

Section - A

Ans 1 → • The pea plant is a cleistogamous flower.

• In this both self fertilization & cross fertilization are present.

• In pea plant 7 characters or traits are present to represent the Mendel law.

• Mendel represent the character of plant in dominant & recessive form.

Ans 2 → • AUG is the initiation codon.

• AUG code for Methionine.

• In some cases at the place of AUG, GUG is used as the initiation codon.

• AUG is a start codon.

Ans 3 → Gene Bank -

• Gene Bank is used to preserve the DNA & RNA sequences.

- It also preserved the protein & nucleotide sequence.
- When we need this sequence we used them from the Gene Bank.
- DDBI, EMBL at EBI works in collaboration & collects the information from the functional unit of protein.

Ans 4 → PCR →

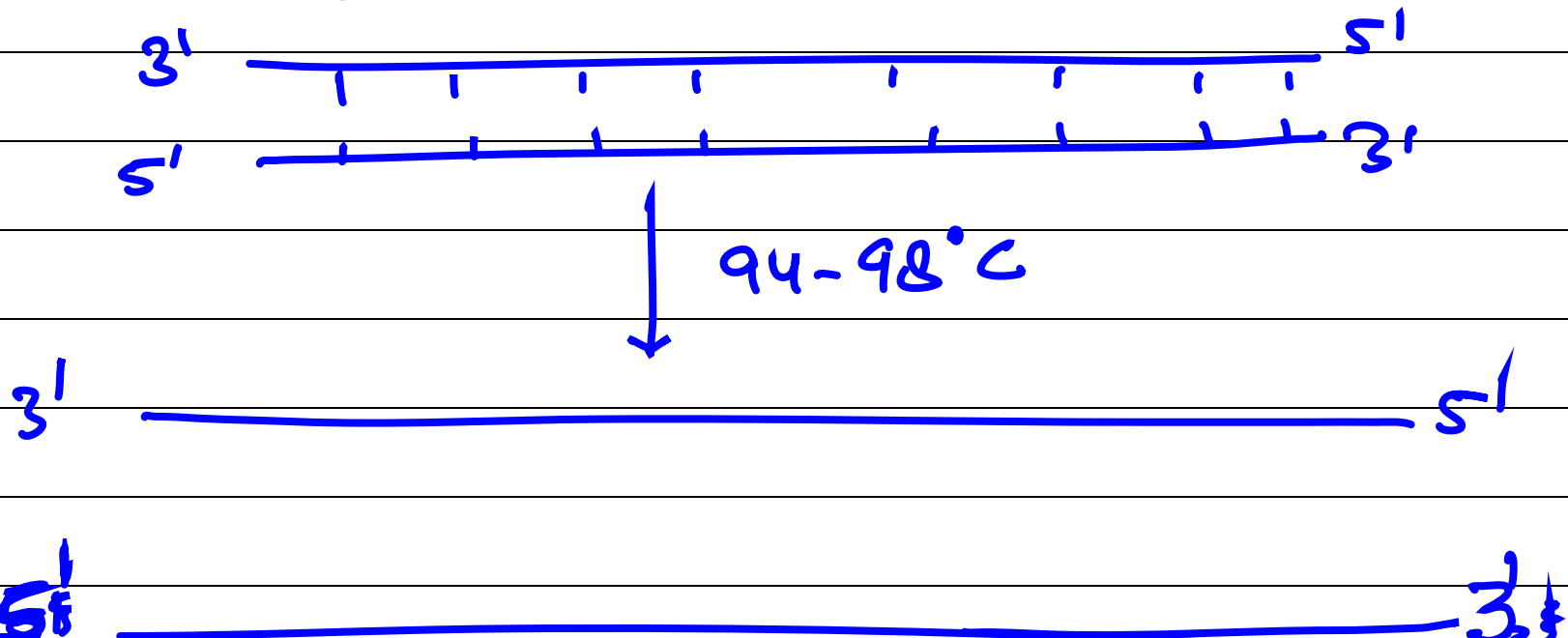
• Polymerase Chain Reaction

- It is used to make multiple copies

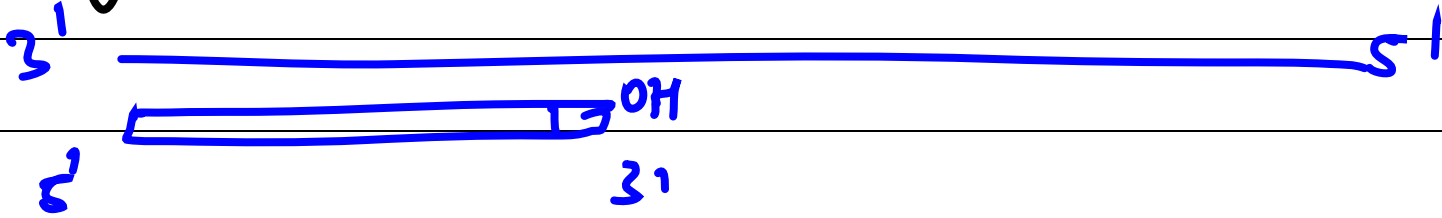
of DNA.

- Three functions to form PCR is -
 - Denaturation
 - Annealing
 - Extension

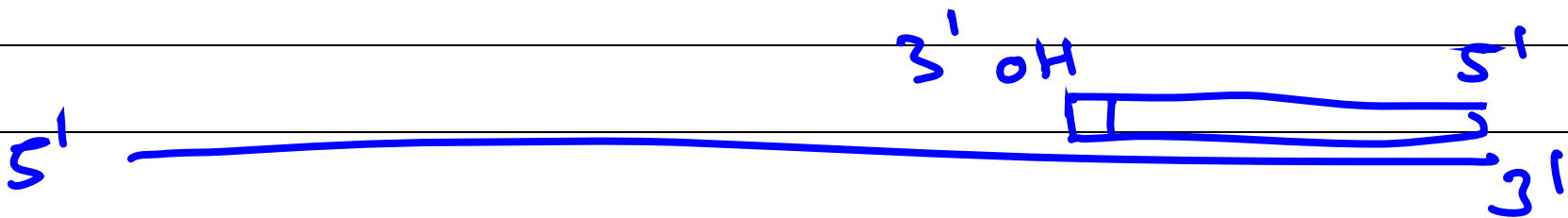
Denaturation -



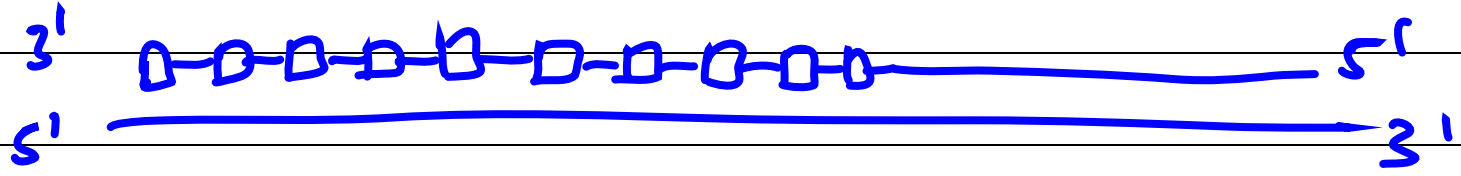
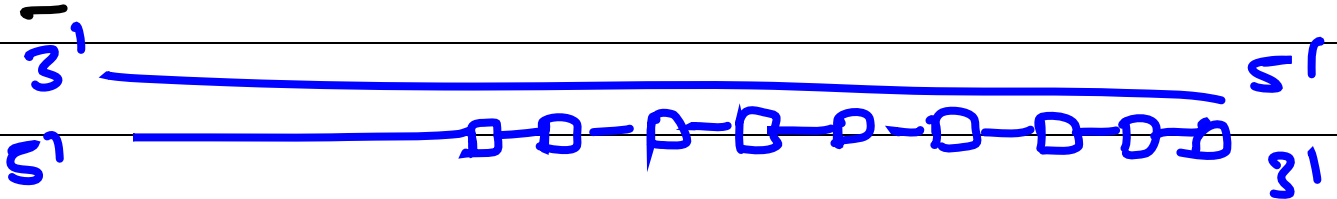
Annealing -



50-60°C



Extension



Multiple copies of DNA formed

6

Ans 5 → Split Gene :-

- The interrupted sequence of nucleotides are referred to as split gene.
- Exon is called as coding sequence
- Introns is called as non-coding sequence.
- First discovered of the gene i.e., the exon are formed in the chain & in b/w these sequences introns are present in the animal virus.

