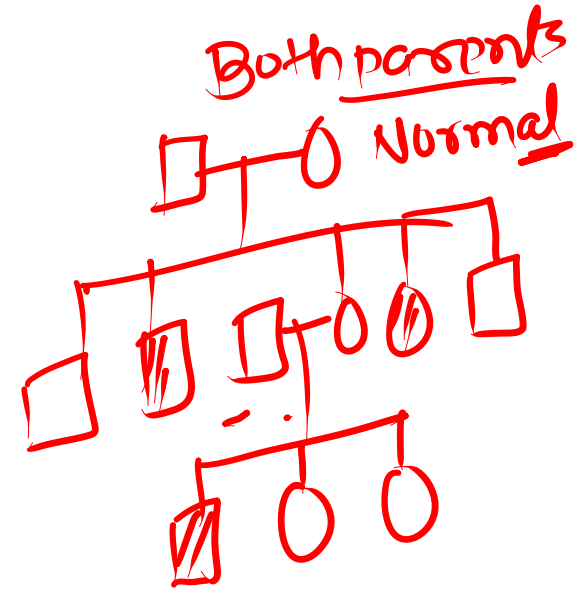
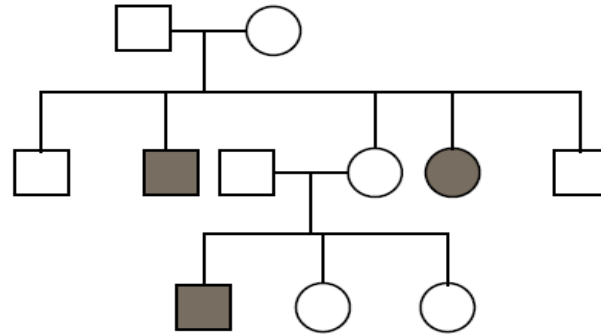


The following pedigree shows



- (a) Autosomal dominant trait
- (c) X-linked recessive trait
- (b) Autosomal recessive trait
- (d) X-linked dominant trait

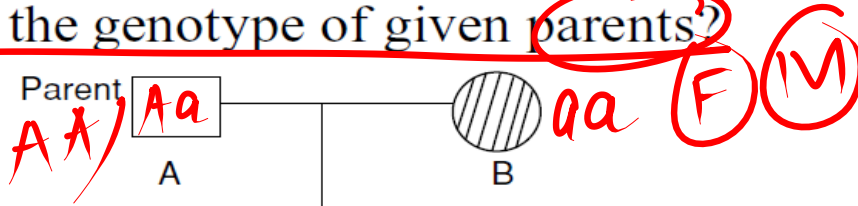
The following pedigree shows



- (a) Autosomal dominant trait
- (b) X-linked recessive trait
- (c) Autosomal recessive trait
- (d) X-linked dominant trait

Which of the given pedigree shows inheritance of autosomal recessive gene.

What is the genotype of given parents?

