BIOLOGY

BOOKS - ARIHANT PUBLICATION

HEREDITY AND VARIATION

Part I Questions For Practice Very Short Answer Type Questions M C Q

1. The process of physical removal of anthers is called

A. emasculation

B. mass selection

C. introduction

D. mutation

Answer: A

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2. Which term did Mendel use to denote something in germ cells responsible for transmis sion of characters?

A. Chromosome

B. Element

C. Factor

D. Gene

Answer: C

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3. The character which predominates and clearly seen in F_1 generation is

A. recessive character

B. dominant character

C. codominant

D. None of these

Answer: B

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4. An individual who has two different alleles of a gene is called

A. alleloparthic

B. homozygous

C. heterozygous

D. codominant

Answer: C

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5. A cross of F_1 with the recessive parent is known as

A. back cross

B. hybrid cross

C. test cross

D. double cross

Answer: C

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Part I Questions For Practice Very Short Answer Type Questions Fill In The Blanks

1. The basic unit of heredity is . . . .

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2. Organism with two different allele is:

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3. Griffith coined the term 'gene' for Mendelian factor

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4. Inheritance is the degree by which progeny differs from their parents

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5. Monohybrid cross yields two numbers of genotype

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6. The phenotypic ratio in the F_2 generation of dihybrid cross is :

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Part I Questions For Practice Very Short Answer Type Questions Express In One Or Two Word S

1. Define the genetic make up or gene complement of an organism

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2. It is a simple square - shaped diagram which is drawn to show the possible combinations of male and female gametes of F_1 - parents

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Part I Questions For Practice Short Answer Type Questions

1. Mention the advantages of selecting pea plant for experiment by Mendel.

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2. Write a note on emasculation


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3. Write short note with 2-3 important points on law of segregation


Watch Video Solution

4. A cross was carried out between two pea plants showing contrasting traits of height of the plants. The result of the cross showed $50\,\%$ parental characters.

Work out the cross with the help of a punnett square

Watch Video Solution

5. A cross was carried out between two pea plants showing contrasting traits of height of

the plants. The result of the cross showed $50\,\%$ parental characters.

Name the type of the cross carried out

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6. Using a Punnett square, work out the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for a single locus

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7. When a cross is made between tall plant with yellow seeds(TtYy) and tall plant with green seed (Ttyy), what proportions of phenotype in the offspring could be expected tp be

tall and green

dwarf and green

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8. How are alleles of particular gene differ from each other ? Explain its significance

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9. During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio . Workout a cross to show how it is possible

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10. Write a short note on Mendel's principle of dominance

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11. Define and design a test-cross.

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12. A teacher wants his/her students to find the genotype of pea plants bearing purple

coloured flowers in their school garden. Name and explain the cross that will make it possible

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13. When tall pea plants were selfed, some of the offsprings were dwarf. Explain with the help of a Punnett square.

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14. A pea plant with purple flowers was crossed with white flowers producing 50 plants with only purple flowers . On selfing, these plants produced 482 plants with purple flowers and 162 with white flowers. What genetic mechanism accounts for these results ? Explain

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15. Write notes on :Law of independent assortment

Watch Video Solution

Part I Questions For Practice Long Answer Type Questions

1. Explain monohybrid cross taking seed coat colour as a trait in Pisum sativum. Workout the cross upto F_2 - generation

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2. State and explain Mendel's laws of inheritance.

Watch Video Solution

3. The phenotypic ratio in the F_2 generation of dihybrid cross is :

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4. Describe Mendel's monohybrid and dihybrid experiment and state the laws derived from them.

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5. You are given tall pea plants with yellow seeds, whose genotypes are unknown. How would you find the genotype of these plants ? Explain with the help of cross .

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6. Discuss Mendel's dihybrid cross with checker board.

Watch Video Solution

7. State and explain Mendel's laws of inheritance.

Watch Video Solution

Part I Questions For Assessment Very Short Answer Type Questions M C Q

1. The work of Mendel was published in 1866 before the Natural Science Society of Brunnn in a paper named

A. hydridisation on pea plant

B. inheritance pattern in pea plant

C. experiments on plant hybridisation

D. Mendelian experiments on pea plant

Answer: C

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2. The scientist not associated with the rediscovery of Mendel's work is

A. Hugo de Vries

B. Carl Correns

C. Erich von Tschermak

D. Willian Bateson

Answer: D

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3. Which one is not the reason for the success of Mendel ?

