



BIOLOGY

BOOKS - SARAS PUBLICATION

Chromosomal Basis of Inheritance

Exercise

1. Which of the following sentences are correct?

1. The offspring exhibit only parental

combinations due to incomplete linkage.

2. The linked genes exhibit some crossing over in complete linkage.

3. The separation of two linked genes are possible in incomplete linkage.

4. Crossing over is absent in complete linkage.

A. 1 and 2

B. 2 and 3

C. 3 and 4

D. 1 and 4

Answer:



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2. Changing the codon AGC to AGA represents

- A. Missense mutation
- B. Nonsense mutation
- C. Frameshift mutation
- D. Deletion mutation

Answer:



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3. How many map units separate two alleles A and B if the recombination frequency is 0.09?

A. 900cm

B. 90cm

C. 9 cm

D. 0.09

Answer:



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4. In which stage does crossing over occur in a cell

A. Leptotene

B. pachytene

C. Diplotene

D. Zygotene

Answer:



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5. Datura is a classical example of

A. Tetrasomy

B. Trisomy

C. Monosomy

D. Nullisomy

Answer:



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6. Draw the diagram of different types of aneuploidy.



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7. What is the difference between mis-sense mutation and non-sense mutation?



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8. What is gene mapping? Write its uses.



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9. Write the salient features of Sutton and Boveri concept.



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10. What is colchicine? Will it affect the source plant?



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11. What is colchicine? Will it affect the source plant?



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12. What happens during inversion?



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13. Mention the name of man-made cereal.

How it is developed?





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14. When two different genes came from same parent they tend to remain together.

Draw the cross with suitable example.



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15. Write the steps involved in molecular mechanism of DNA recombination.



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16. Write briefly about the type of linkage in male *Drosophila*.



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17. Multiple alleles may be present within a population, but an individual had only two of those alleles. Why?



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18. If you cross dominant genotype PV /PV male Drosophila with double recessive female and obtain F_1 hybrid. Now you cross F_1 male with double recessive female.

Draw the cross with correct genotype.



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19. If you cross dominant genotype PV /PV male Drosophila with double recessive female and obtain F_1 hybrid. Now you cross F_1 male

with double recessive female.

Draw the cross with correct genotype.



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20. If you cross dominant genotype PV/PV male *Drosophila* with double recessive female and obtain F_1 hybrid. Now you cross F_1 male with double recessive female.

Draw the cross with correct genotype.



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21. If you cross dominant genotype PV /PV male Drosophila with double recessive female and obtain F_1 hybrid. Now you cross F_1 male with double recessive female.

Draw the cross with correct genotype.



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22. If you cross dominant genotype PV /PV male Drosophila with double recessive female and obtain F_1 hybrid. Now you cross F_1 male

with double recessive female.

Draw the cross with correct genotype.



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23. An allohexaploidy contains

- A. Six different genomes
- B. Six copies of three different genomes
- C. Two copies of three different genomes
- D. Six copies of one genome

Answer:



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24. The A and B genes are 10 cM apart on a chromosome. If an AB/ab heterozygote is test crossed to ab/ab, how many of each progeny class would you expect out of 100 total progeny?

A. 25 AB, 25 ab, 25 Ab, 25 aB

B. 10 AB, 10 ab

C. 45 AB, 45 ab

D. 45 AB, 45 ab, 5 Ab, 5 aB

Answer:



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25. Which of the following sentences are correct?

1. The offspring exhibit only parental combinations due to incomplete linkage.
2. The linked genes exhibit some crossing over

in complete linkage.

3. The separation of two linked genes are possible in incomplete linkage.

4. Crossing over is absent in complete linkage.

A. 1 and 2

B. 2 and 3

C. 3 and 4

D. 1 and 4

Answer:



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26. Accurate mapping of genes can be done by three point test cross because increases

- A. Possibility of single cross over
- B. Possibility of double cross over
- C. Possibility of multiple cross over
- D. Possibility of recombination frequency

Answer:



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27. Due to incomplete linkage in maize, the ratio of parental and recombinants are

A. 50:50

B. 7:1:1:1

C. 96.4:3.6

D. 1:7:7:1

Answer:



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28. Genes G S L H are located on same chromosome. The recombination percentage is between Land G is 15%, Sand Lis 50%, H and S are 20%. The correct order of genes is

A. GHSL

B. SHGL

C. SGHL

D. HSLG

Answer:



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29. The point mutation sequence for transition, transition, transversion and transversion in DNA are

A. A to T, T to A, C to G and G to C

B. A to G, C to T, C to G and T to A

C. C to G, A to G, T to A and G to A

D. G and C, A to T, T to A and C to G

Answer:



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30. If haploid number in a cell is 18. The double monosomic and trisomic number will be

A. 35 and 37

B. 34 and 35

C. 37 and 35

D. 17 and 19

Answer:



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31. Changing the codon AGC to AGA represents

- A. Missense mutation
- B. Nonsense mutation
- C. Frameshift mutation
- D. Deletion mutation

Answer:



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32. Assertion (A) : Gamma rays are generally use to induce mutation in wheat varieties.

Reason (R) : Because they carry lower energy to non-ionize electrons from atom

A. A is correct. R is correct explanation of A

B. A is correct. R is not correct explanation of A

C. A is correct. R is wrong explanation of A

D. A and R is wrong.

Answer:



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33. How many map units separate two alleles A and B if the recombination frequency is 0.09?

A. 900 cm

B. 90 cm

C. 9 cm

D. 0.9 cm d

Answer:



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34. Name the biologist who first suggested the occurrence of distinct pair of chromosomes.

- A. T.Boveri
- B. Montgomery
- C. Wilhelm Roux
- D. Correns

Answer:



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35. Who independently proposed the chromosome theory of inheritance?

- A. Sutton and Boveri
- B. De Vries and Tschermak
- C. Mendel and Correns
- D. Roux and Boveri

Answer:



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36. Thomas Morgan confirmed chromosomal theory of inheritance by studying on.

A. Pea plant

B. Maize plant

C. *Drosophila melanogaster*

D. Horsetail plant

Answer:



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37. During which phase do the homologous chromosomes segregate

A. Metaphase II

B. Telophase II

C. Anaphase I

D. Prophase I

Answer:



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38. The theory proposed by William Bateson and Reginald Punnett upon studying in sweet pea is.

- A. Coupling and repulsion theory
- B. Theory of gene linkage
- C. Law of independent assortment
- D. Chromosomal theory of heredity

Answer:



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39. How many types of linkage were found by T.H. Morgan.

- A. One type of linkage
- B. Two types of linkage
- C. Three types of linkage
- D. Four types of linkage

Answer:



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40. Complete linkage was observed by C.B. Bridges in.

A. Male *Drosophila*

B. Maize

C. *Neurospora*

D. *Mucor*

Answer:



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41. Number of linkage groups found in maize is.

A. 2

B. 7

C. 4

D. 10

Answer:



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42. Who coined the term 'crossing over'?

A. Morgan

B. Bateson

C. Mendel

D. Reginald Punnett

Answer:



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43. Pairing of homologous chromosomes can be seen during

A. Leptotene

B. Diplotene

C. Pachytene

D. Zygotene

Answer:



44. In which stage does crossing over occur in a cell

A. Leptotene

B. Pachytene

C. Diplotene

D. Zygotene

Answer:



45. Synaptonemal complex formation is absent in.

- A. Male Drosophila
- B. Yeast
- C. Female Drosophila
- D. Bacteria

Answer:



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46. Multiple alleles were observed by East in.

A. Maize

B. Sweet peas

C. Nicotiana

D. Papaya

Answer:



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47. Who discovered sex determination in plants?

A. Bridges

B. Morgan

C. Punnett

D. Allen

Answer:



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48. How many chromosomes are found in *Carica papaya*?

A. 36 chromosomes

B. 34 chromosomes

C. 38 chromosomes

D. 32 chromosomes

Answer:



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49. How many alleles control sex determination in papaya?

- A. Two alleles
- B. Three alleles
- C. Four alleles
- D. Six alleles

Answer:



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50. Name the hormone that plays an important role in the suppression of stamens in maize.

A. Auxins

B. Abscisic acid

C. Cytokinin

D. Gibberellins

Answer:



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51. Who coined the term 'mutation'?

A. Morgan

B. C.E. Allen

C. Hugo de Vries

D. Alfred Sturtevant

Answer:



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52. Who developed the concept of gene mapping _____

A. Morgan

B. C.E. Allen

C. Hugo de Vries

D. Alfred Sturtevant

Answer:



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53. Mutation was observed by De Vries while studying on the plant.....