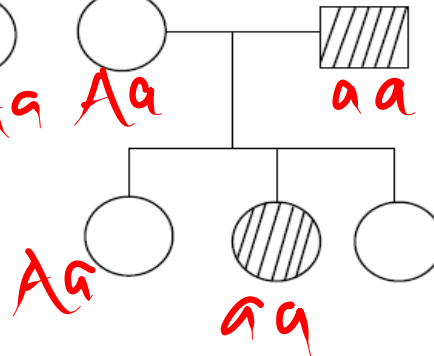


(a) AA, aa

(c) aa, aa

(b) Aa, AA

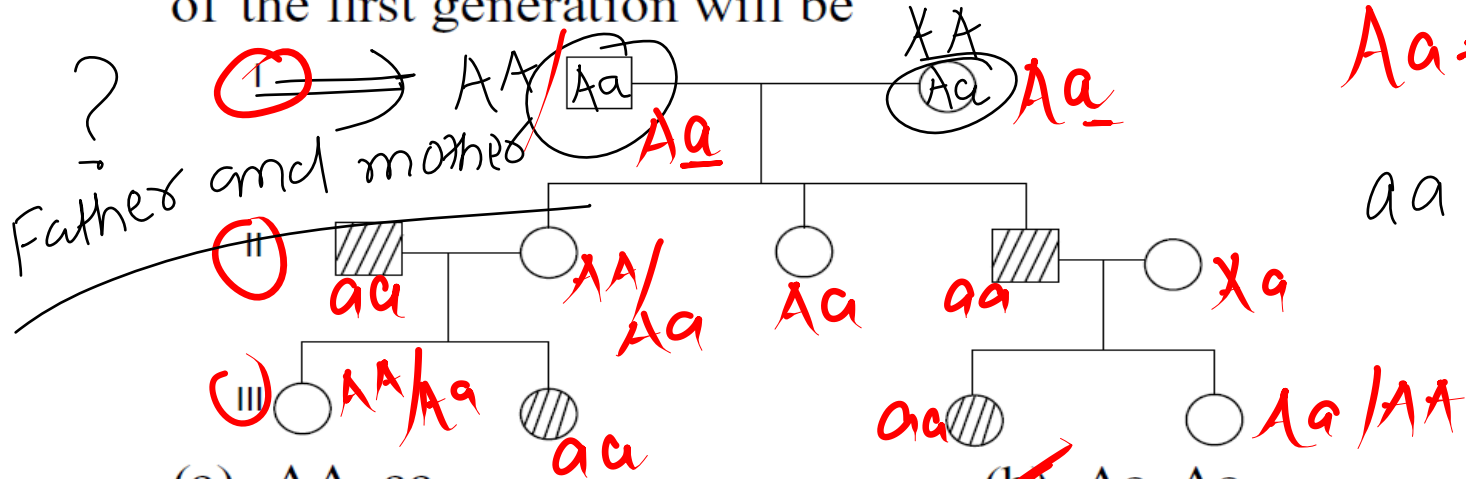
(d) Aa, Aa



AA ⇒ Disu  
Aa ⇒ Normal  
aa ⇒ Normal  
AA - Normal  
Aa - Normal  
aa - Dis

A pedigree is shown below for a disease that is autosomal recessive. The genetic makeup of the first generation will be

$AA \Rightarrow$  Normal  
 $Aa \Rightarrow$  Normal but carrier  
 $aa \Rightarrow$  Disease

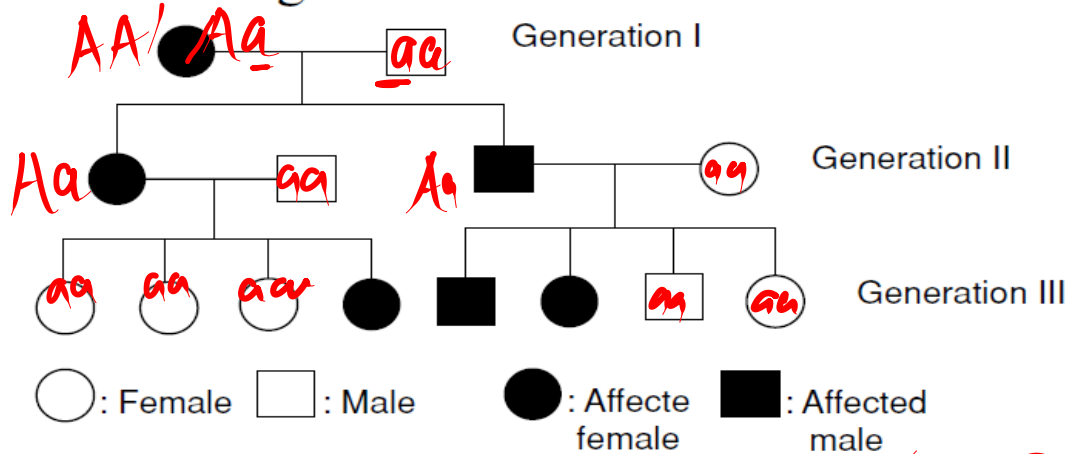


- (a)  $AA$ ,  $aa$
- (c)  $Aa$ ,  $aa$

- (b)  $Aa$ ,  $Aa$
- (d)  $aa$ ,  $aa$



A pedigree is shown below for a disease that is autosomal dominant. The genetic makeup of the first generation is



Autosomal dominant

$AA \Rightarrow$  Disease (affected)

$Aa \Rightarrow$  affected but carrier.

$aa \Rightarrow$  Normal.

(a)  $AA, Aa$

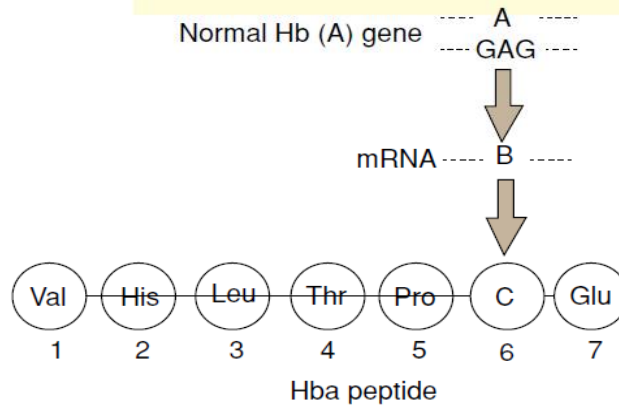
(c)  $Aa, AA$

(b)  $Aa, aa$

(d)  $Aa, Aa$

$Aa$     $aa$

Identify A, B and C from the following diagram.