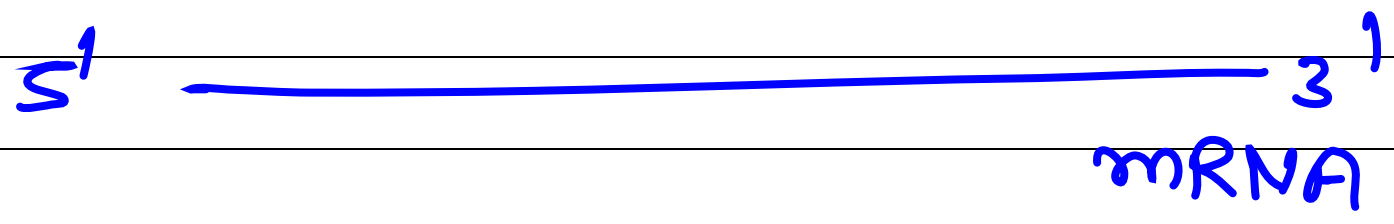
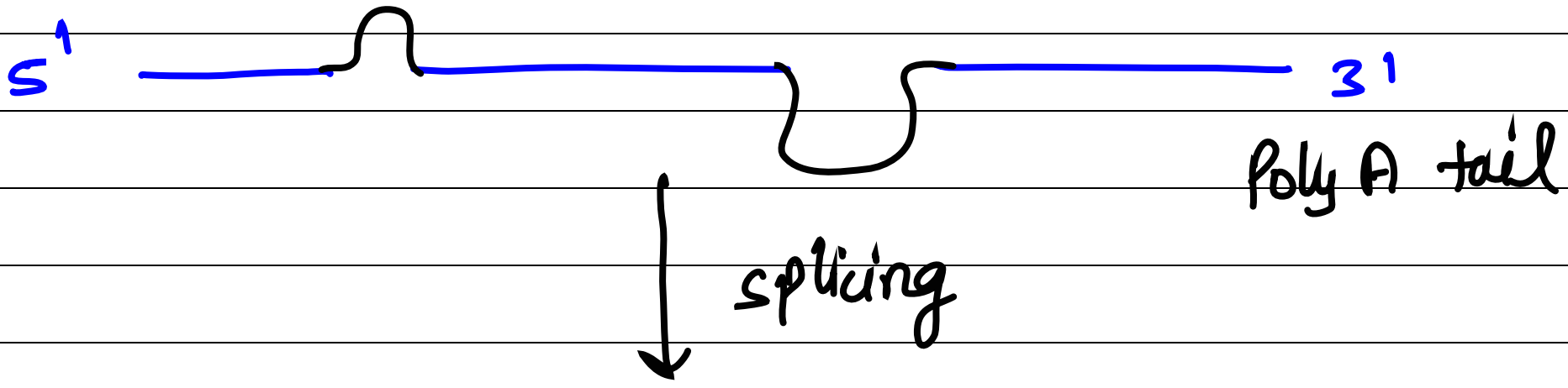
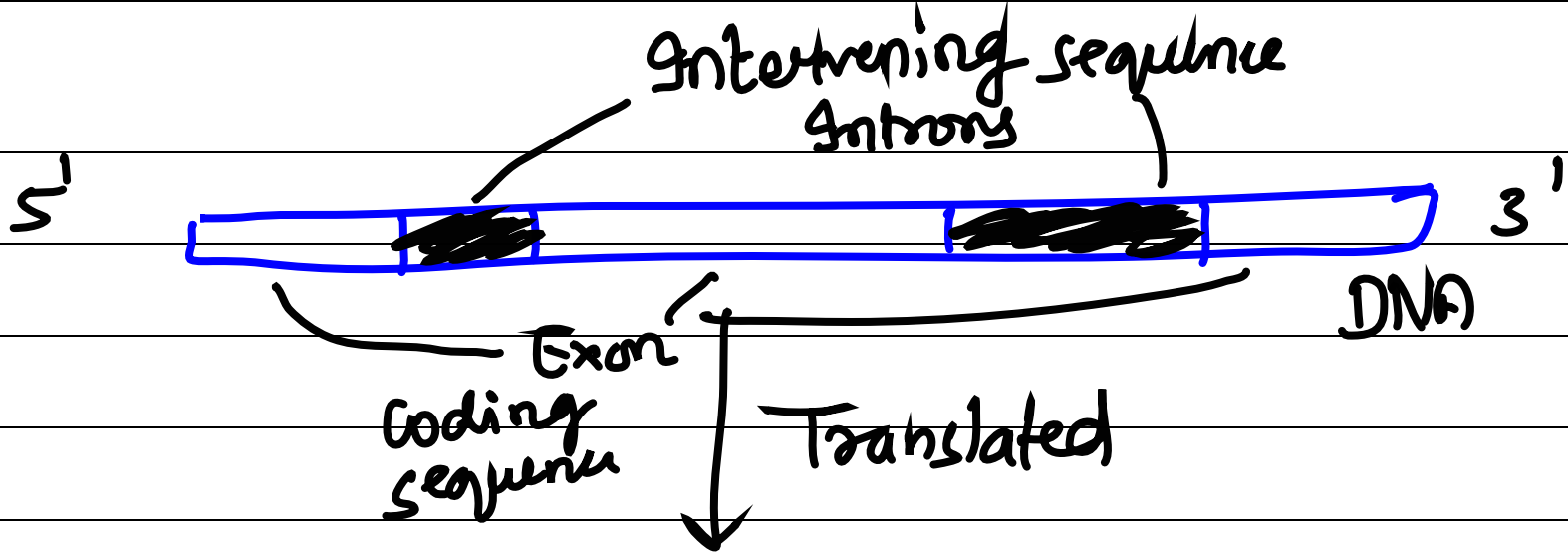
• It is of two types -