A. *Oenothera lamarckiana*

B. *Equisetum*

C. *Zea mays*

D. *Melandrium album*

Answer:



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54. What is the other name for silent mutation?

A. Missense mutation

B. Indel mutation

C. Frameshift mutation

D. Synonymous mutation

Answer:



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55. Who was the first to find out physical mutagen in *Drosophila*?

A. Muller

B. Mendel

C. Morgan

D. Montgomery

Answer:



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56. Sharbati sonora is a mutant variety of .

A. Maize

B. Corn

C. Wheat

D. Rice

Answer:



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57. Sharbati sonora is developed from MeXIIcan variety by

- A. Treating with beta rays
- B. Irradicating with X-rays
- C. Irradiating with cosmic rays
- D. Irradiating with gamma rays

Answer:



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58. _____ is father of "Indian Green Revolution"

- A. Birbal Sahni
- B. M.S. Swaminathan
- C. B.G.L Swamy
- D. Janaki Ammal

Answer:



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59. Caster Aruna is developed by treatment of seeds with.....

- A. Alpha rays
- B. Ultraviolet rays
- C. Cosmic rays
- D. Neutrons

Answer:



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60. Which is not a chemical mutagen?

A. Nitrous acid

B. Magnus salt

C. Ethyl alcohol

D. Eosin

Answer:



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61. Which chemical can enhance the effects of known mutagens?

- A. Caffeine
- B. Sodium chloride
- C. Sulphuric acid
- D. Carbon monoxide

Answer:



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62. What did Muller use for the first time to induce mutation in fruit fly?

A. Gamma rays

B. Cosmic rays

C. Beta rays

D. X rays

Answer:



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63. Who first reported chemical mutagenesis?

A. Muller

B. Stadler

C. Auerbach

D. Hugo de Vries

Answer:



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64. Type of ploidy seen in Raphanobrassica.

A. Autopolyploidy

B. Aneuploidy

C. Allopolyploidy

D. Hexaploidy

Answer:



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65. Which chemical induces polyploidy in plants?

A. Cochicine

B. Mustard gas

C. Methyl methane sulphonate

D. Erythrosine

Answer:



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66. Which is the first successful man made cereal?

A. Maize

B. Rye

C. Wheat

D. Triticale

Answer:



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67. Which is not a man made autotriploid?

A. *Cynodon dactylon*

B. Watermelon

C. Tomato

D. Sugar beet

Answer:



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68. Presence of some genes in more than two copies were first reported in.....

A. Maize

B. Pea

C. Drosophila

D. Corn

Answer:



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69. Duplication is not observed in.

A. Maize

B. Pea

C. Drosophila

D. Corn

Answer:



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70. Who first reported inversion in Drosophila.

A. Sturtevant

B. Muller

C. Hugo de Vries

D. C.E. Allen

Answer:



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71. Which statement is true about null mutation?

- A. Increases normal function
- B. Reduces normal function
- C. Eliminates normal function
- D. Gains function

Answer:



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72. What happens in nonsense mutation?

- A. There is no change in the encoded amino acid
- B. shifts triplet reading of codons out of correct phase
- C. Changes the encoded amino acid
- D. Creates translational termination codon

Answer:



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73. What is known as procentric synapsis?

A. Initiation of intimate pairing between two homologous chromosomes from middle of the chromosome.

B. Initiation of intimate pairing between two homologous chromosomes from telomeres.

C. Initiation of intimate pairing between non homologous chromosomes from

telomeres.

D. Initiation of pairing from anywhere.

Answer:



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74. Monoploidy is a type of.....

A. Euploidy

B. Aneuploidy

C. Hyperploidy

D. Hypoploidy

Answer:



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75. Raphanobrassica is a cross between Raphanus sativus and.....

A. Brassica carinata

B. Brassica juncea

C. Brassica rapa

D. Brassica oleracea

Answer:



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76. What are linked genes connected together on sex chromosomes called as.

- A. Complete linkage
- B. Incomplete linkage
- C. Sex linkage

D. Autosomal linkage

Answer:



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77. Datura is a classical example of.

A. Tetrasomy

B. Trisomy

C. Monosomy

D. Nullisomy

Answer:



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78. In a mutation event, when adenine is replaced by thymine, it is known as.

- A. Silent mutation
- B. Transition
- C. Transversion
- D. Nonsense mutation

Answer:



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79. Mutual exchange of genetic material between homologous chromosomes take place in.....

