Question No:- 01 Define plant breeding write a general objective of plant breeding :

* Plant breeding :- Plant breeding is defined as a technology of developing superior characters in crop plant in various purposed called plant breeding.

* General objective of plant breeding :-

1) Higher yield
2) Improve a quality
3) Resistance to Biotic stress
4) Resistance to Abiotic stress.
5) Early Maturity
6) development toxic free variety.
7) Temprature and light Intensitivity.
8) Insect and pest Resistant variety
9) crop sepecific objective.

* Higher yield :-

The main objective of a plant breeder is to improve the yield of economic produce which differs from crop to crop, Improvement in yield can be done by hybrids varieties

* Improve Quality :-

The price op products is determined by its quality like baking, cooking, protien, fibre, finess, Malting, nutrition, oil content sugar content those the quality are affect on products.

* Biotic stress Resistance (insect + pest) :-

The steess is caused by biotic factor such as insect, ~~etc~~ pest paeasitic weeds, diseases. due to biotic stress ceop consi derable yield losses, the genetic eesistant is the cheapest and best method to minimizing such losses.

* Abiotic steess Resistanance (Environmental factor) :-

The ceop plant is suffee feom abiotic factors such as drought soil salinity, heat, wind, cold, frost, the breedee develop such a resistance varities for such environmental condition.

* Early Matueity :-

Early Maturity is desirable characteE which has several advantage, it required less crop Management peeiod, less insecticide ~~periods~~, sprayes, Means the farmeE's cost of production is decrease.

* Toxin feee varieties :-

To Make a ceop safe for humam consumption for example Nurotoxin in Khesaei, eurcic acid from Brassica, gossypol feom seed of cotton.

* Temperature & light intensity :-

The plant breeders are developed such a varieties the varieties aee cultivated in intensive light and tempreture.
Maixe, Rice, Potato's new varieties aee available which cam gtow in summee season.

Quation No:02 Define self Incompability give the classification of self Incompability? (2)

* self incompability :-

The self incompability is defined as the inability of plant with Functional pollen to set seeds when self pollinated.

* Types of incompability :-

1) Gametophytic self Incompability :-

2) Sporophytic self Incompability :-

* Gametophytic self Incompability :-

The self Incompability which is conteolled by the genetic constitution of gametes it is known as gametophytic self Incompability system.

This system has been reported in red clovee, white clovee of potato and ~~pota~~ tomato and several other crop plant.

* Sporophytic self Incompability :-

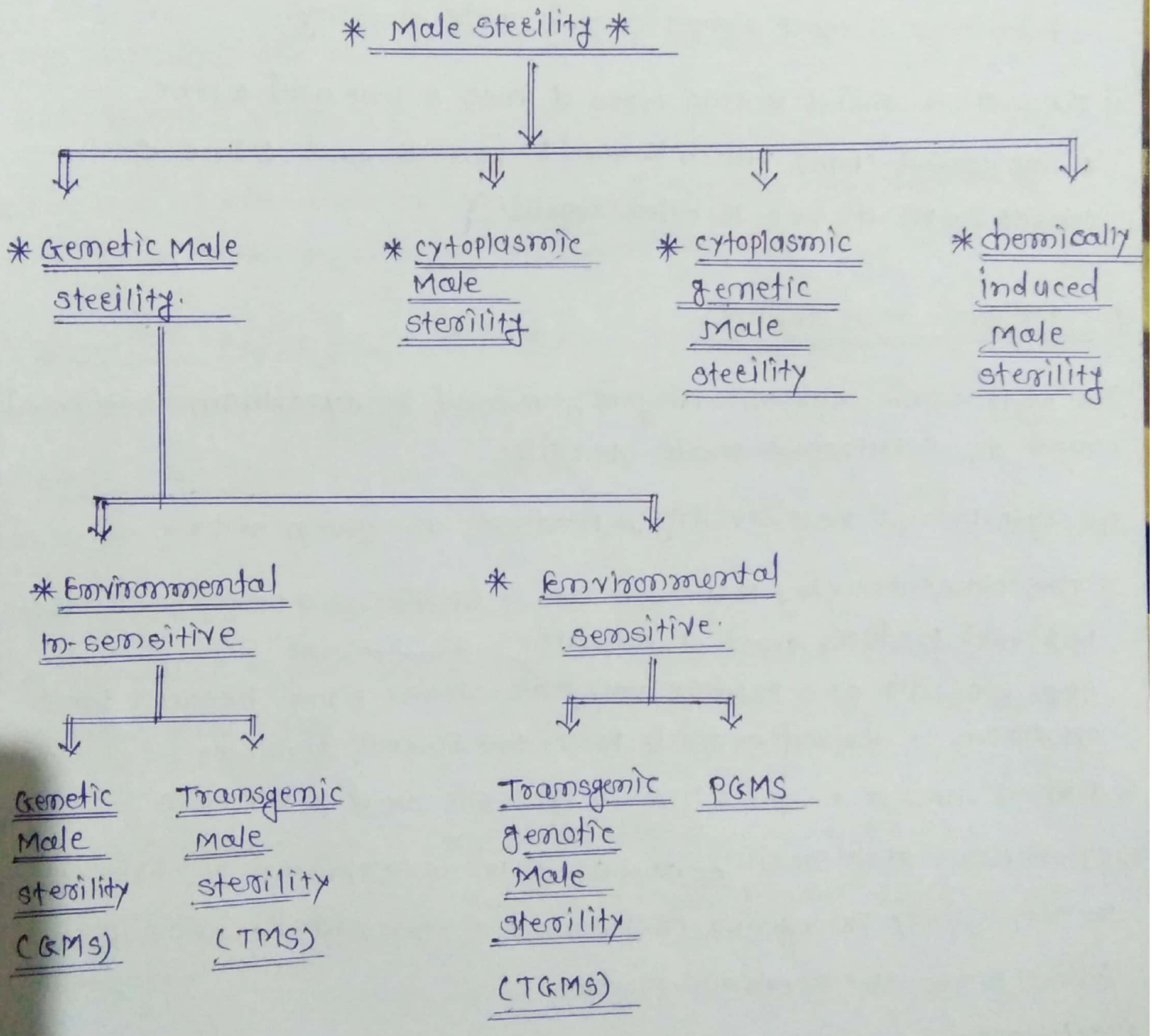
The self Incompability which is governed by the genotype of pollen producing plant (sporophyte) is called sporophytic self Incompability system.