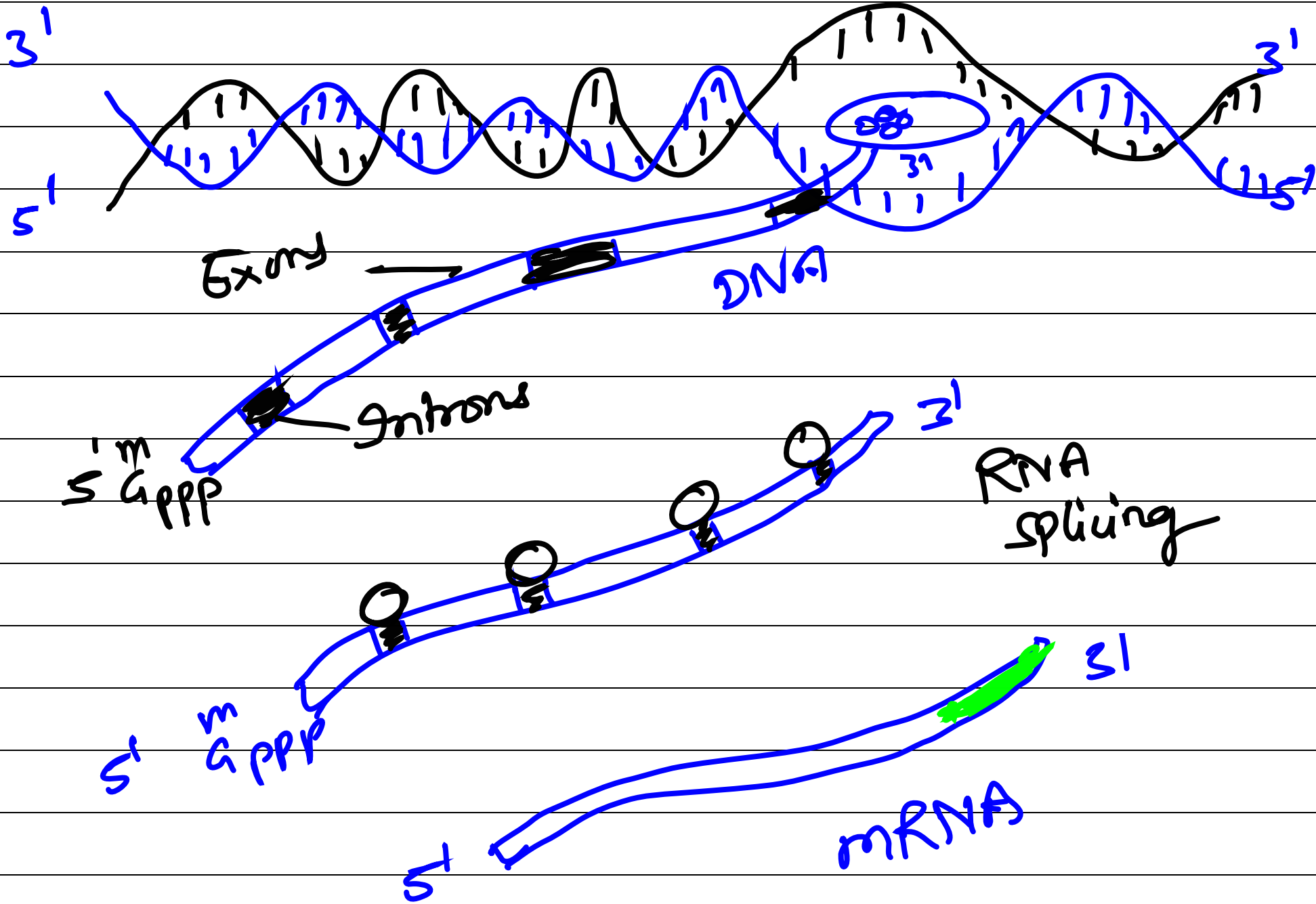
- 1) Normal sequences
- 2) Interrupted sequences (introns)

