

## ⑧ Nucleic Acid :-

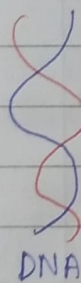
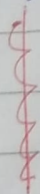
- Stores all hereditary information
- Contains information for making all bodily proteins

### Two types of Nucleic Acid :-

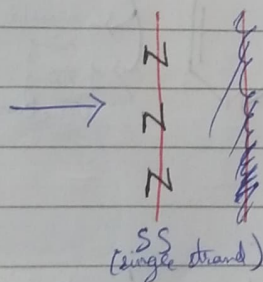
- 1) DNA (Deoxyribonucleic Acid) → Universal genetic material for all organisms
  - 2) RNA (Ribonucleic Acid) → Genetic material of certain viruses (which also mutate)
- Acidic in nature & found primarily on nucleus

• Length of DNA =  $\frac{\text{Number of Nucleotides}}{\text{No. of Bases}}$  (for single strand DNA)

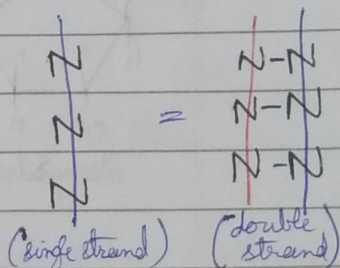
$= \frac{\text{Number of Nucleotides}}{\text{No. of Base Pairs}}$  (for double strand DNA)