A. Made statistial analysis of the offsprings

B. Kept accurate records

C. Select pea plant

D. Only did cross - pollination in plants

Answer: D

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4. Which one is a heterozygous condition ?

A. RR

B. rr

C. Rr

D. RRrr

Answer: C

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5. Phenotype is

A. the genetic make up of an individual

B. the same for parent and offspring

C. the account of physiological activities

D. the appearance of an individual

Answer: D

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6. To determine heterozygosity of a cross , one has to perform :

A. back cross

B. test cross

C. reciprocal cross

D. All of the above

Answer: B

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7. The genetic ratio of 9 : 3 : 3 : 1 is due to

A. segregation of characters

B. crossing over of characters

C. independent assortment of genes

D. homologous pairing between chromosomes

Answer: C

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8. Fill in the blank: Organisms phenotypically similar and but genotypically different are called _____.

A. heterozygous

B. monozygous

C. multizygous

D. homozygous

Answer: C

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Part I Questions For Assessment Very Short Answer Type Questions Fill In The Blanks

1. An allele of T is . . . . .

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2. Test cross is a cross between :

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Part I Questions For Assessment Very Short Answer Type Questions Correct The Sentences If Required By Changing The Underline Word S

1. A cross in which parents differ in a single pair of contrasting character is called dihybrid cross

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2. Allelomorphs or alleles indicate identical characters of an individual

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Part I Questions For Assessment Very Short Answer Type Questions Express In One Or Two Word S

1. These express contrasting characters of an individual

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2. sum total of heredity or genetic makeup

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Part I Questions For Assessment Short Answer Type Questions

1. How is the Mendelian monohybrid ratio be mathematically condensable in the form of the binomial expression

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2. What proportion of individuals produced in the progeny of a cross between two individuals with genotype TtSs will be TtSs and ttss , respectively .

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3. Mention the salient features in Mendel's methodology of investigation of the inheritance pattern.

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4. Why the law of independent assortment is not always valid for two or more phenotypical traits of an individual ?

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Part I Questions For Assessment Long Answer Type Questions

1. State and explain Mendel's laws of inheritance.

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2. State and explain Mendel's laws of inheritance.

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Part Ii Questions For Practice Very Short Answer Type Questions M C Q

1. Lack of independent assortment of two genes A and B in fruitfly is due to

A. repulsion

B. recombinarion

C. linkage

D. crossing over

Answer: C

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2. The gene which controls many characters is called

A. codominant gene

B. polygene

C. pleiotropic gene

D. multiple gene

Answer: C

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3. A linkage group is explained as

A. different groups of genes located on the same chromosome

B. all the linked genes of a chromosome

C. all genes of a chromosome

D. None of the above

Answer: B

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4. Crossing over brings about

A. recombination of genes

B. no significant change

C. sturdy offspring

D. cytoplasmic reorganisation

Answer: A

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5. Different mutations referrable to the same locus of a chromosome gives rise to

A. multiple alleles

B. pseudoalleles

C. polygenes

D. oncogenes

Answer: A

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6. ABO blood group is an example of

A. pseudoalleles

B. isoalleles

C. multiple alleles

D. cytoplasmic inheritance

Answer: C

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7. Sutton gave chromosomal theory of inheritance, he united the knowledge of chromosomal segregation with

A. recombination

B. crossing over

C. Both (a) and (b)

D. Mendelian principle of segregation

Answer: D

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Part Ii Questions For Practice Very Short Answer Type Questions Correct The Statements If Required By Changing The Underlined Word

1. The number of phenotypic classes is same as to the genotype in $\underline{\text{complete}}$ dominance

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2. In a cross between red and white flowered plants , F_1 - hybrids are pink. This is called $\underline{\text{quantitative}}$ dominance

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3. When two or more genes equally express themselves, they are called dominant genes

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4. Inheritance of skin colour in man is monogenic

Watch Video Solution

Part Ii Questions For Practice Very Short Answer Type Questions Fill In The Blanks

1. A man with blood group 'AB' marries a woman with 'O' blood group. The blood group of offsprings will be . . .

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2. Phenylketonuria is an example of . . . .

