BYJU'S Home Learning Program

Topic covered:

- **Principles of Inheritance and Variation (Session 1) - NEET**

Daily Practice Problems

1. The reason Mendel chose *Pisum sativum* as the experimental material in genetics was because:
   a. The flowers are self pollinated
   b. It is an annual plant with a short life cycle
   c. The number of seeds produced is quite large
   d. All of the above

2. Where would you find the alleles of a particular gene?
   a. Same chromosome
   b. Homologous chromosomes
   c. Any chromosome
   d. Non-homologous chromosome

3. What did Mendel do differently from that of his predecessors?
   a. He kept breeding records
   b. He used several traits at one time
   c. He differentiated inherited traits
   d. He analysed his results quantitatively

4. The unknown genotypes of individuals can be determined by performing
   a. reciprocal cross
   b. backcross with homozygous recessive parent
   c. backcrossing with heterozygous parent
   d. backcrossing with homozygous dominant parent

5. Pure pea plant with axial flower position was crossed with pure plant with terminal flower position. All the offsprings of this cross have flowers in axial position.The allele for terminal flower position is
   a. dominant over the allele for axial flower
   b. recessive over the allele for axial flower
   c. codominant to allele for axial flower
   d. incompletely dominant over allele for axial flower

6. Homozygous condition means
   a. having similar alleles at same locus on non-homologous chromosomes
   b. having different alleles at different locus on homologous pair of chromosomes
   c. having similar alleles at same locus on homologous pair of chromosomes
   d. having dissimilar alleles at same locus on homologous pair of chromosomes

7. Law of purity of gametes is also called
   a. Law of dominance
   b. Law of segregation
   c. Law of independent assortment
   d. Law of linkage

8. What is a phenotype?
   a. The genetic makeup of an individual
   b. It is when both the parent and offspring are identical
   c. It is an account of physiological activities
   d. It is the external appearance of an individual.

9. If an individual has a recessive phenotype for a given trait, the genotype of an individual would be
   a. heterozygous
   b. homozygous recessive
   c. homozygous dominant
   d. either homozygous recessive or heterozygous

10. Which one of the Mendel's laws has no exceptions and is universally applicable to all sexually reproducing organisms?
   a. Only the second law
   b. Both second and third law
   c. All the three laws
   d. Only the first law

ANSWER KEY

Question Number	1	2	3	4	5	6	7
Correct Answer	(d)	(b)	(d)	(b)	(b)	(c)	(b)

Question Number	8	9	10
Correct Answer	(d)	(b)	(a)

Solutions

1. (d)
   Mendel chose *Pisum sativum* as the experimental material to study genetics because:
   - The flowers of this plant are bisexual.
   - They can be easily self pollinated
   - They are easy to cultivate
   - They have several contrasting characteristics
   - They have a short life span

2. (b)
   Homologous chromosomes are pairs of chromosomes containing the same set of genes in the same loci. One chromosome of the pair is obtained from the mother and the other from the father. Alleles of a gene coding for a particular characteristic are found on the same loci on the homologous chromosomes.

3. (d)
   Mendel's success was dependent on his careful selection of pea plants. Mendel studied all the seven pairs of different contrasting characters individually. He classified the offspring according to their characters as dominant and recessive and also maintained the record of parents and offsprings having particular characters. This quantitative method of recording the number of offsprings exhibiting a particular character was vital for Mendel's success.

4. (b)
   A backcross is a cross of the offspring with one of its parents. If it is done with the recessive parent, it is called a test cross. Backcross with homozygous recessive parents (test cross) can be used to determine the genotypes of an individual.
   A reciprocal cross is a pair of crosses between a male of one strain and a female of another, and vice versa.

5. (b)
   Law of dominance states that in a cross of parents that are pure for contrasting traits, only one form of the trait called the dominant trait will appear in the next generation. A pure pea plant with axial flowers on crossing with a pure pea plant with terminal flower position, all the offsprings had flowers in axial position. This means the allele coding for axial flower position is dominant over terminal flower position. The allele for terminal flower position, is thus, the recessive trait here.

6. (c)
   A locus is the specific point on the chromosome which has a gene. In homologous chromosomes, the gene and its allele are present on the same loci on the chromosomes. Homozygous condition means having similar alleles at the same locus on a homologous pair of chromosomes.

7. (b)
   Law of segregation is also called law of purity of gametes and it states that allele pairs separate during gamete formation and reunite after fertilization. So, a gamete has only one allele of a gene. So, this law is also called the law of the purity of gametes.

8. (d)
   The term phenotype refers to the external physical characteristics of an individual that can be seen with the naked eyes.

9. (b)
   A recessive gene for a particular character will express itself only in the absence of its dominant allele, which means it is always homozygous for the character.

10. (a)
    Mendel's second law, law of segregation is universally applicable to all sexually reproducing organisms. This law states that every individual possess pair of alleles. Only one allele is passed to the offspring. This law is universally true in all the cases and accepted without any exceptions.
    Law of dominance cannot be accepted due to the presence of phenomena such as incomplete dominance and codominance. Both these are deviations from Mendel's law.
    Law of independent assortment is applicable for the traits that are located on different chromosomes and not true in case of linked genes. Hence it is not true in all the cases.