- (a) A: CTC; B: GAG; C: Glu
- (c) A: CTC; B: GAG; C: Thr
- (b) A: GAG; B: CTC; C: Pro
- (d) A: CTC; B: GAG; C: Leu

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>C</b>	<b>B</b>	<b>A</b>	<b>D</b>	<b>A</b>	<b>B</b>	<b>A</b>	<b>B</b>	<b>B</b>	<b>A</b>

30. In  $F_2$  generation, a phenotypic ratio of  $1 : 1 : 1 : 1$  exhibits  
 (a) Back cross (b) Monohybrid test cross  
 (c) Lethality (d) ~~Dihybrid test cross~~
31. Which of the following depicts the Mendel's dihybrid ratio?  
 (a)  $3 : 1$  (b)  ~~$9 : 3 : 3 : 1$~~  (c)  $9 : 7$  (d)  $15 : 1$
32. In dihybrid cross, out of 16 plants obtained, the number of genotypes will be  
 (a) 4 (b) ~~9~~ (c) 16 (d) 12
33. Pure homozygous offsprings in a dihybrid cross in the  $F_2$  generation will be  
 (a)  ~~$\frac{1}{2}$~~  (b)  $\frac{1}{4}$  (c)  $\frac{1}{8}$  (d)  $\frac{1}{16}$
34. In hybridization,  $Tt \times tt$  gives rise to the progeny of ratio  
 (a)  ~~$1 : 1$~~  (b)  $1 : 2$  (c)  $2 : 1$  (d)  $1 : 2 : 1$
35. Self-pollination between  $Tt$  and  $Tt$  plants results into the genotype ratio of  
 (a)  $3 : 1$  (b)  ~~$1 : 2 : 1$~~  (c)  $1 : 3$  (d)  $4 : 0$

$Tt \times tt$   
 $Tt$

$Tt \times Tt$   
 $1 : 2 : 1$

36. Mendel crossed a pure white-flowered recessive pea plant with a dominant pure red-flowered plant. The first generation of hybrids from the cross should show

- (a) 50 per cent white-flowered and 50 per cent red-flowered plants
- (b) All red-flowered plants
- (c) 75 per cent red-flowered and 25 per cent white-flowered plants
- (d) All white-flowered plants

$CCPP \times CCPP$   
(coloured) colourless  
 $F_1 \rightarrow CcPp$

37. If in a dihybrid cross, Mendel had used two such characters which have linked, he would have faced difficulty in explaining the results on the basis of his

- (a) Law of segregation
- (b) Law of multiple factor hypothesis
- (c) Law of independent assortment
- (d) Law of dominance

38. From a cross  $Aa BB \times aa BB$ , which of the following genotypic ratio will be obtained in  $F_1$  generation?

- (a) 1 Aa BB : 1 aa BB
- (b) 1 Aa BB : 3 aa BB
- (c) 3 Aa BB : 1 aa BB
- (d) All Aa BB : No aa BB

39. A farmer crossed a walnut combed chicken with a single combed one and obtained all walnut combed chickens in  $F_1$ . The genotype of the parents was

- (a)  $Rr Pp \times rr pp$
- (b)  $RR PP \times rr pp$
- (c)  $RR pp \times rr pp$
- (d)  $RR Pp \times rr pp$

40. In sweet peas, genes C and P are necessary for colour in flowers. The flowers are white in the absence of either or both the genes. What will be the percentage of coloured flowers in the offspring of the cross  $Cc pp \times cc Pp$ ?