This system has been reported in Radish, cabbage, cauliflowee sunflowee, cosmos and several other crop plants.

Quetion No:- 03 :- Define Male sterility, Explain and enlist the type of Male sterility and there utilization in crop improvement & (3)

* Male sterility :- Male steeility is defined as an absence or non-Functional of pollens in plant is called Male steeility.

* Types of Male sterility :-



* Genetic Male sterility :

The Genetic Male sterility is governed by nuclear gene or single gene this term is called genetic male sterility. This type of sterility has been reported in several crop plant like barley, wheat, Maize, cotton, sorghum, cucurbits, tomato Main features of genetic Male sterility as below.

1) The Male sterility gene are are usually recessive and rarely dominant

2) In Majority of cases sterility is caused by single gene, In few cases two or more genes control male sterility.

3) The system consist of two types of lines A line and B line A line consist (mm) which is used to female and B line is consist (mM) it's line is heterozygous.

* cytoplasmic Male sterility :

The cytoplasmic Male sterility is governed by cytoplasm is termed called as cytoplasmic male sterility.

The cytoplasmic Male sterility's features are given below.

1) The plant carrying particular type of cytoplasm are male sterile but will produce seed if pollinators are present. the F1 seed's are produce only Male sterile plant because there cytoplasm is derived entirely from the female gamete.

2) System consist A and B line A is sterile and B is fertile

3) cytoplasmic Male sterility can used in development of hybrids in vegetatively propagated crops and ornamental crops where grain is not the economic product.

4) cytoplasmic male sterility is not Influenced by environment factors such as low or high temperature.

* Cytoplasmic Genetic Male steeility :-

The steeility is governed by both cytoplasm and Nucleae genes it is known as cytoplasmic genetic Male steeility.

The cytoplasmic genetic male steeility has beem eepoeted in several ceops.

The Main features of cytoplasmic Genetic male sterility aee following.

1) The Male sterility is controlled by the inteeaction of cytoplasm and nucleae genes.

2) this type of Male sterility cam be used for the production of hybrids in both vegetatively propagated oe seed.

*utilization in ceop improvement :-

1) All types of Male steeility used in ceop improvement programmes.

2) Genetic male sterility cam used for the development of commercial hybrids in both seed and vegetatively propagated plant

3) The cytoplasmic Male sterility cam used for the development of hybrids in vegetatively propagated ceops plant forage, ornamental plant where the vegetative paet is economic product

4) The cytoplasmic Genetic Male sterility cam be used in development of both a seed propagated and vegetatively propagated plant.

the CGMS generally used for commercial production of hybrids.

