



# **BIOLOGY**

## **BOOKS - EVERGREEN BIOLOGY**

### **(ENGLISH)**

## **GENETICS : MENDEL'S LAW OF INHERITANCE**

**Choose the correct answer**

1. Which sex chromosomes are present in all mature human sperm cells?

- A. Both X and Y chromosomes
- B. Either X and Y chromosomes(
- C. Only X chromosomes
- D. Only Y chromosomes

**Answer: B**



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2. Which one of the following is the phenotypic monihybrid ratio in  $F_2$  generation ?

A. 2: 2

B. 1: 2: 1

C. 3: 1

D. 1: 3

**Answer: C**



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3. If a pure tall plant is crossed with a pure dwarf plant, then offspring will:

A. All tall

B. All dwarf

C. 3 tall 1 dwarf

D. 50% tall 50% dwarf

**Answer: A**



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4. After mitotic cell division, a female human cell will have :

A. 44+XX chromosomes

B. 44 +XYchromosomes

C. 22 +X chromosomes

D. 22 +Y chromosomes

**Answer: A**



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5. A cross was made between tall and dwarf plants. In  $F_1$  generation all plants were tall, when the  $F_1$  plants were selfed, the tall and dwarf plants appeared in 3:1 ratio in  $F_2$  generation. This is due to :

- A. Dominance
- B. Hybridisation
- C. Crossing over
- D. Segregation

**Answer: D**





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6. The recessive gene is one that expresses itself in :

A. Heterozygous condition

B. Homozygous condition

C.  $F_2$  generation

D. Y-linked inheritance

**Answer: B**



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7. Genetics is the study of:

A. Development of organisms

B. Mechanisms of inheritance

C. Nuclear division

D. Variation between species

**Answer: B**



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8. What is the transmission of genetic information from generation to generation known as?

A. cell division

B. Inheritance

C. Meiosis

D. Mitosis

**Answer: B**



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9. Which chromosomes can be found in a single sperm?

A. X and X

B. X and Y

C. X and X

D. X and Y

**Answer: D**



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10. Which structure will be found in the nucleus of a body cell in a woman?

A. X allele

B. X Chromosome

C. Y allele

D. Y chromosomes

**Answer: B**



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11. What are the chromosomes for the two sexes in human beings?

	Male	Female
(a)	XY	XX
(b)	XX	YY
(c)	YY	XY
(d)	XY	XX



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12. What is always found in female gametes and may be found in male gametes?

A. One X chromosome

B. One Y chromosome

C. Two X chromosomes

D. One X chromosome and one Y  
chromosome

**Answer: A**



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**13.** In a plant species, the allele for red flowers, R, is dominant to the allele for white flowers, r. Homozygous red-flowered plants, RR, are

crossed with homozygous white-flowered plants, rr. What is the colour of the flowers produced by the offspring of this cross?

- A. All red
- B. All white
- C. Equal numbers of red and white
- D. Three white to one red

**Answer: A**



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**14.** Which word describes an individual who has two identical alleles for a particular gene?

- A. Dominant
- B. Heterozygous
- C. Homozygous
- D. Phenotype

**Answer: C**



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15. The allele for detached earlobes is dominant to the allele for attached earlobes. Two parents are heterozygous for detached earlobes. What is the probability of their first child having attached earlobes?

A. 0

B. 0.25

C. 0.5

D. 0.75

**Answer: B**





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16. Which term is used for an organism that has two different alleles of a particular gene?

- A. Dominant
- B. Heterozygous
- C. Homozygous
- D. Recessive

**Answer: B**



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17. The phenotype of an organism is its:

- A. Combination of alleles
- B. Family pedigree
- C. Genetic make-up
- D. Observable features

**Answer: D**



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**18.** What will be the genotypes of the offspring resulting from a genetic cross between two individuals, one of which is homozygous dominant, (TT), and the other heterozygous?

A. All Tt

B. 50% TT, 50% tt

C. 50% TT, 50% Tt

D. 25%TT, 50%Tt, 25% tt

**Answer: C**



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19. When white-flowered pea plants are crossed with red-flowered pea plants, the offspring ( $F_1$ ) all have red flowers. If these  $F_1$  plants pollinate themselves, the next generation ( $F_2$ ) contains both red and white flowered plants. Which statement explains this?

