

CBSE Test Paper 04
Ch-5 Principles of Inheritance and Variation

1. A self-fertilizing trihybrid plant forms:
 - a. 8 different gametes and 16 different zygotes
 - b. 8 different gametes and 32 different zygotes
 - c. 8 different gametes and 64 different zygotes
 - d. 4 different gametes and 16 different zygotes
2. Which of the following genetic disease is autosome linked recessive trait?
 - a. Sickle cell anemia
 - b. Phenylketonuria
 - c. Colour blindness
 - d. Hemophilia
3. The physical expression or appearance of a character is called as
 - a. Phenotype
 - b. Genotype
 - c. Morphology
 - d. Ecotype
4. The major reason for the success of Mendelian experiments was
 - a. Garden pea was true breeding
 - b. Garden pea was heterozygous
 - c. Garden pea was cross breeding
 - d. Garden pea was easily available
5. Deviation from Mendelism's occurs due to
 - a. Multiple alleles
 - b. Co dominance
 - c. Linkage and crossing over
 - d. Independent assortment
 - a. All are correct
 - b. Only a, b and c is correct
 - c. Only b and c is correct
 - d. Only b and c are correct

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6. What is aneuploidy?
 7. Define multiple allelism.
 8. Why in a test cross, did Mendel cross a tall pea plant with a dwarf pea plant only?
 9. Name the respective pattern of inheritance where F_1 phenotype:
 - (a) does not resemble either of the two parents and is in between the two
 - (b) resembles only one of the two parents.
 10. What is the phenotypic and genotypic ratio of incomplete dominance?
 11. Who proposed the chromosomal theory of inheritance? Point out any two similarities in the behaviour of chromosomes and genes.
 12. Give any two similarities between the behaviour of genes (Mendel's factors) during inheritance and of chromosomes during cell division.
 13. The male fruit fly and female fowl are heterogametic while the female fruit fly and the male fowl are homogametic. Why are they called so?
 14. List the differences between Turner's syndrome and Klenifelter's syndrome
 15. A particular garden pea plant produces only violet flowers.
 - i. Is it homogenous dominant for the trait or heterozygous?
 - ii. How would you ensure its genotype? Explain with the help of crosses.

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Answer

1. c. 8 different gametes and 64 different zygotes, **Explanation:** Self-fertilized plants are pure line and trihybrid plant will form 8 different kinds of gametes. These gametes undergo independent assortment to form 64 combination of zygote.
2. a. Sickle cell anemia, **Explanation:** Sickle cell anemia is a autosome linked genetic disorder. This defect arises when both the parents are carrier of the gene that cause this defects.
3. a. Phenotype, **Explanation:** The physical appearance of a character is called as phenotype. The genetic make of individual is called genotype. Tallness, round, wrinkled, yellow etc. are physical appearance.
4. a. Garden pea was true breeding, **Explanation:** Mendel was successful in his experiments as he selected the garden pea as hybridizing plant which breeds true. He recorded the results statically and observe each trait one by one.
5. b. Only a, b and c is correct, **Explanation:** Deviation from Medelism's occurs due to co-dominance, multiple alleles, incomplete dominance in which single gene is not completely dominant over the other to produce dominant trait.
6. Non separation of chromosomes during meiosis is called non-disjunction. It may result in less or more number of chromosomes. This condition is called aneuploidy.
7. When more than two alternative forms of a gene are present on the same locus it is said to exhibit multiple allelism.
8. To know the genotype whether it is homozygous or heterozygous for the dominant trait.
9. (a) Incomplete dominance
(b) law of dominance
10. The phenotypic ratio is 1 : 2 : 1
The genotypic ratio is 1 : 2 : 1

11. Sutton and Boveri

- (i) Both factors/genes and chromosomes occur in pairs in normal diploid cells.
- (ii) Both of them segregate/separate during gametogenesis and enter different gametes, i.e. one member of an allelic pair enters one gamete and the other enters another gamete.

12. (i) Both the chromosomes as well as genes (Mendelian factors) whether dominant or recessive are transferred from generation to generation in an unaltered form.

- (ii) During S-phase each chromosome replicated to form two daughter chromatids. The two chromatids separate and pass into two daughter nuclei and cells during mitosis. Each number of allele pairs also pass similarly into daughter cells during mitosis. This maintains the similar genetic composition of all the cells of a multicellular organisms.

13. Cell type of male fruit fly - XY

Female fowl - ZW

The sex chromosomes are different, hence, they are called heterogametic.

While female fruit fly has XX and male fowl has ZZ. The sex of chromosomes are similar hence homogametic.

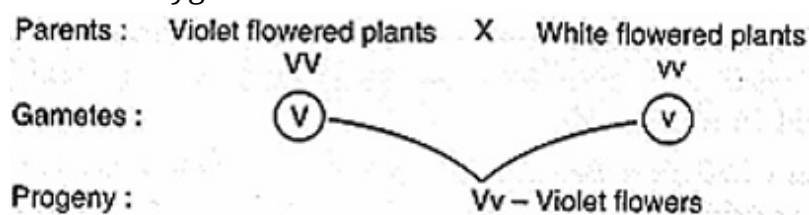
14.

Klinefelter syndrome	Turner syndrome
It is due to trisomy ($2n+1$) of sex chromosome.	It is due to monosomy ($2n-1$).
Genetic Sex: XXY; generally female because of the presence of two X chromosomes.	XO; genetically sexless.
The individual has 47 Chromosomes($44+XXY$).	The individual has 45 chromosomes. ($44+X$).
Gonadal sex: Testes present, but atrophied, gonadally male, presence of testis is due to Y chromosome.	No ovary; no testes; no gonadal sex.
Phenotype	Phenotype female, outward appearance;

male, outward appearance male; penis, vas deferens, seminal vesicles present, but small sized, no spermatogenesis; sterility present.	female; vulva, vagina and uterus present, but breasts do not develop owing to the absence of estrogens; no menstruation; sterility present.
Clinical symptoms: Male with slowly degenerating testes, enlarged breasts.	Short stature, webbed neck, female with poorly developed breasts and degenerated ovaries and rudimentary sexual characteristics.

15. i. It must be homozygous dominant since it produces only violet flowers.
- ii. The plant must be crossed with a plant bearing white (recessive) flowers. If the progeny consists of plants, are producing violet flowers, the plant is homozygous dominant. (Cross 1) If the progeny contains violet flowered plants as well as white flowers plants. The given plant is heterozygous. (Cross 2)

a. Cross 1: ozygous dominant



b. Cross 2: Heterozygous