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

41. In a monohybrid cross, 120 plants are obtained. The ratio of homozygous and heterozygous will be  
 (a) 40 : 80      ~~(b) 60 : 60~~      (c) 20 : 100      (d) 10 : 110
42. If Mendel had studied the seven traits using a plant with 12 chromosomes instead of 14, in what way would his interpretation have been different?  
 (a) He could have mapped the chromosome.  
 (b) He would have discovered blending or incomplete dominance.  
 (c) He would not have discovered the law of independent assortment.  
 (d) He would have discovered sex linkage.
43. How many different types of genetically different gametes will be produced by a heterozygous plant having the genotype AABbCc?  
 (a) 2       (b) 4      (c) 6      (d) 9
44. Mendel's law of independent assortment is applicable for  
 (a) All genes in all organisms      (b) All genes of pea plant only  
 (c) All linked genes only       (d) All non-linked genes only
45. In a plant, red fruit (R) is dominant over yellow fruit (r) and tallness (T) is dominant over shortness (t). If a plant with RRTt genotype is crossed with a plant that is rrtt, then  
 (a) 75 per cent will be tall with red fruit      (b) All the offspring will be tall with red fruit  
 (c) 25 per cent will be tall with red fruit       (d) 50 per cent will be tall with red fruit

AABbCc

RRTt  
 RRTt × rrtt

Rt

46. When a tall plant with rounded seeds (TTRR) is crossed with a dwarf plant with wrinkled seeds (ttrr), then the generation consists of tall plants with rounded seeds. How many types of gametes a plant would produce?
- (a) One                      (b) Three                      (c) Four                      (d) Eight
47. Mendel did his experiment on
- (a) Garden pea (*Pisum sativum*)                      (b) Snapdragon  
 (c) *Drosophila*                      (d) *Lathyrus odoratus*
48. How many contrasting traits are chosen by Mendel?
- (a) 7                       (b) 14                      (c) 21                      (d) 4
49. Mendel conducted an experiment on garden pea for how many years?
- (a) 7                      (b) 10                      (c) 4                      (d) 15

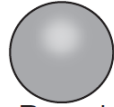
50. Select the incorrect matching.

**Characters**

**Dominant trait**

**Recessive trait**

(a) Seed shape

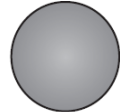


Round

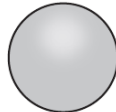


Wrinkled

(b) Seed colour



Yellow



Green

(c) Flower colour

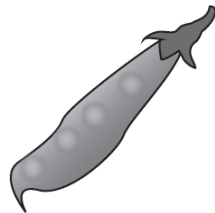


Violet



White

(d) Pod shape



Constricted



Full



51. Number of character of garden pea flower chosen by Mendel?

(a) 1

(b) 2

(c) 3

(d) 4

52. Select the false statement from the following:

(a) Mendel for the first time applied statistical analysis and mathematical logics to problems in biology.

(b) Mendel's experiment had a large sampling size, which gave greater credibility to the data that he collected.

(c) Mendel conducted artificial cross-pollination experiment using true-breeding pea lines.

(d) Mendel selected 14 true-breeding pea plant varieties, as pairs which were similar except for two characters with contrasting traits.

53. In Mendelian dihybrid cross, how many individuals are homozygous dominant for both the genes in  $F_2$  generation?

(a)  $\frac{1}{16}$

(b)  $\frac{2}{16}$

(c)  $\frac{4}{16}$

(d)  $\frac{6}{16}$

**54.** In Mendelian dihybrid cross, how many individuals are homozygous recessive for one of the character only in  $F_2$  generation?

- (a)  $\frac{1}{16}$                       (b)  $\frac{2}{16}$                       (c)  $\frac{3}{16}$                       (d)  $\frac{6}{16}$

**55.** In Mendelian dihybrid cross, how many individuals are heterozygous of both the character in  $F_2$ -generation?

- (a)  $\frac{1}{16}$                       (b)  $\frac{2}{16}$                       (c)  $\frac{3}{16}$                       (d)  $\frac{4}{16}$

**56.** In Mendelian dihybrid cross, how many of progeny in  $F_2$  generation possess genotype rryy?

- (a)  $\frac{1}{16}$                       (b)  $\frac{2}{16}$                       (c)  $\frac{3}{16}$                       (d)  $\frac{4}{16}$

**57.** How many genotypes are formed in Mendelian dihybrid cross?

- (a) 4                              (b) 9                              (c) 6                              (d) 8