Normal sequences -

• In this type of sequence the mRNA is translated to the DNA from split gene.

• It is code for a specific polypeptide chain & it is called exons.



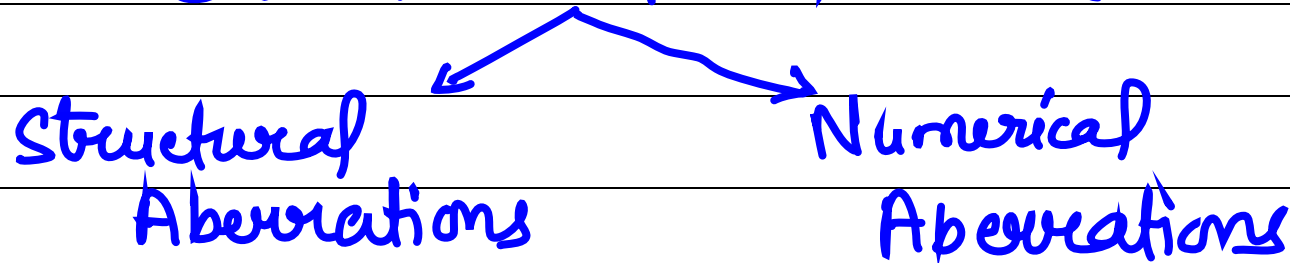


Section - C

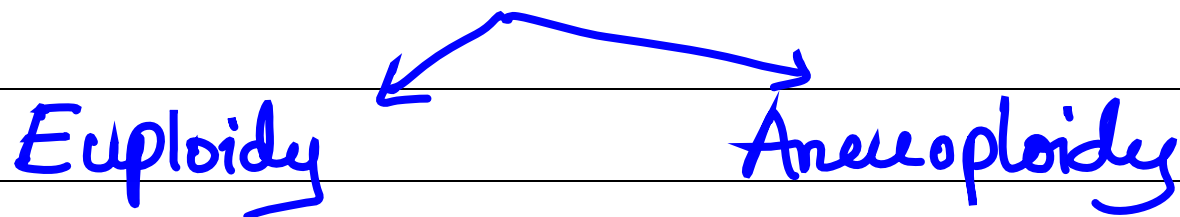
Ans 10 → Numerical Alterations of Chromosomes