DNA

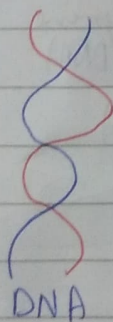


+

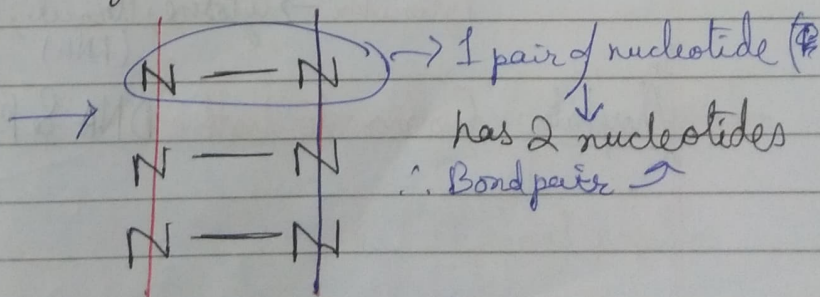


- Nucleic acids are polymers of nucleotides

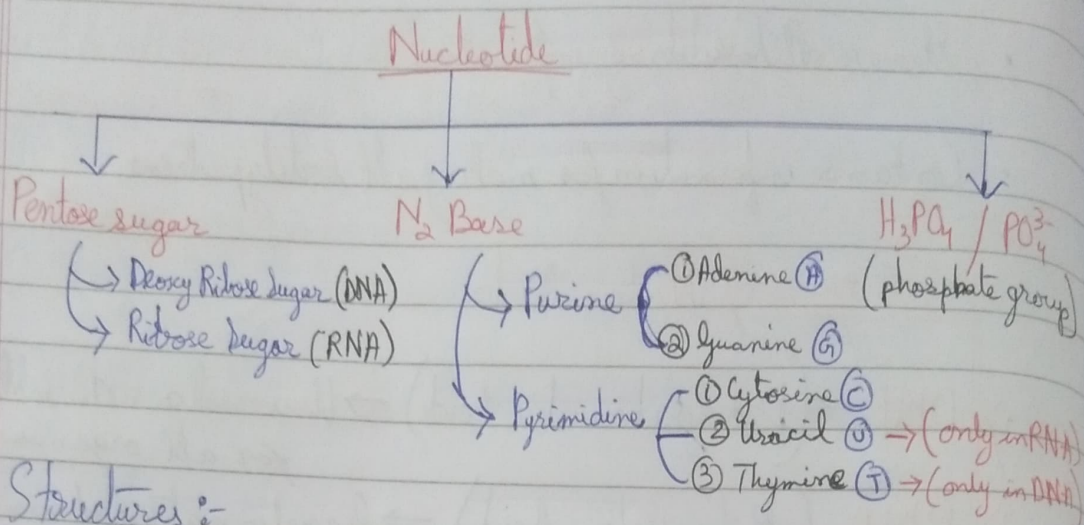
⑧ DNA :- It is a polynucleotide chain



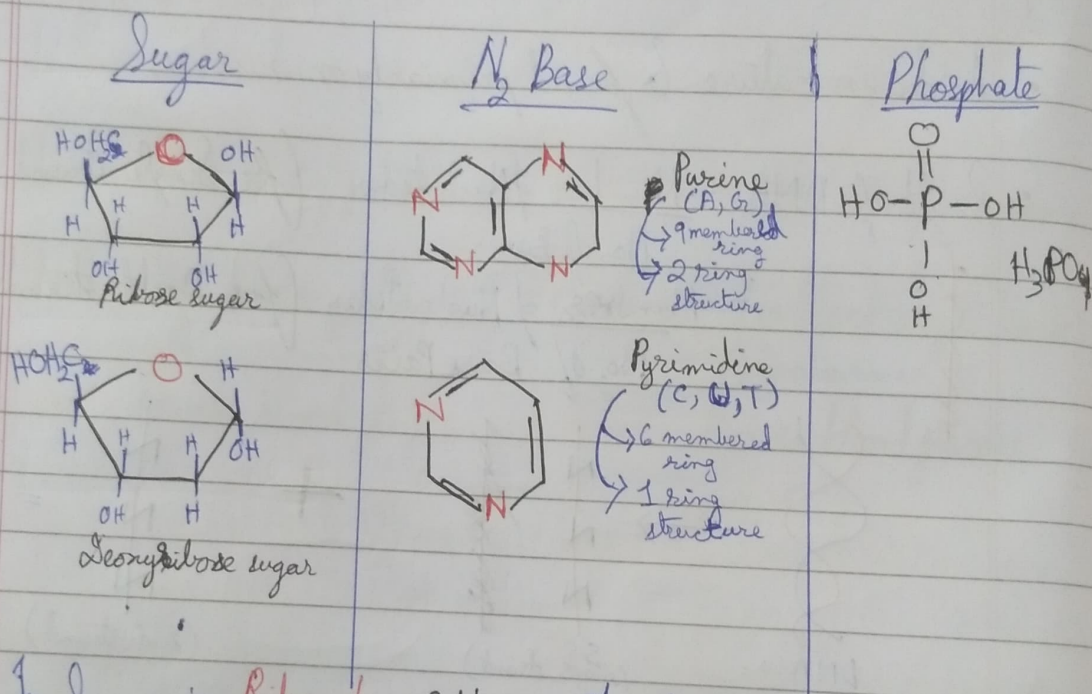
DNA



# ~~DNA~~ Nucleotide:-



## Structures:-



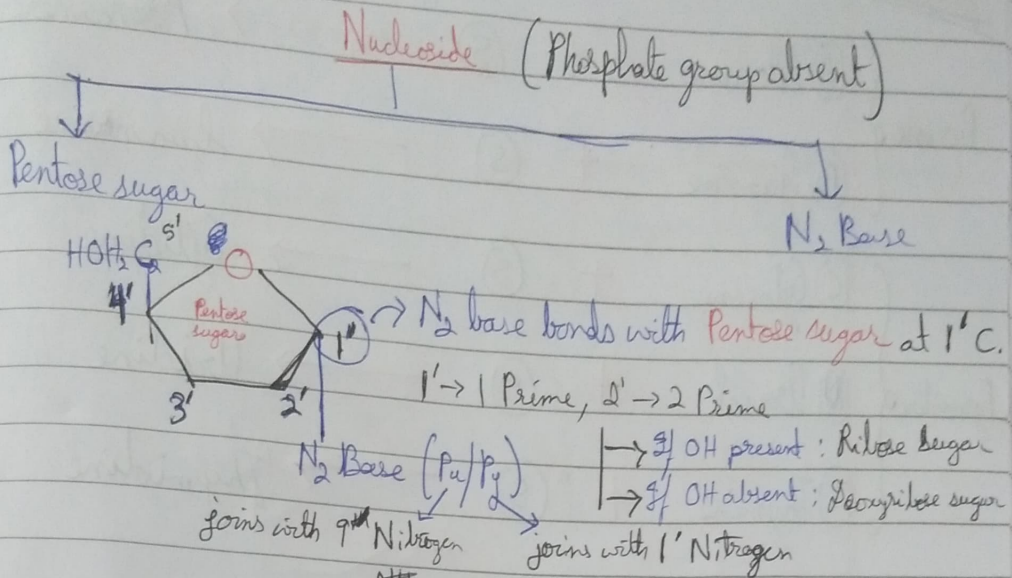
- In Sugar:- Ribose has OH in 2' carbon  
Deoxyribose does not have H in 2' carbon