A. The allele for red flowers is dominant and the  $F_1$  plants are heterozygous.

B. The allele for red flowers is dominant and the  $F_1$  plants are homozygous.

C. The allele for red flowers is recessive and the  $F_1$  plants are heterozygous.

D. The allele for red flowers is recessive and the  $F_1$  plants are homozygous.

**Answer: A**



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20. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because:

A. Tallness is the dominant trait

B. Shortness is the dominant trait

C. Tallness is the recessive trait

D. Height of pea plant is not governed by gene 'T' or 't'

**Answer: A**





21. In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are:

(i) Large chromosome

(ii) Small chromosome

(iii) Y-chromosome

(iv) X-chromosome

A. (i) and (ii)

B. (iii) only

C. (iii) and (iv)

D. (ii) and (iv)

**Answer: C**



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**22.** Mendel selected which of the following traits for his studies:

A. Stem length, flower position

B. Flower colour, seed shape



C. Colour of pod, cotyledon colour

D. All of these

**Answer: D**



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**23.** Which of these characters is dominant?

A. Wrinkled shape of seeds

B. Apical position of flowers

C. Green colour of cotyledons

D. Axial position of flowers

**Answer: D**



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**24.** Which statement concerning a pair of alleles for a gene controlling a single characteristic in humans is true?

- A. Both genes come from the father.
- B. Both genes come from the mother.

C. One gene comes from the mother and one gene comes from the father.

D. The genes come randomly in pairs from either the mother or father.

**Answer: C**



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**25.** A genotype can be described as:

A. The genetic makeup of an organism.

B. Part of a chromosome that codes for a certain hereditary trait.

C. The outward, visible expression of the hereditary makeup of an organism.

D. The shifting of gene positions in chromosomes.

**Answer: A**



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**26.** The sex of a person depends on:

A. The genetic makeup of autosomes found in the egg cell.

B. The genetic makeup of autosomes found in the sperm cell.

C. Whether the unfertilized egg contains an X- or Y-chromosome.

D. Whether the sperm that fertilizes the egg contains an X-or Y-chromosome.

**Answer: D**



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27. F represents the gene for brown coat colour and f represents the gene for white coat colour. In the cross  $FF \times ff$  all the offspring have a brown coat. Which genetic principle is illustrated by this cross?

A. Crossing-over

B. Multiple alleles

C. Co-dominance

D. Dominance

**Answer: D**



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**28.** In pea plants, yellow seeds are dominant to green. If heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green plants would you expect in  $F_1$  generation ?

A. 50: 50

B. 9: 1

C. 1: 3

D. 3: 1

**Answer: A**



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**29.** Among the following characters, which one was not considered by Mendel in his experiments on pea ?



A. Stem-Tall or Dwarf

B. Trichomes - Glandular or Non -glandular

C. Seed -Green or Yellow

D. Pod-Inflated or Constricted

**Answer: B**



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**30.** In a homozygous pea plant, axial flowers

(a) are dominant over terminal flowers. What

is the phenotype of the  $F_1$  generation if a

plant bearing pure axial flowers is crossed with a plant bearing pure terminal flowers?

A. Phenotype - There are mix of both axial and terminal flowers.

B. Phenotype - All bear axial flowers.

C. Phenotype - The axial and terminal flowers are in the ratio of 3 : 1.

D. Phenotype - The axial and terminal flowers are in the ratio of 2:1.

**Answer: B**



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31. An individual has the genotype Rr. What is the correct description of this genotype?

A. Heterozygous, with two different genes of the same allele.

B. Homozygous, with two different alleles of the same gene.

C. Heterozygous, with two different alleles of the same gene.

D. Homozygous, with two different genes of the same allele.

**Answer: C**



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**32.** When white-flowered pea plants are crossed with red-flowered pea plants, the offspring ( $F_1$ ) all have red flowers. If these  $F_1$  plants pollinate themselves, the next generation ( $F_2$ ) contains both red and white

flowered plants. Which statement explains this?