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Part Ii Questions For Practice Very Short Answer Type Questions Express In One Or Two Word S

1. Genes located in the same chromosome and being inherited together

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2. Inheritances of skin colour in human is an example of:

Watch Video Solution

Part Ii Questions For Practice Short Answer Type Questions

1. How does the gene 'I' control ABO blood groups in humans ? Write the effect the gene has on the structure of red blood cells

Watch Video Solution

2. With the help of one example, explain the phenomenon of codominance and multiple allelism in human population .

Watch Video Solution

3. Briefly mention the contribution of T.H. Morgan in genetics.

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4. Linkage and crossing over of genes are alternatives of each other . Justify with the help of an example

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5. Two heterozygous parents are crossed . If the two loci are linked, what would be the distribution of phenotypic features in F_1 - generation for a dihybrid cross ?

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6. Explain two situations, when independent assortment of genes occurs, resulting is $50\,\%$ recombinants

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7. In a dihybrid cross, white-eyed, yellow - bodied female Drosophila was crossed with red-eyed, brown - bodied male Drosophila, produced in F_2 - generation are 1.3% recombinants and 98.7% progeny with parental type combinations. This observation of Morgan deviated from Mendelian F_2- phenotypic dihybrid ratio. Explain giving reasons, Morgan's observations

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8. How do biologists use cross over frequencies to map genes on chromosomes?

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9. Explain the phenomenon of multiple allelism and codominance taking ABO blood group system as an example

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10. What is the phenotype of the following

(a) $l^A i$

(b) ii

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11. A child has blood group O. If the father has blood group A and mother group B, work out the genotypes of the parents and the possible genotypes of the other offsprings.

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12. Explain the following

What is the most common example of pleiotropy in humans ?

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13. Explain the following

How are the pleiotropic genes useful ?

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14. State the significance of crossingover.

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15. What is Chiasma ?

Watch Video Solution

16. What is likage? mention it's Significance.

Watch Video Solution

17. Write a short notes on: Crossing over

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18. Define multiple allelism

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19. During his studies on genes in Drosophila that were sex-linked, TH Morgan found F_2 - population phenotypic ratio to be

deviated from expected 9 : 3 : 3 : 1 . Explain the conclusion he arrived at

20. List three different allelic forms of gene 'I' in human . Explain the different phenotypic expression, controlled by these three forms

21. A woman with blood group 'A' marries a man with blood group 'O' . Discuss the possibilities of the inheritance of the blood group in the following starting with 'Yes' or 'No' for each

They produce children with blood group 'A' only

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22. A woman with blood group 'A' marries a man with blood group 'O' . Discuss the possibilities of the inheritance of the blood group in the following starting with 'Yes' or 'No' for each

They produce children some with 'O' blood group and some with 'A' blood group

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23. _____blood group are called universal recipient.

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24. Explain ABO blood group?

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25. Inheritance pattern of flower colour in garden pea plant and snapdragon differs. Why

is this difference observed ? Explain showing the crosses upto F_2 generation

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26. Explain the genetic basis of blood grouping in human population

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27. Can a child have blood group o if his parents have blood group A and b. Explain.

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28. How do genes and chromosomes share similarity from the point of view of genetical studies ?

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Part Ii Questions For Assessment Very Short Answer Type Questions M C Q

1. Multiple alleles control the inheritance of . . .

. in man

A. phenylketonuria

B. colour blindness

C. sickle-cell anaemia

D. blood groups

Answer: D

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2. An incomplete dominance is shown by

A. pisum sativum

B. Neurospora

C. Mirabillis jalapa

D. Lathyrus odoratus

Answer: C

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3. Pleiotropy occurs when a gene has

A. a complementary gene elsewhere

B. a small effect on one trait

C. reversible effectson on the phenotype, depending on age

D. many effects on the phenotype

Answer: D

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4. Crossing over occurs at

A. e strand stage

B. 4 strand stage

C. Both (a) and (b)

D. None of these

Answer: B

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5. The number of linkage group found in Drosophila is

A. 1

B. 3

C. 2

D. 4

Answer: D

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Part Ii Questions For Assessment Very Short Answer Type Questions Correct The Statements If Required By Changing The Underlined Word S

1. Inheritance of skin colour in man is monogenic

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2. Multiple allelism is the phenomenon in which a single gene regulates several phenotypes .