A. Translocation

B. Crossing over

C. Deletion

D. Duplication

Answer:



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80. If the recombination frequency value is more than 50% the two genes are.

A. Linked

B. Unlinked

C. Identical

D. Non-identical

Answer:



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81. One centi Morgan is equal to recombination frequency of.....

A. 0.1

B. 1

C. 0.01

D. 10

Answer:



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82. Distance between two linked genes is measured in map units that depict.....

- A. Ratio of crossing over between them
- B. Cross over value
- C. Number of genes between them
- D. None of the above

Answer:



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83. Sex determination in humans controlled by

A. x-chromosome.

B. y-chromosome.

C.

D.

Answer:



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Example

1. What is difference between missense and nonsense mutation.



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2. A B C C B D E F G H I

From the above figure identify the type of

mutation and explain it.



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3. Draw the diagram of different types of aneuploidy.



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4. Write the salient features of Sutton and Boveri concept.



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5. What is gene mapping? Write its uses.



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6. When two different genes came from same parent they tend to remain together.

What is the name of this phenomenon?



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7. What two different genes came from same parent, they tend to remain together.

Draw the cross with suitable example.



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8. When two different genes came from same parent they tend to remain together.

Write the observed phenotypic ratio.



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9. If you cross dominant genotype PV /PV male Drosophila with double recessive female and obtain F_1 hybrid. Now you cross F_1 male with double recessive female.

Draw the cross with correct genotype.



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10. If you cross dominant genotype PV /PV male Drosophila with double recessive female and obtain F_1 hybrid. Now you cross F_1 male

with double recessive female.

Draw the cross with correct genotype.



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11. If you cross dominant genotype PV/PV male *Drosophila* with double recessive female and obtain F_1 hybrid. Now you cross F_1 male with double recessive female.

Draw the cross with correct genotype.



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12. Explain the mechanism of crossing over.



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13. Write the steps involved in molecular mechanism of DNA recombination.



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14. How is *Nicotiana* exhibit self-incompatibility? Explain its mechanism.





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15. How is sex determined in maize? Write their genes involved in it.



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16. Mention the name of man-made cereal?
How is it formed?



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17. State chromosomal theory of inheritance.



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18. Define sex linkage.



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19. What is meant by cis configuration?



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20. What is meant by trans configuration?



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21. What are the types of linkages found by Morgan?



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22. On what basis did Morgan classify linkages.



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23. Define linkage groups.



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24. Define linkage groups.



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25. How to construct a gene map?



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26. Differentiate tetrasomy from tetraploidy.



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27. What is difference between missense and nonsense mutation.



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28. What is the biological process that takes place during pachytene stage of prophase I of

meiosis?.



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29. Differentiate linked genes from synthetic genes.



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30. What are the two types of crossing over based on the site of occurrence? Write their differences.



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31. What is meant by bivalents?



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32. Define genetic codon



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33. Define chiasmata and explain what happens at chiasmata during crossing over.



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34. Define synaptonemal complex.



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35. What is the contribution of Montgomery to the historical development of chromosome

theory.



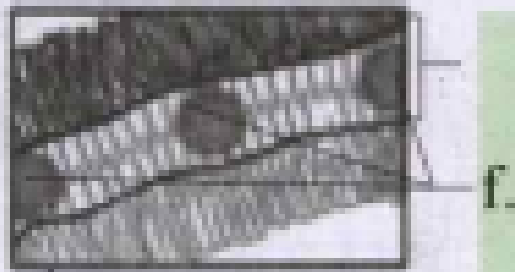
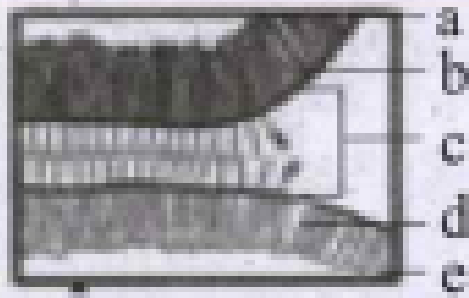
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36. Define recombinants.



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37. Identify the given diagram A and label the parts marked as a,b,c,d,e and f.



A



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38. Which is the widely accepted model of DNA replication? Who has proved it?



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39. Define recombination frequency.



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40. What is meant by map unit?



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41. What are multiple alleles?



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42. What is meant by self-incompatibility?