Question No:-05 Define heterosis, Enlist theories and explain dominance hypothesis of heterosis with objectives

* Heterosis :- The heterosis is defined as the superiority of F1 hybrid is one or more characters over its parents. is called heterosis.

* Theories of heterosis :-

1) Dominance

2) over-dominance

3) epistasis

* Dominance heterosis :-

1) This theory was proposed by davenpoet (1908), Bruce (1910) Keeble and pallew (1910) this is the mostly accepted explaination of heterosis according to hypothesis

2) Here the deleterious recessive gene of one parent are hidden by the dominant genes of another parent.
Both of parents differ for dominant gene.

3) suppose genetic constitution of one parent is AABBccdd and that of another as aabbCCDD. a hybrid between this two parents which have four dominant gene

AABBccdd × aabbCCDD → Aa Bb Cc Dd
(1 parent) (2 parent Hybrid with 4 dominant gene

4) Thus heterosis is directly prapotional to the number of dominant of ~~dom~~ genes contributed by each parent.

Question No: 06 Define heterosis Enlist its Type and Explain the Types of heterosis? (5)

* Heterosis: The superiority of F1 hybrid is one or more character over its parent is called heterosis.

* Types of heterosis:-

1) Positive heterosis
2) Negative heterosis
3) True heterosis
4) Pseudo heterosis

* Positive heterosis:-

Positive heterosis leads to increase over parents in adoptation yield, quality, disease resistance, maturity and general vigour for majority of plant character.

* Negative heterosis:-

Negative heterosis leads for plant height, maturity duration means its discribe a many superior character of plant.

* True heterosis:-

In case of true heterosis there is increase over parents in general vigour, yield and adaptation.

* Pseudo heterosis:-

When the F1 hybrids exhibits increase over parent in vegetative growth but not in general vigour, yield and adoptation it is called pseudo heterosis.

Suction No: 08 : Define Hybridization, Enlist and Explain the types of Hybridization, Write a objective of Hybridization. (6)

* Hybridization :- Hybridization is defined as the artificial ceossing between genetically dissimilar plants. is called Hybridization.

* Types of Hybridization :-

1) Intra- specific hybridization
2) Inter- specific hybridization
3) Inter- genetic hybridization.

* Intra-specific hybridization :-

It involve two diffrent genotype of same species
This type of hybridization generally used in plant breeding and development varieties.
It also known as Inter-varietal hybridization

* Interspecific hybridization :-

It involve two different species belonging to the same genus
It is used to transfer specipic character from one species another species. It is lesser common than Intra specific hybdi.
It also known as Intragenetic hybridization

* Intra-genetic Hybridization :-

It involve two species each belonging to diffrent genus of a family. It is rarely used to transfer of specific character from genus to another, this type of hybrids are always sterile the sterility is restored by doubling of chromosomes by colchine treatment.

Question No-09:- Define Mutation, list out the different Mutagene with example. (7)

* objective of Hybridization:-

* 1) To combine several desirable feaits from different into a single genotype

* 2) To create vast genetic variability for various econom character in population

3) To develop superior crop delivers.

* 4) Develop hybrid varieties for commercial cultivation

Question No-09:- Define Mutation, list out the different Mutagene with example. (7)

* Mutation:- Mutation is defined as sudden heritable changes in phenotype of an individual called Mutation

* Mutagene:- Mutagene is defined as it is the chemical and chemical agent influence the ~~fame~~ frequency of Mutation called mutagene.

* Types of Mutagene:-

Mutagene

Physical Mutagene

1) X-rays
2) Gamma-rays
3) Ultra-Violet rays
4) Alfa-(α) particles
5) Bita (β) particles.
6) Thermal nutrons

chemical Mutagene

1) Alkylating agent
2) Base analogues
3) Acridine Dyes
4) others.

1) * Physical Mutation :-

The Mutation is Influnsed by various type of Radiation this is called as physical Mutation.

1) x-rays :- x-rays can break chromosomes and produce all type of Mutation in nucleotides. Now days the x-rays is commonly used for Induction of Mutations in various crop plants.

2) Gamma rays :- Gamma rays are identical to x-rays. In most of physical properties and biological effects. but gamma rays are shorter wavelength than x-rays. they generated from radioactive deccay of some elements like C14 / C60 radium, cobalt-60 is commonly used for production of gamma rays.

3) Alpha rays :- Alpha rays are composed of alpha particles. they are Made of two protons and neutrons and thus have double positive charge. it result the chromosomal Mutation.

4) ultra virolet rays :- The uv rays are non-ionizing radiations The uv rays produced from Mecury vapour lamps they are also present in Solar radiation. it penetrate one-two cell layers. Because of low penetrating capacity they commonly used for Irradiating of Microorganism like bacteria, viruses.