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Part Ii Questions For Assessment Very Short Answer Type Questions Fill In The Blanks

1. During incomplete dominance, phenotypic ratio is . . . . .

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2. Inheritances of skin colour in human is an example of:

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Part Ii Questions For Assessment Very Short Answer Type Questions Express In One Or Two Word S

1. In this phenomenon, the number of phenotypic classes is same as to the genotype

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2. In this phenomenon, both the genes of allelomorphic pair express themselves equally in the F_1 - hybrids

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Part Ii Questions For Assessment Short Answer Type Questions

1. Write a short notes on: Linkage

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2. Explain inheritance of human skin colour

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Part Ii Questions For Assessment Differentiate Between The Following

1. Distinguish between: Monohybird cross and dihybrid cross

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2. Distinguish between:Dominance and incomplete dominance

Watch Video Solution

3. Distinguish between: Linkage and crossing over

Watch Video Solution

4. Distinguish between:Incomplete dominance and co-dominance

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5. Monogenic and Polygenic inheritance

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions M C Q

1. The experimental plant material used by Mendel was :

A. cowpea

B. garden pea

C. wild pea

D. sweet pea

Answer: B

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2. Which of the following characters is not among the seven characters considered by Mendel for his hybridization experiments ?

A. Seed colour

B. Pod shape

C. Flower position

D. Flower shape

Answer: D

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3. Which law Mendel would not have proposed , if the phenomenon of linkage was known to him ?

A. Law of unit character

B. Law of dominance

C. Law of segregation

D. Law of independent assortment

Answer: D

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4. The number of genotypes produced in F_2 generation in Mendel's monohybrid cross was :

A. 1

B. 2

C. 3

D. 4

Answer: C

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5. In which of the crosses , half of the offspring show dominant phenotype ?

A. $Tt \times Tt$

B. $'TT' \times tt$

C. $'T't \times tt$

D. $TT \times TT$

Answer: C

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6. Two allelic genes are located on the :

A. same chromosome

B. two homologous chromosomes

C. two non-homologous chromosomes

D. any two different chromosomes

Answer: B

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7. Red (RR) Antirrhinum is crossed with white (rr) one . The F_1 hybrid is pink . This is an example of :

A. complete dominance

B. codominance

C. incomplete dominance

D. complete recessive

Answer: C

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8. In a dihybrid cross , in F_2 generation , the parental types are far greater in number than the recombinants . This is due to :

A. linkage

B. incomplete dominance

C. multiple allelism

D. complete dominance

Answer: A

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1. A pair of Mendelian factors (genes) that appear at a particular location on a particular chromosome and control the same

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2. Phenomenon where in the heterozygous condition an intermediate phenotype is observed

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3. Genes which move together and do not show independent assortment

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions Express In One Or Two Word S

1. Fill in the blanks:The phenomenon of single gene contributing to multiple phenotypic traits is called _____

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions Express In One Or Two Word S

1. A cross between the F_1 - hybrids with any one of the homozygous parents

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions Correct The Sentences If Required By Changing The Underlined Word S Only

1. The process of transmission of characters through generations is known as $\underline{\text{variation}}$

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2. In Mendel's dihybrid cross in F_2 - generation , $\underline{\text{nine}}$ phenotypes are produced

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3. In a test cross, always $\underline{\text{dominant}}$ parent is used

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions Correct The Sentences If Required By Changing The Underlined Word S Only

1. In Mendel's monohybrid cross, the dwarf phenotype is always homozygous

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2. The phenomenon of linkage disproved the principle of independent assortment

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3. The distance between genes in a constructed gene map is expressed as Mendel unit

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions Fill In The Blanks

1. Monohybrid cross in F_2- generation yields . .

. . number of phenotypes

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2. Monohybrid cross in F_2 - generation yields .

. . . number of genotypes

Watch Video Solution

3. The genotype of a plant showing the dominant phenotype can be determined by :

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4. In a cross between AaBB and aaBB, the genotypic ratio in F_1 - generation will be ....