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43. Write the characteristic of sexually monomorphic plants?



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44. What are dimorphic plants?



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45. How is sex determined in maize? Write their genes involved in it.



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46. How is sex determination in *Silene latifolia* controlled?



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47. Does environment play a major role in the determination of sex in plants? Explain.



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48. What are the types of inflorescence in maize.



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49. List the major processes responsible for genetic variation.



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50. Define mutation. Who proposed mutation theory?



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51. On what bases, can mutation be classified?



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52. How can mutation be classified based on origin? Give its major features.



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53. How are mutations classified?



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54. Name types of mutagenesis.



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55. What is point mutation? Give one example.



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56. What are the two types of point mutation?

Define them.



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57. What are the sub types of base substitutions?



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58. What is Sharbati sonora?



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59. Write a note on mutant variety of castor.



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60. What are physical mutagens? Give examples.



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61. Explain the action of nitrous oxide in mutation.



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62. Name and describe the interaction which is introduced by W. Bateson.



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63. How are chromosomal mutation classified?



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64. What is ploidy?



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65. Name the types of ploidy?



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66. Write briefly about aneuploidy?



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67. What is colchicine? Will it affect the source plant?



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68. Define structural chromosomal aberration.



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69. What causes structural chromosomal aberration occur?



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70. What are deficiency loops?



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71. DNA stands for



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72. Define deletion



[Watch Video Solution](#)

73. What happens during inversion?



[Watch Video Solution](#)

74. What are the types of inversion?



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75. Define translocation.



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76. Differentiate crossing over from translocation.



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77. What is meant by illegitimate crossing over?



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78. Describe allopolyploidy.



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79. What are allopolyploids?



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80. Define branch migration.



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81. Define Holliday Junction.



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82. What is a three point test cross?



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83. What is meant by autopolyploidy?



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84. Explain the role of fossil genes in understanding evolution.



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85. What is meant by linkage?



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86. Some species of plants and animals identical have number of chromosomes. Can number of chromosomes differentiate the character of species from one another. Give reasons.



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87. What are autopolyploids?





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88. How is structural chromosomal aberration classified?



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89. Compare Mendelian factors with chromosome.



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90. Write briefly about gene



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91. Write briefly about the type of linkage in male *Drosophila*.



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92. Give a schematic representation of complete linkage in male *Drosophila*.



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93. Write the differences between linkage and crossing over.



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94. Why crossing over does not take place in some species of male *Drosophila*?



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95. How is crossing over classified? Explain its types.



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96. Give the importance of crossing over.



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97. Write about map unit in genetics.



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98. Write the characteristics of multiple allele's.



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99. How are mutations classified based on their effects on translation?



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100. Classify and explain autoimmune diseases.



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101. How are mutations classified based on their effects on translation?



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102. Define comutagens.

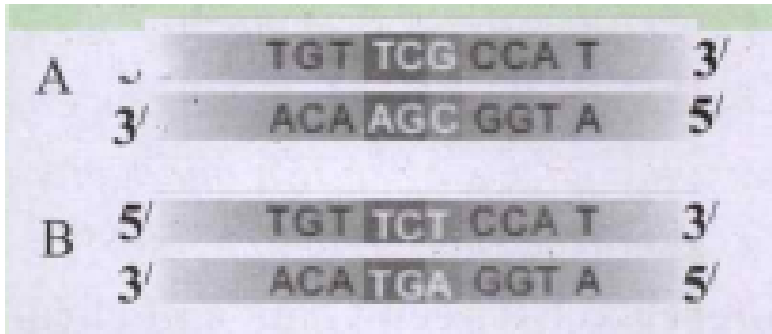


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103. What is the significance of ploidy?

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104. Identify the following figures



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105. Somatic cell having two sets of chromosomes is called diploidy. Half the number of somatic chromosome is called haploid. Is haploidy the same as monoploidy. Explain.



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106. Multiple alleles may be present within a population, but an individual had only two of those alleles. Why?



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107. Point out any three salient features of chromosomal theory of inheritance.



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108. What is a three point test cross?



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109. How is sex determined in papaya?



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110. Explain the sex determination of Bryophytes.



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111. What are mutagenic agents? How is mutation induced by physical agents?



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112. Define euploidy.



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113. What is meant by hyperploidy?



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114. Draw a flow chart depicting the various types of ploidy.