Summary

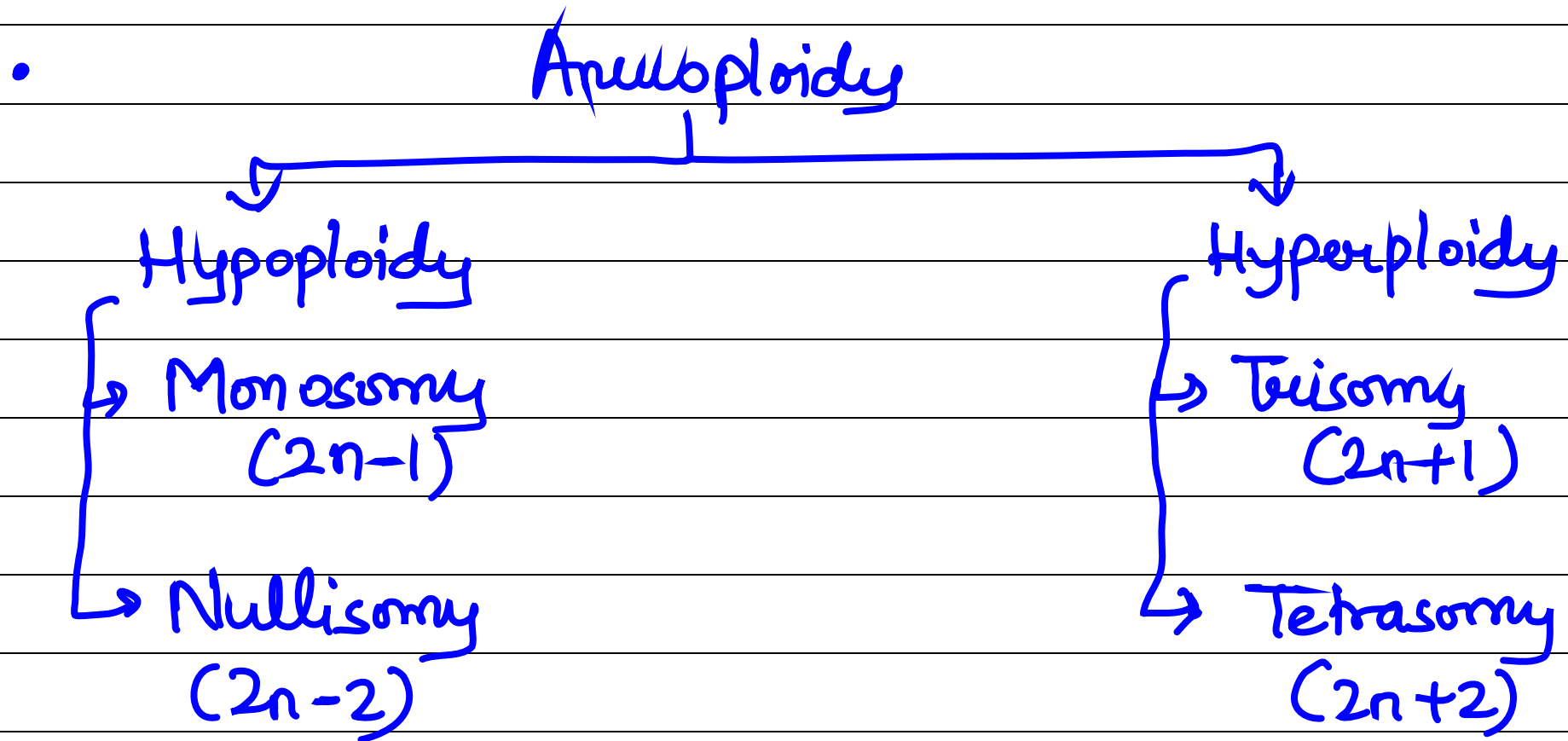
- Chromosomal Aberration



- Numerical Aberration



- Euploidy
 - Monoploidy (n)
 - Diploidy ($2n$)
 - Polyploidy ($3n, 4n, 5n \dots$ etc)



Chromosomal Aberrations -

- In chromosomal aberrations there is a change in chromosome or there is extra or missing or rearrangement of chromosome.
- When there is change in the chromosome number the disorder is happen in the body.

e.g. Down Syndrome (Trisomy 21)
Edward Syndrome
Turner Syndrome etc.

Numerical Aberration -

It is of two types in which there are extra chromosome is present or there is a missing of chromosome.

- 1) Euploidy
- 2) Aneuploidy

Euploidy :-

In this there are complete set of chromosome is present.

→ Monoploidy (n) —
In this there is
no chromosome number.

→ Diploidy ($2n$) —
Double half of the
chromosome is present in it.

→ Polyploidy ($3n, 4n, 5n, \dots$) —

In this there is a multiple copies
of chromosome or a complete
set of chromosome is present.

Aneuploidy →

In this there is an extra chromosome is present or a single or a paired chromosome is absent, missing or subarranged & due to this they caused disease in the human beings.

→ Nullisomy ($2n-2$) :-

- In this a pair of chromosome is absent.