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Odisha Bureau S Textbook Solutions A Very Short Answer Type Questions Fill In The Blanks

1. The name of scientist often coined with linkage is . . . . .

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Odisha Bureau S Textbook Solutions B Short Answer Type Questions

1. Write notes on :Law of independent assortment

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2. Multiple alleles

Watch Video Solution

3. WRITE SHORT NOTES ON: Chromosome theory of inheritance

Watch Video Solution

4. Write notes with 2 to 3 important points : Codominance

Watch Video Solution

5. Write notes: Incomplete dominance

Watch Video Solution

6. WRITE SHORT NOTES ON: Law of segregation

Watch Video Solution

7. Write a short notes on: Linkage

Watch Video Solution

8. Recombination

Watch Video Solution

9. WRITE SHORT NOTES ON: Test cross

Watch Video Solution

10. WRITE SHORT NOTES ON: Back cross

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Odisha Bureau S Textbook Solutions C Differentiate Between The Following

1. Distinguish between:Homozygous and heterozygous

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2. DISTINGUISH BETWEEN: Genotype and phenotype

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3. Dominant genes and Recessive genes

Watch Video Solution

4. Distinguish between:Test cross and back cross

Watch Video Solution

5. DISTINGUISH BETWEEN:Qualitative and quantitative inheritance

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Odisha Bureau S Textbook Solutions D Long Answer Type Questions

1. Explain Mendel's monohybrid cross and discuss the law of purity of gametes.

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2. State and explain Mendel's laws of inheritance.

Watch Video Solution

3. What do you mean by back cross and test cross? Explain test cross through an example.

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4. Discuss Mendel's dihybrid cross with checker board.

Watch Video Solution

5. Give an account of linkage and recombination

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Chapter Practice Very Short Answer Type Questions M C Q

1. Segregation of alleles takes place during

A. meiosis

B. cleavage

C. fertilisation

D. crossing over

Answer: A

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2. Which of the following is best suited for codominance ?

A. Flower colour in sanpdragon

B. ABO blood group in human

C. Both (a) and (b)

D. Skin colour in human

Answer: B

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3. How many pairs of contrasting characters in pea pod were chosen by Mendel ?

A. 2

B. 5

C. 7

D. 9

Answer: A

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4. Genetic complement is called

A. genotype

B. phenotype

C. alleles

D. dominant

Answer: A

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5. What is the major advantage of using a Punnett square ?

A. Show all gametic combinations

B. Show genotypic ratios

C. Show all phenotypic ratios

D. All of the above

Answer: D

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6. If F_1 - progeny of a cross of tall with a dwarf plant are tall , it indicates that the character of tallness is

A. dominant

B. recessive

C. mutant

D. sex-linked

Answer: A

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7. A recessive gene can be expressed if the genotype is

A. homozygous recessive

B. homozygous dominant

C. heterozygous

D. Both (b) and (c)

Answer: A

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8. Mendel's law of segregation states that

A. the two factors for the same trait separate in the production of gametes

B. the two different traits will be inherited independently of each other

C. the gametes are produced by meiosis

D. All of the above

Answer: A

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Chapter Practice Very Short Answer Type Questions Fill In The Blanks

1. . . . . . and crossing over do not conform to Mendel's principles of inheritance

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2. . . . . . states that when two alternative forms of a trait or character are present in an

organism only one factor expresses itself in F_1

- progeny

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Chapter Practice Very Short Answer Type Questions Correct The Statements If Required By Changing The Underlined Word

1. Polygenic inheritance is also called $\underline{\text{quantitative}}$ inheritance

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2. The genetic ratio of 9 : 3 : 3 : 1 is due to

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Chapter Practice Very Short Answer Type Questions Express In One Or Two Word S

1. The phenomenon in which both alleles of a pair express themselves fully in F_1 - hybrid

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Chapter Practice Short Answer Type I Questions

1. A diagram used to explain the production of gametes by the parents, the formation of zygotes and the F_1 and F_2 - generations

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2. How are dominance, codominance and incomplete dominance patterns of inheritance different from each other

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3. Who proposed chromosomal theory of inheritance ? Point out any two similarities in the behaviour of chromosomes and genes

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Chapter Practice Short Answer Type Ii Questions

1. Differentiate between the law of segregation and law of independent assortment

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