A. The allele for red flowers is dominant and the  $F_1$  plants are homozygous.

B. The allele for red flowers is recessive and the  $F_1$  plants are heterozygous.

C. The allele for red flowers is recessive and the  $F_1$  plants are homozygous.

D. The allele for red flowers is dominant and the  $F_1$  plants are heterozygous.

**Answer: D**



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**33. Match the items of column A with those in Column B and select the correct option**

**Column A****Column B**

(i) Genetics

(a) Chromosomes similar in size and shape.

(ii) Autosomes

(b) The alternative forms of genes.

(iii) Recessive genes

(c) Study of laws of inheritance of characters.

(iv) Allele

(d) A gene that can express only when in a similar pair.

(v) Homologous chromosomes

(e) Chromosomes other than the pair of sex chromosomes.

(a) (i) - (c), (ii) - (e), (iii) - (d), (iv) - (b), (v) - (a)

(b) (i) - (e), (ii) - (c), (iii) - (d), (iv) - (b), (v) - (a)

(c) (i) - (c), (ii) - (e), (iii) - (d), (iv) - (a), (v) - (b)

(d) (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d), (v) - (e)



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**Complete the following statements**

1. A pair of corresponding chromosomes of the same shape and size and derived one from each parent is known as \_\_\_\_\_.

A. Homologous chromosomes

B. Homozygous chromosomes

C. Autosomes

D. Allosomes

**Answer: A**



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2. Damage and errors in DNA cause \_\_\_\_\_.

A. Mutation

B. DNA repair

C. Translation

D. Transcription

**Answer: A**



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3. Any two matched genes that are \_\_\_\_\_ are called alleles.

A. Found only on autosomes.

B. At the same locus on homologous chromosomes.

C. Found only in the mother

D. At the same position on the sex chromosomes

**Answer: B**



4. The two members of a pair of factors separate during the formation of gametes.

This is Mendel's \_\_\_\_\_.

A. Law of Dominance

B. Law of segregation

C. Law of Independent Assortment

D. Law of Codominance

**Answer: B**



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5. The recessive gene is one of that expresses itself in \_\_\_\_\_.

A. Heterozygous condition

B. Homozygous condition

C.  $F_2$  generation

D.  $F_1$  generation

**Answer: B**



6. A genetic cross between two organisms may be shown as  $Gg \times Gg$ . The letter 'g' represent \_\_\_\_\_.

- A. A dominant allele
- B. A dominant chromosome
- C. A recessive allele
- D. A recessive chromosome

**Answer: C**



7. In one type of plant, the allele for red flowers (R) is dominant to the allele for white flowers (r). A plant with red flowers is crossed with a plant with white flowers. Half of the offspring have red flowers and half have white flowers. The genotypes of the parent plants are \_\_\_\_\_.

A. R and r

B. Rr and rr

C. RR and rr

D. Rr and Rr

**Answer: B**



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**Name the following**

1. When an individual has both the genes of a contrasting characters, it is said to be :

A. Homozygous

B. Heterozygous

C. Phenotype

D. Genotype

**Answer: B**



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2. When two individuals differing in atleast one character are crossed, the process is known as :



A. Hybridization

B. Selection

C. Pedigree

D. None of these

**Answer: A**



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3. A cross was made between tall and dwarf plants. In  $F_1$  generation all plants were tall, when the  $F_1$  plants were self-pollinated , the

tall and dwarf plants appeared in 3:1 ratio in  $F_2$  generation . This phenomenon is known as :

- A. Dominance
- B. Segregation
- C. Hybridization
- D. Crossing over

**Answer: B**



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4. Alternate forms of genes are known as :

A. Alleles

B. Linked genes

C. Chromosomes

D. Homologous chromosomes

**Answer: A**



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5. The crossing of a homozygous tall plant with a dwarf would yield plants in the ratio of :

A. All heterozygous tall

B. Two tall and two dwarf

C. One homozygous tall, two heterozygous tall and one homozygous dwarf

D. All homozygous dwarf

**Answer: C**



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## Explain the following terms

### 1. Law of segregation

A. The two members of a pair of factors join during the formation of gametes.

B. The two members of a pair of factors separate during the formation of gametes.

C. The two chromosomes of a pair of factors separate during the formation of gametes.

D. The two members of a pair of factors separate during the process of germination.\

**Answer: B**



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## 2. Mutation

A. A permanent alteration in the nucleotide sequence of one or more genes or in the number or structure of one or more chromosomes.