→ Monosomy ($2n-1$) :-

In this a single

chromosome is absent.

→ Trisomy ($2n+1$) :-

In this a chromosome is extra.

In this the chromosome no. is 47.

eg.	Down Syndrome	(Trisomy 21)
	Patau Syndrome	(Trisomy 13)
	Edward Syndrome	(Trisomy 18)

→ Tetrasomy ($2n+2$) :-

In this a pair

of chromosome is extra.

* In this the chromosome no. is 48.

eg. Klinefelter Syndrome
Turner Syndrome

Ans 9 → Mendelian Principles of Genetics

Summary

- Mendel's Law
→ Law of Dominance

- Law of Segregation
- Law of Independent Assortment

- Variations of Mendel's Law

- Codominance

Mendel's Principles :-

- Mendel selected the pea plant to define their characters & traits.
- They define the 7 characters.
- It define the character in dominant &

Successive form.

Characteristics	Dominant	Recessive
Height	Tall	Dwarf
Pod shape	Round	Wrinkled
Pod colour	Yellow	Green
Flower colour	Red	White
Flower shape	Axial	Terminal

Mendel's law →

1) law of Dominance →

TT × tt

F_1 →
Generation

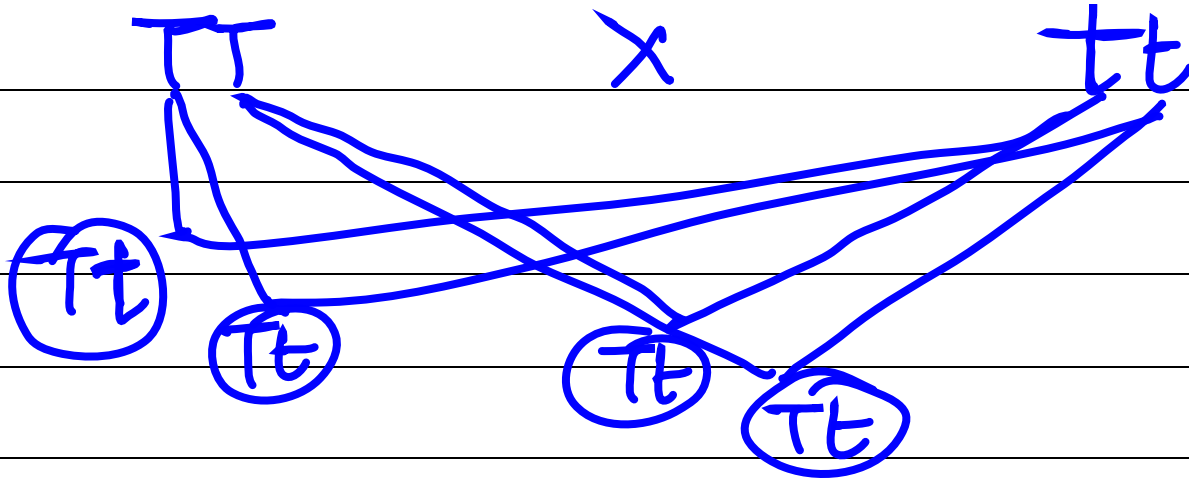
	T	T
t	Tt	Tt
t	Tt	Tt

- When two pure homozygous forms are crossed each other than only

- one character are formed.
- In F_1 generation only dominant character are seen.
 - Recessive character are not found in F_1 generation.
 - In this law only dominant character are formed.

Law of Segregation —

It is also called law of purity or pure gametes.



$Tt : Tt : Tt : Tt$
 All are dominant in F_1 Generation

F_2 Generation \rightarrow

	T	t
T	TT	Tt
t	Tt	tt

Phenotypic ratio \rightarrow Tall : Dwarf
3 : 1

Genotypic ratio \rightarrow 1 : 2 : 1

In first law or in F_1 Generation

recessive character is lost but in F_2 Generation the recessive character are formed by the mitosis.

Law of Independent Assortment -

This law is not depend on other law.

It is independent law which shows their character independently.