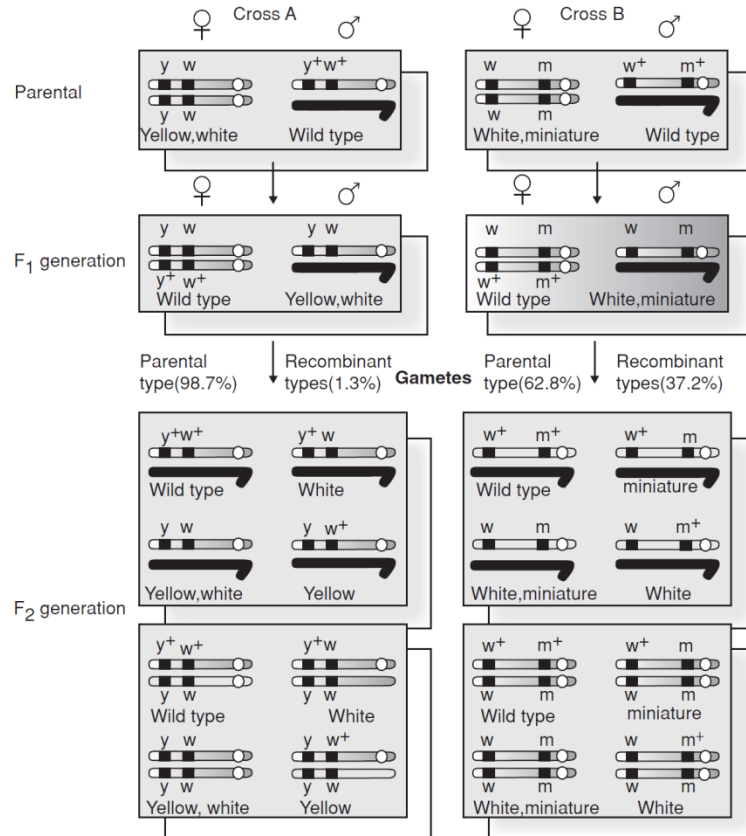
80. Drosophila has four pairs of chromosomes. How many linkage groups does it have?  
 (a) Eight  (b)  Four  
 (c) One less than the pairs of chromosomes  (d) One more than the pairs of chromosomes
81. Linkage in Drosophila was first discovered by  
 (a)  Morgan  (b) Bateson and Punnett  
 (c) Sturtevant  (d) Bridges
82. Number of linkage groups in Pisum sativum is  
 (a) 2  (b) 5   
 (c)  7  (d) 9
83. Who coined the term linkage?  
 (a) Mendel  (b) Tschermak   
 (c) Sturtevant  (d)  T. H. Morgan
84. In humans, the chromosomal condition of male is  
 (a) 44 AA + XO  (b) 44 AA + XX   
 (c)  44 AA + XY  (d) 44 AA + XXY
85. Physical association of two genes is known as  
 (a) Heterozygosis  (b)  Linkage   
 (c) Recombination  (d) Homozygosis

44 AA + XY

86. Find out the incorrect statement.

- (a) Morgan carried out several dihybrid crosses in drosophila to study the genes that were sex linked.
- (b) Sturtevant used the frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes and mapped their position on chromosome.
- (c) Henking gave the term X-body.
- (d) Boveri united the knowledge of chromosomal segregation with Mendelian principles and called it the chromosomal theory of inheritance.

87. Which cross shows very tight linkage?



- (a) Cross A
- (b) Cross B
- (c) Both (a) and (b)
- (d) None of these

88. Why *Drosophila melanogaster* is suitable for the study of genetical variation?
- (a) Could be grown on simple synthetic medium in laboratory.
  - (b) Complete life cycle is 2 weeks and single mating produces a large number of progeny flies.
  - (c) Clear sexual dimorphism is present and many types of heredity variation can be seen with low power microscope.
  - (d) All of these
89. Cytological observation made in a many number of \_\_\_\_\_ led to the development of the concept of genetic/chromosomal basis of sex determination
- (a) Mammals
  - (b) Birds
  - (c) Humans
  - (d) Insects
90. Who discovered X-body but could not explain its significance?
- (a) Mendel
  - (b) Morgan
  - (c) Henking
  - (d) De vries
91. X-body of Henking was
- (a) Nucleus
  - (b) Lipid
  - (c) Chromosome
  - (d) Ribosomes
92. X-chromosome is used in the determination of sex; therefore, it is known as
- (a) Autosomes
  - (b) Sex chromosomes
  - (c) Microsomes
  - (d) Oxysomes
93. Which type of sex-determination is found in grasshopper?
- (a) XO type
  - (b) XY type
  - (c) ZW type
  - (d) Any of these

XO (23)

94. In the number of insects and mammals the type of sex determination is  
 (a) XO type       (b) XY type      (c) ZW type      (d) Any of these
95. Male is homogametic in  
 (a) Drosophila      (b) Human       (c) Fowl      (d) All of these
96. How many chromosomes are present in human male?  
 (a) 22 Pairs + XX      (b) 22 Pairs + YY  
 (c) 22 Pairs + XY      (d) 21 Pairs + XY

22 pairs + XY

97. The below figure possess which of the following sex chromosomes?



- (a) XX      (b) XY  
 (c) ZZ      (d) ZW