B. A temporary alteration in the nucleotide sequence of one or more genes or in the number or structure of one or more chromosomes.

C. A permanent alteration in the sequence of RNA or on the number or structure of one or more chromosomes.

D. A temporary alteration in the sequence of RNA or in the number or structure of one or more chromosomes.

**Answer: A**



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### 3. Recessive Character

A. The character which is dominant in the  $F_1$  generation and hidden in the second generation.

B. The character which is dominant both in  $F_1$  generation and  $F_2$  generation.

C. The character which remains hidden both in  $F_1$  and  $F_2$  generation.

D. The character which remains hidden in  $F_1$  generation and expressed in the second generation.

**Answer: A**



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#### 4. Heredity

A. Transmission of both the recessive and dominant characters to the progeny

from generations to generations.

B. Transmission of dominant characters to the progeny from generations to generations.

C. Transmission of potential characters to the progeny from generations to generations.

D. Transmission of recessive characters to the progeny from generations to generations.

**Answer: C**



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## 5. Phenotype

- A. Set of observable characteristics or traits of an organism
- B. Set of hidden characteristics or traits of an organism.
- C. Set of recessive traits of an organisms.

D. Set of traits of an organism.

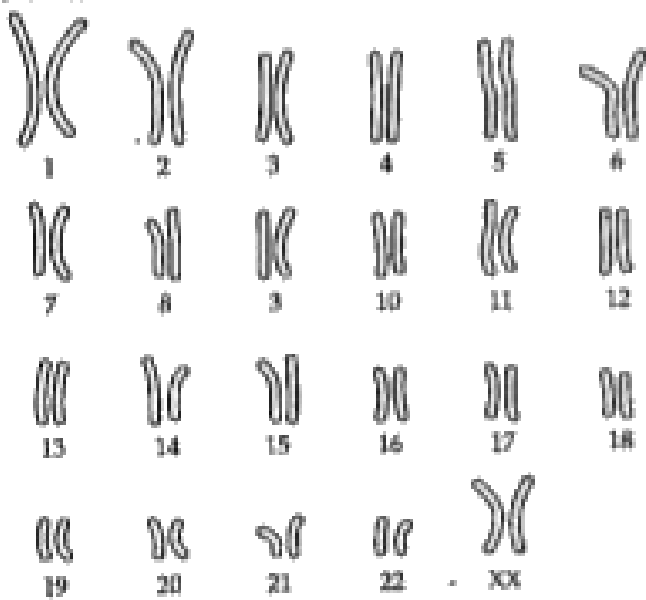
**Answer: A**



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## Diagram based Questions

1. The diagram shows the chromosomes in one human cell :



What can be concluded from the chromosomes in this cell ?

- A. The cell is from a man.
- B. The cell is from a woman.
- C. There are only 23 chromosomes per cell.

D. There are only 46 pairs of chromosomes per cell.

**Answer: B**



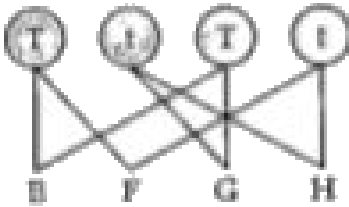
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2. The diagram shows a cross between heterozygous tall pea plants :

Parental genotypes

Tt × Tt

Gametes



Offspring

Which statement is not correct ?

- A. Offspring E and H are both homozygous.
- B. Offspring F and G are both heterozygous.
- C. The phenotypes of offspring E, F and G are the same.
- D. The ratio of different phenotypes in the offspring is 1: 1.

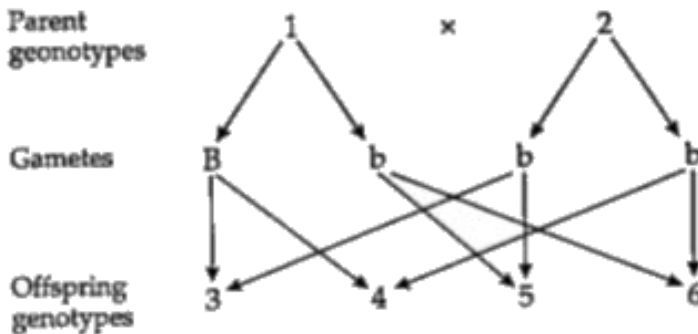


Answer: D



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3. The genetic diagram shows a monohybrid cross. B is the dominant allele and b is the recessive allele:



Which

of the parents and offspring are heterozygous

?

