1. Mention the advantages of selecting pea plant for experiment by Mendel.
Ans: Mendel select garden pea (Pisum Sativum) for the following reasons.
(i) It is an annual plant with short life span and gives results within 3 months.
(ii) The plant is grown easily and does not require after care except at the time of pollination.
(iii) F1 hybrids are fertile.
(iv) Seven pairs of contrasting characters easily detectable.
(v) True breeding self pollination.

2. Differentiate between the following -
(a) Dominance and Recessive
(b) Homozygous and Heterozygous
(c) Monohybrid and Dihybrid.
Ans: (a) The difference between dominance and recessive me:

	Dominance	Recessive
(i)	When a factor (allele) expresses itself in the presence or absence of its recessive factor called dominance.	It can only express itself in the absence of its dominant factor or allele.
(ii)	It forms a complete functional enzyme that perfectly express it.	It forms a incomplete defective enzyme which fails to express itself when present with its dominant allele, *i.e.*, in heterozygous condition.

(b) Differences between homozygous and heterozygous individuals:

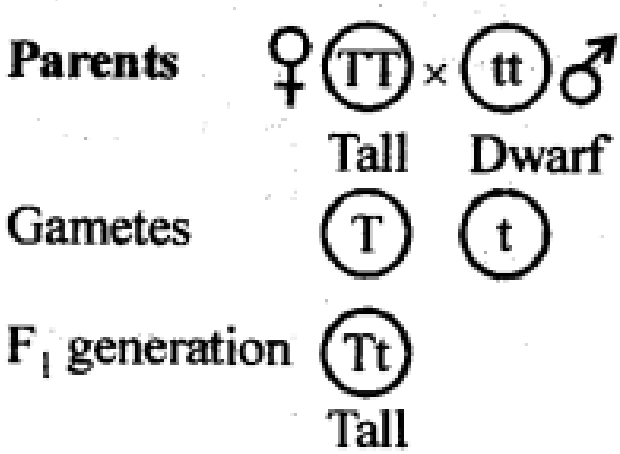
	Homozygous	Heterozygous
(i)	They have similar alleles (TT or tt) for a trait.	Have dissimilar alleles (Tt) for a trait.
(ii)	Contains either dominant (TT) or recessive (tt) alleles but not both types (Tt).	Contains both-dominant and recessive alleles (Tt).
(iii)	They are true-breeding for a specific trait and produce progeny having same genotypes and phenotypes on selfing.	They are not true-breeding and produce offspring having three genotypes and mostly two or some time three phenotypes.
(iv)	Only one type of gametes are formed either 'T' or 't' type only, not both.	Produce two types of gametes containing 'T' as well as 't'.

(c) In breeding experiments when a cross is made between the individuals considering their same single character, it is called mono¬hybrid cross, while a cross is done consid¬ering two characters at fee same time is called dihybrid cross (Yellow Round *

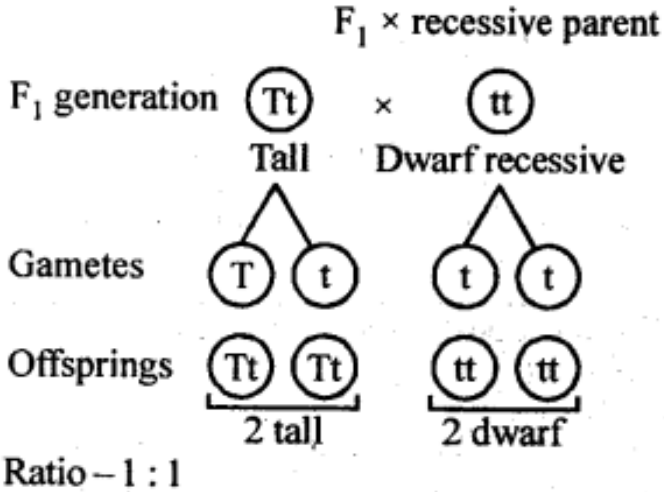
Green Wrinkled).

3. A diploid organism is heterozygous for 4 loci, how many types of gametes can be produced?
Ans: A diploid organism heterozygous for 4 loci will have the supported genetic constitution Yy Rr for two characters. The alleles Y-y and R-r will be present on different 4 loci. Each parent will produce four types of gametes - YR, Yr, yR, yr.