5) Fast and thermal neutrons :-

The fast and thermal nutrons are ionizing and highly penetrating particles, they are electrically nutral partical The fast and thermal ~~nat~~ neutrons used for induction of Mutation specially in asexually reproducing crop species.

* chemical Mutagens :-

1) Alkylating agents :-

this is the most powerful group of Mutagenes. the Ethyl methane sulphnate, Methyl Methane sulphonate, Ethyl Ethane sulphonate Ethylene Imines, are the chemical are used to induced Mutation

2) Base Analogous :-

Base Analogous refers to chemical compounds which are very similar to DNA base. such chemicals sometimes are incorporated DNA replication. after the DNA replication the most commonly used base analogues are

5-bromo uracil (5-BU)
2-amino purine (2AP)

3) Acridine Dyes :-

Acridine dyes is most poweeful mutagens. Acridine dyes include proflavin, acradine orange, acradine yellow to induced the Mutation)

4) others :-

Nitrous Acid, Hydroxylamine, sodium azide are the chemical asp used to induced the Mutation.

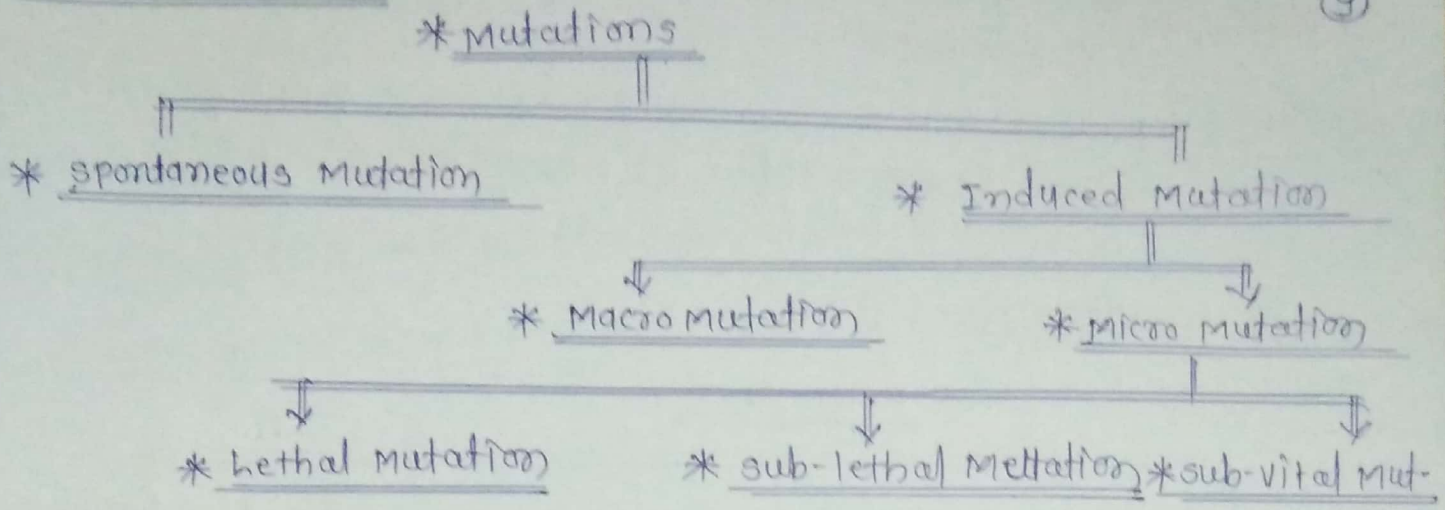
Question No-10 Define Mutation and Mutation breeding, give the types of Mutation, give the application Mutation breeding in crop improvement?

* Mutation:- Mutation is a suttern heritable changes phenotypes of gamete called Mutation.

* Mutation breeding:- The genetic improvement of crop plant for various economic character through use of induced Mutations called Mutation breeding.

* Application of ~~crop~~ for Mutation breeding in crop improvement:-

1) Improvement in yield
2) Improvement in Quality
3) Early Maturity
4) Dwaef varieties
5) Disease resistance
6) toxin resistance
7) crop Evolution
8) Improvement in adoptation
9) Induction of Male sterility
10) production of Haploids
11) overcoming self Incompatibility
12) Genetic variability.



*** Spontaneous Mutation :-**

Mutations that occur in nature are called spontaneous mutation spontaneous Mutation is caused by cosmic radiations. the rate of spontaneous mutation is about 10^{-6} for an individual gene.