- In N<sub>2</sub> Base:- Purine → Adenine & Guanine  
Pyrimidine → Cytosine, Uracil, Thymine  
(RNA) (DNA)

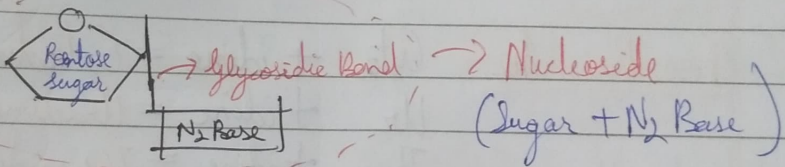
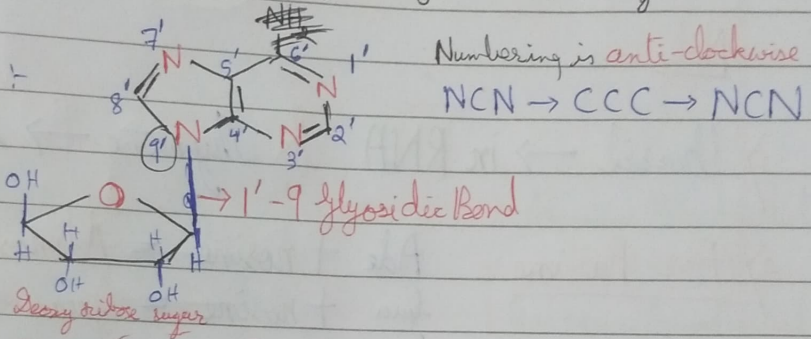
- Phosphate:- Common to both DNA & RNA



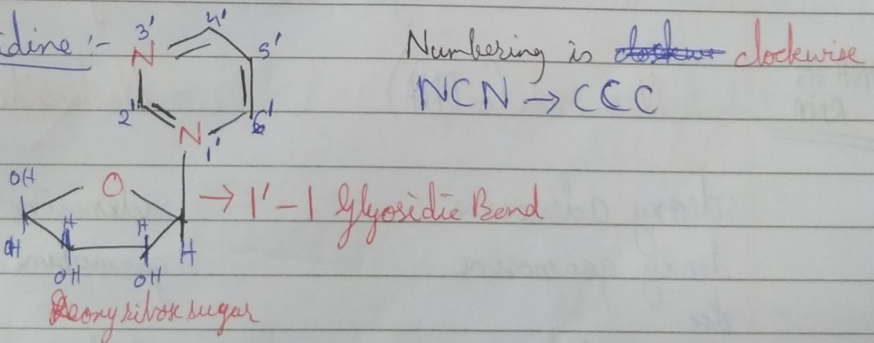
## \* Nucleoside :-



## • Purine :-

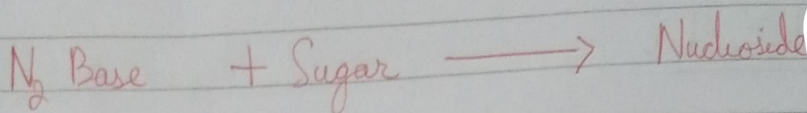


## • Pyrimidine :-

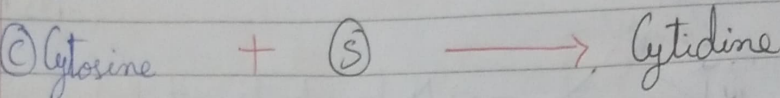
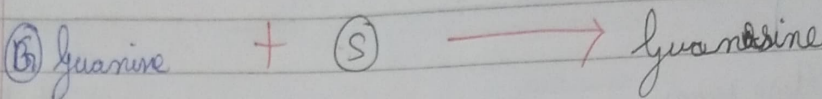
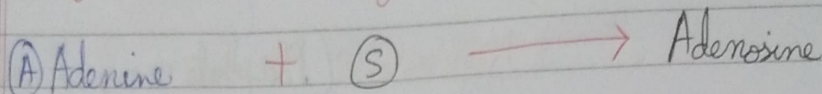


In Purine, Sugar bonds with it at 9' (9 prime) position

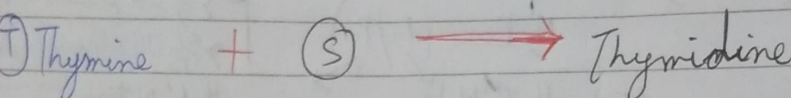
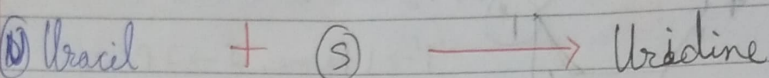
In Pyrimidine, Sugar bonds with it at 1' (1 prime) position