A. 1,3 and 4

B. 1,5 and 6

C. 2,3 and 4

D. 2,5 and 6

**Answer: A**



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4. If 'A' represents the dominant gene and 'a' represents its recessive allele, which of the following would be the most likely result in

the first generation offspring when  $Aa$  is crossed with  $aa$ ?

- A. All will exhibit dominant phenotype.
- B. All will exhibit recessive phenotype.
- C. Dominant and recessive phenotypes will be 50% each.
- D. Dominant phenotype will be 75%

**Answer: C**



**View Text Solution**

5. In pea plants, the allele for tall stems is dominant to the allele for short stems. A heterozygous tall plant is crossed with a short plant, and 100 offspring are produced. How many of the offspring are likely to be tall?

A. 25

B. 50

C. 75

D. 100

**Answer: B**

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6. In a species of plant, the allele for red flowers (R) is dominant over the allele for white flowers (r). Two red-flowered plants were crossed.

Parents	Plants with red flowers X plant with red flowers
	↓
Offspring	93 red-flowered and 28 white-flowered

What are the genotype of the parents ?

A. RR and rr

B. RR and Rr

C. Rr and Rr

D. Rr and rr

**Answer: C**



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7. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the  $F_1$  plants were selfed the resulting genotypes were in the ratio of:

A. 1:2:1::Tall heterozygous: tall homozygous

: Dwarf

B. 3:1::Tall: Dwarf

C. 3:1:: Dwarf: Tall

D. 1:2:1: Tall homozygous: Tall heterozygous

: Dwarf

**Answer: A**



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**8.** In humans, the ability to roll the tongue is dominant over the inability to roll the tongue.

If two parents who are homozygous dominant for this trait have 8 children, how many children would be expected to be unable to roll their tongues?

A. 0

B. 2

C. 8

D. 4



**Answer: A**



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9. In human, tongue rolling is a dominant trait (R), those with the recessive condition cannot roll their tongues. Mohan can roll his tongue, but his mother could not. He is married to Surekha, who cannot roll her tongue. What is the probability that their first born child will not be able to roll his tongue?

A. 0

B. 0.3

C. 1

D. 0.5

**Answer: D**



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**Assertion and Reason**

1. Assertion: In a monohybrid cross,  $F_1$  generation indicate dominant characters.

Reason: Dominance occurs only in heterozygous state.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: C**



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2. Assertion, Mendel was successful in his hybridization.

Reason: Garden pea proved ideal experimental material.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: B**



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**3. Assertion:** Genes pass from one generation to another.

**Reason:** The units of inheritance are genes.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: A**



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4. Assertion: Autosomes are the chromosome other than the sex chromosome.

Reason: Sex chromosomes help in determination of sex.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: B**



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5. Assertion: Mendel used true-breeding pea lines for artificial pollination experiments for his genetic studies.

Reason: For several generations, a true-breeding line shows the stable trait inheritance and expression.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: A**



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6. Assertion: The genetic complement of an organism is called as genotype.

Reason: Genotype is an inherited property of an organism.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: B**



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7. Assertion: Dominant allele is an allele whose phenotype expresses even in the presence of another allele of that gene .

Reason: It is represented by a capital letter, e.g. T

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: B**





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**8. Assertion:** The sex of the children will be determined by chromosome received from the father.

**Reason:** A human male has one X and one Y - chromosome.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: A**



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9. Assertion: It is possible to study several generations of pea within a short span of time.

Reason: The pea plant completes its life-cycle in one season.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: A**



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**10.** Assertion: Pea plants are with bisexual flowers, a condition that favours self-pollination.

Reason: Self-fertilisation makes it easy to obtain pure lines for several generations.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true and reason is the correct explanation of assertion.

C. If both assertion and reason are true and reason is the correct explanation of assertion.

D. If both assertion and reason are true and reason is the correct explanation of assertion.

**Answer: B**



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