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115. What is the type of linkage reported in maize? Write short notes about it and give diagram to show it.



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116. Define hypoploidy. How is it classified?



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117. Define polyploidy. How is it classified?

Write the merit and demerit of it.



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118. What is meant by autopolyploidy?



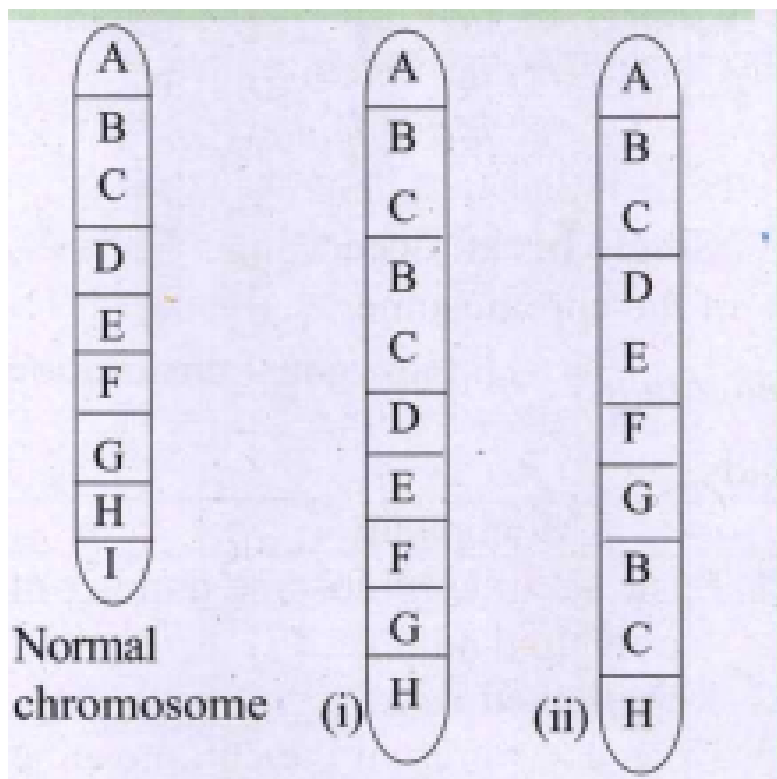
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119. What is deficiency loop? Which causes this? Explain about the cause with its types.



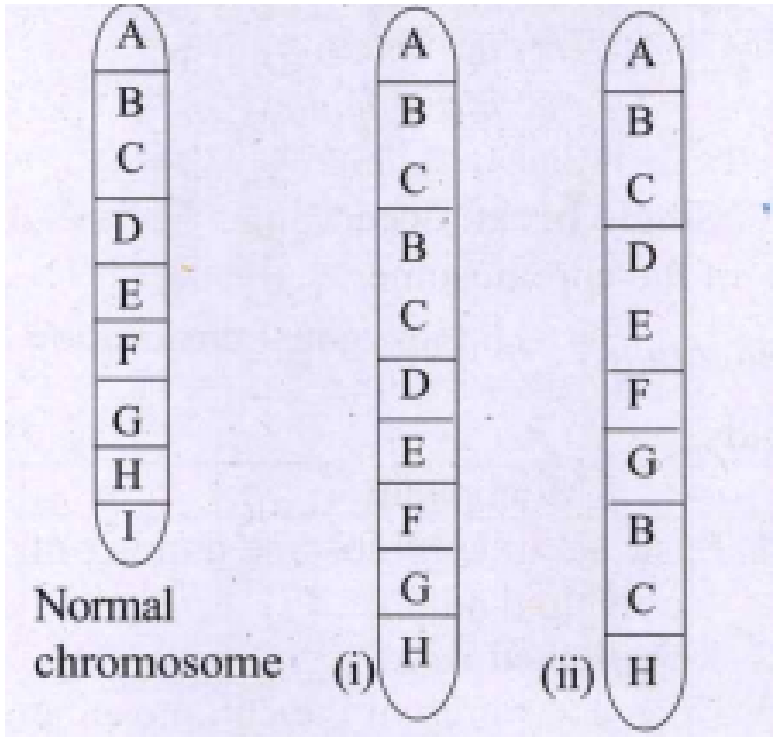
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120. Identify the following figures and define it.



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121. Explain the changes in (i) and (ii).



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122. Explain the types of translocation with diagram.



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123. Differentiate haploidy from monoploidy.



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