General form

Purine



Pyrimidine

Note:-

Uracil  $\rightarrow$  in RNA & Thymine  $\rightarrow$  in DNA

For Purine:- Ade + nosine = Adenosine  
Gua + nosine = Guanosine

For Pyrimidine:- Cyt + idine = Cytidine  
Ura + idine = Uridine  
Thym + idine = Thymidine

DNA v/s RNA

Nucleoside (in DNA)

Nucleoside (in RNA)

deoxy adenosine

deoxy guanosine

~~deoxy~~

deoxy cytidine

{ deoxy uridine }  $\times \rightarrow$  uracil absent in DNA

deoxy thymidine

adenosine

guanosine

cytidine

uridine

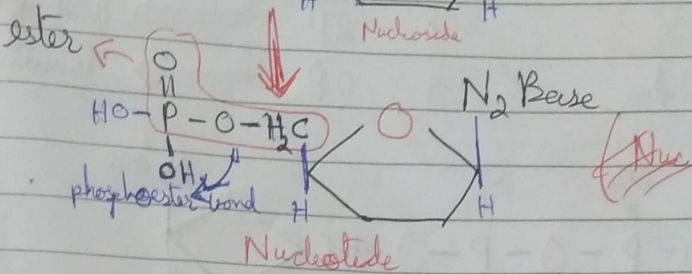
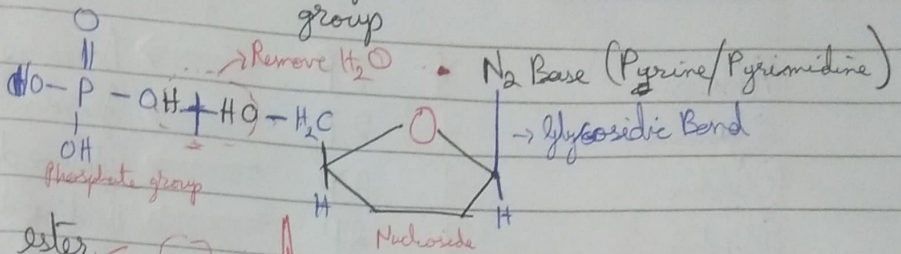
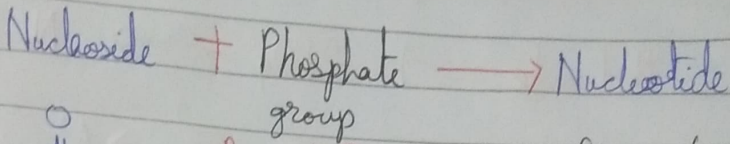
{ Thymidine }  $\times$

$\rightarrow$  thymine absent in RNA

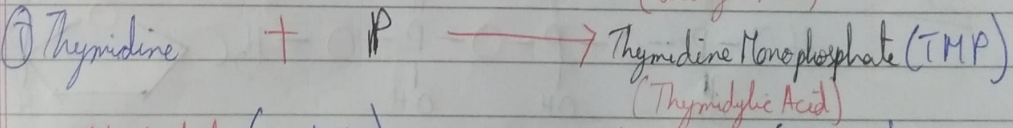
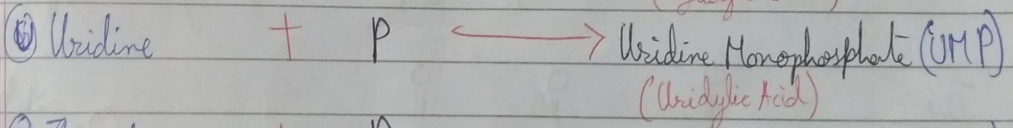
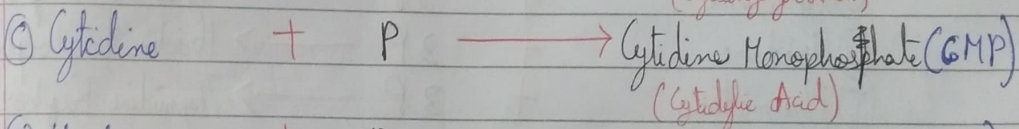
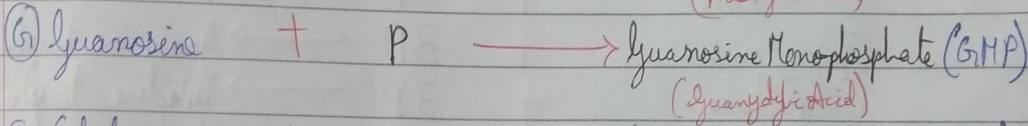
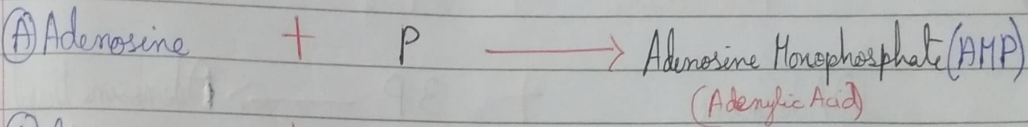
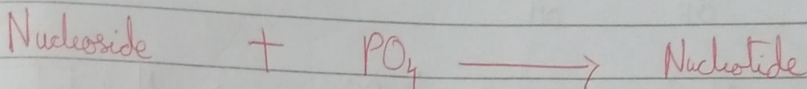
'deoxy' added prior to nucleoside name