4. Explain the Law of Dominance using a monohybrid cross.
Ans: When two different factors (genes) or a pair of contrasting forms of a character are present in an organism, only one expresses itself in the F, generation and is termed as dominant while the other remains unexpressed and called recessive factors (gene).
A tall (TT) true breeding plant is crossed with a dwarf (tt) plant. The character of height is represented by'T' for tall't' for dwarf are the alternate form as character of height. The Fj hybrid 'Tt' is Tall, showing that tall is dominant over dwarf while dwarf remains unexpressed in F, offspring due to phenomenon of dominance by tall factor or gene.In this Tt heterozygous has tall phenotype showing T is dominant over t allele.

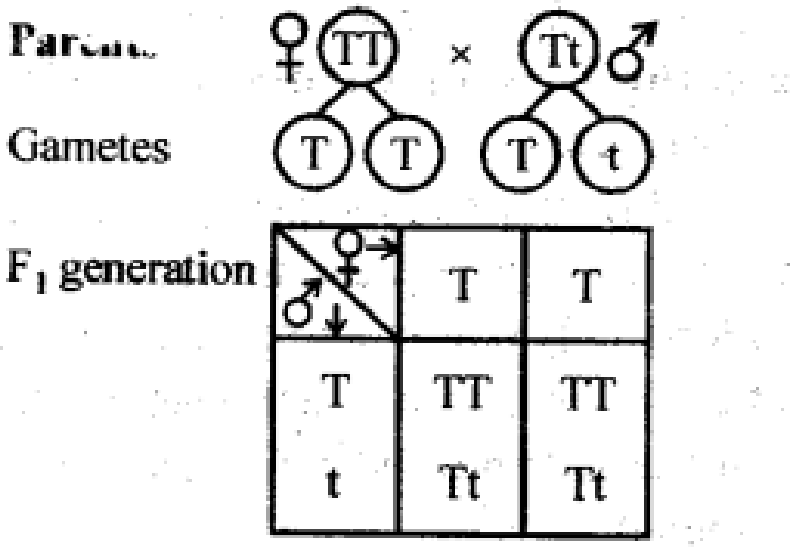


5. Define and design a test-cross.
Ans: When an individual is crossed with the homozygous recessive parent. It is called test cross.



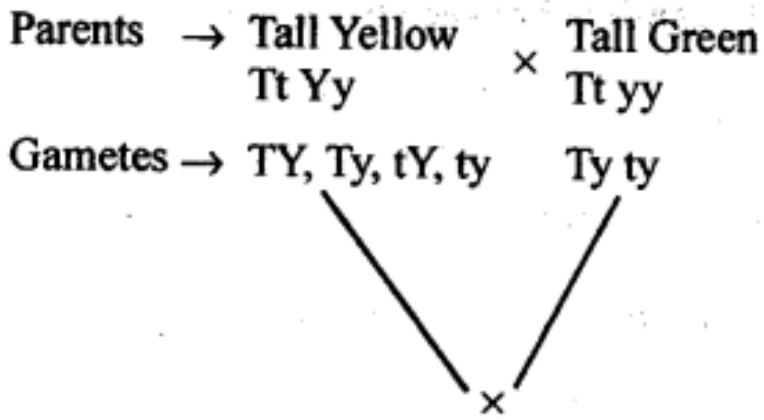
Test cross helps in establishing hetero/ homozygosity of dominant trait.

6. Using a Punnett Square, workout the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for single locus.
Ans:



Phenotype: All tall
Genotype ratio : TT: Tt 2:2 or 1:1

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 to be
(a) tali and green.
(b) dwarf and green.
Ans: A cross between tall plant with yellow seeds (TtYy) & tall plant with green seed (Ttyy) is given below.



♂ \ ♀	Ty	ty
TY	TT Yy (Tall, yellow)	Tt Yy (Tall, yellow)
Ty	Tt yy (Tall, green)	Tt yy (Tall, green)
tY	Tt Yy (Tall, yellow)	tt Yy (Dwarf, yellow)
ty	Tt yy (Tall, green)	tt yy (Dwarf, green)

Phenotype ratio :

(a) Tall and green = 3/8 or 37.5%

(b) Dwarf and green = 1/8 or 12.5%

8. Two heterozygous parents are crossed. If the two loci are linked what would be the distribution of phenotypic features in F1 generation for a dihybrid cross?
Ans: Consider 2 characters Blue (B), long (L) seeds of a plant - both characters linked.

Crossing Parents :

Parents ♀ BbL/ × BbL/ ♂

Gametes BL, b/ | BL, b/

No B/, bL as B and L are **linked**

F_1 generation

♀ ♂	BL	b/
BL	BBLL	BbL/
b/	BbL/	bb//

Phenotype : BBLL : BbL/ : BbL/ : bb//

BBLL : BbL/ : BbL/ — Blue long

bb// — White small

All parental combination, No recombinants.

********** END **********