	T	t
T	TT	Tt
t	Tt	tt

	R	r
R	RR	Rr
r	Rr	rr

$$Tt \times Tt \rightarrow 3:1$$

$$Rr \times Rr \rightarrow 3:1$$

$$9:3:3:1$$

$$TtRr \times TtRr \rightarrow 9:3:3:1$$

$$Ww \times Ww \rightarrow \frac{3:1}{27:9; 9:3; 9:3; 3:1} = 64$$

Deviations of Mendel's Law -

①

	r	R
R	Rr	Rr
r	Rr	Rr

Red \times White \rightarrow Pink

② Codominance :-

Rhino Hair Colour

Black

BB

Grey

bb

	b	b
B	Bb	Bb
B	Bb	Bb

BB X bb \longrightarrow Bb
 Black Grey Black-Grey

Blood Colour

AA

BB

AO

BO

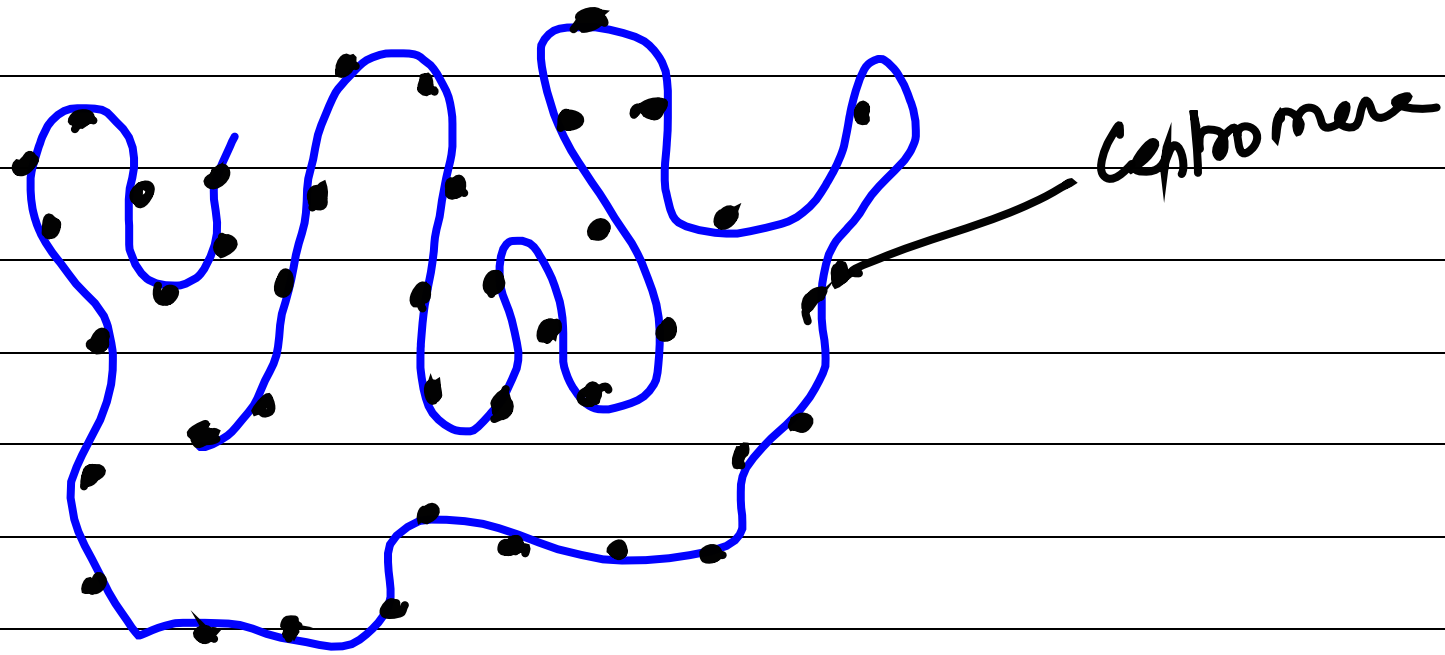
	B	B
A	AB	AB
A	AB	AB

AB is the blood colour

Section-B

Q. 6.3 Polytene Chromosome -

- Polytene Chromosome is also called giant chromosome.
- It is made up of several thousands of DNA.
- In this 5 chromosome are larger & one are short chromosome.



- Polytene chromosome are present in the salivary glands, nuclei & larval form of dipterians.
- In this chromomere or centromere are present.

- In this DNA strands are present which is annual as quickly as possible.
- These chromosomes are larger chromosomes.
- These are the visible region of chromosomes.