*** Induced Mutation :-**

The Mutation that are artificially produced by the treatment of various Mutagenic agent called Induced Mutation. Most of the induced Mutation is harmful to organism. only 0.1%, Induced Mutation is useful to crop improvement.

*** Macro Mutation :-**

The Macro Mutation are found in qualitative character and therefore called Macro Mutation.

*** Micro Mutation :-**

The Micro Mutation are found in quantitative character.

*** Leathal Mutation**

The 100% Mortality caused is called leathal Mutation

*** sub-lethal Mutation**

The ~~so~~ More than 50% Mortality caused called sub leathal Mutation.

*** sub-vitual Mutation.**

the less than 50% Mortality caused called sub-vitual Metation.

Question No-11 :- Define pollination, Explain a types of pollination in crop improvement ?

* Pollination :- Pollination is the process of transfer of pollen grain Anther to stigma called as pollination.

* Types of pollination :-

* Pollination

* self pollination (Autogamy)

* cross pollination (Allogamy)

* Autogamy (self pollination) :-

The pollengrain are transfered from anther to stigma of same flower is called Autogamy or self pollination.

Autogamy is the closet form of inbreeding the several mechanism of Autogamy they are following.

1) It have a regular Mating or pollination

2) Genetic constitution is homozygous

3) Genetic variability is low

* cross pollination (Allogamy) :-

The pollen grain are transfered forma one plant of anther to athee plant of stigma is called Allogamy or cross pollination.

1) It have a random pollination

2) Genetic constitution is heterozygous

3) Genetic variability is high

4) New gene combustion possible during mating.

5) Buffering capacity is moderate high

Mechanism during self pollination :-

1) Bisexuality :- Male and Female organ presence on same flower.

2) Homogamy :- Maturation of anther & stigma of flower on same time

3) cleistogamy :- Pollination/fertilization occure on unopened flower

4) chasmogamy :- opening of flowes after pollination only

*Mechanism during cross pollination :-

1) Dichogamy :- Maturation of Anther and stigma on same flower but in diff time.

2) Heterostyly :- styles and filament in flower are different length

3) Herkogamy :- pollination cause by physical barriers.

4) self incompability :- Inability of fertile pollens to fertile the same flower.

5) Male sterility :- Non functional pollengrain present on flower.

Question No : 12 Define Emasculation, Explain the Types of Emasculation Write procedue of Mechanical Emasculation

* Emasculation : Emasculation is the artificial process of removal of stamens/anthers from bisexual buds

* Types of Emasculation :-

1) Mechanical Emasculation
2) Emasculation with Hot water
3) Emasculation with cold water
4) Emasculation with Alcohol
5) chemical emasculation
6) suction method
7) Male sterility

* Mechanical Emasculation

1) select young immature bud, with calyx,
2) Removed the flower which are already develop and pods
3) Keep required no of buds
4) the bud should be carefully open and anther are remove by forcep or needle.
5) After Emasculation the bud covered with butter paper bag to protect them from foreig pollen.
6) Emasculation buds are labeled
   1) Name of female parent
   2) Date & time of Emasculation
   3) no of buds emasculated
   4) mitial breeder.

Quetion No:-13:- What is wide hybridization, Explain different types in short and give role of wide hybridization in crop improvement (11)

* Wide Hybridization:- crossing between diffrent species of same genus or different genera of the same family is called as hybridization or wide hybridization

* Types of wide Hybeidization:-

1) Interspecific Hybridization:-

crossing or mating between two different ~~of the same~~ species of the same genus is referred to as interspecific hybridization.
Main features of interspecific hybridization are following.

1) It also known as intra-genetic hybridization
2) It is used when the desirable character is not found within the various crop
3) It is the effective method of transferring desirable gene into cultivated plant.
4) Interspecific hybridization generally takeplace in vegetatively propagated plant.
5) The interspecific hybridization gives ries to three type of crosses. ① fully fertile ② partially fertile ③ fully sterile.

* 2) Intergeneeic Hybridization:-

Intergeneric hybridization refers to crossing between two different genera of the same family
such crosses are easely used in crop improvement because of various problem associated with them.
The various features of intergenetic hybridization following

1) This Method is easely used for crop improvement programmes and transfer specific character.

2) Intergeneric hybridization has been generally used in asexually propagated species.

3) The hybridization was used by some workers to developed new species.

* Role of Wide Hybridization in crop Improvement :-

1) Improvement in yield

2) Disease resistance

3) Insect resistance

4) Improvement in quality

5) Improvement in quantity

6) Improvement in adoptation

7) Mode of Reproduction

8) Earliness

9) Dwarf variety.