# Conversion from Nucleoside $\rightarrow$ Nucleotide



Monomer:



Nucleotide (in DNA)

Nucleotide (in RNA)

dAMP

AMP

dGMP

GMP

dCMP

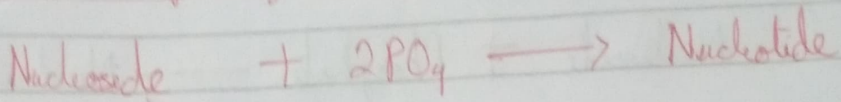
CMP

dTMP

UMP

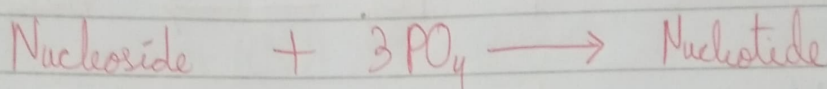
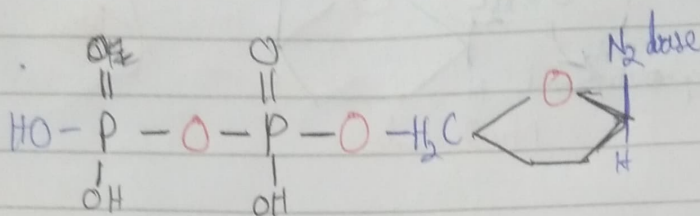
DNA vs RNA

## For Nucleic Acid groups 2-



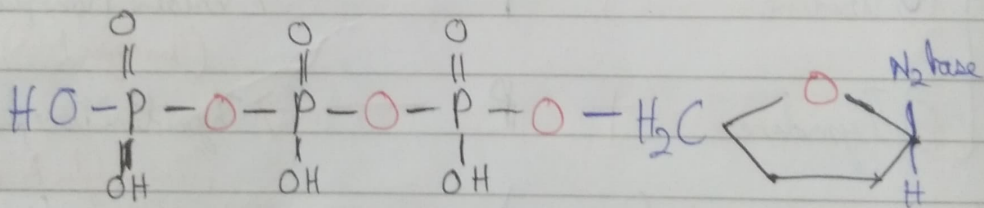
(A) Adenosine	+	2P	$\longrightarrow$	Adenosine diphosphate (ADP)
(G) Guanosine	+	2P	$\longrightarrow$	Guanosine diphosphate (GDP)
(C) Cytidine	+	2P	$\longrightarrow$	Cytidine diphosphate (CDP)
(U) Uridine	+	2P	$\longrightarrow$	Uridine diphosphate (UDP)
(T) Thymidine	+	2P	$\longrightarrow$	Thymidine diphosphate (TDP)

Di:-



(A) Adenosine	+	3P	$\longrightarrow$	Adenosine triphosphate (ATP)
(G) Guanosine	+	3P	$\longrightarrow$	Guanosine triphosphate (GTP)
(C) Cytidine	+	3P	$\longrightarrow$	Cytidine triphosphate (CTP)
(U) Uridine	+	3P	$\longrightarrow$	Uridine triphosphate (UTP)
(T) Thymidine	+	3P	$\longrightarrow$	Thymidine triphosphate (TTP)

Tri:-



- In Nucleoside, Glycosidic Bond  $\rightarrow$  between sugar &  $\text{N}_2$  base
- In Nucleotide, Phosphoester Bond  $\rightarrow$  between sugar & Phosphate group & Glycosidic Bond
- In Nucleic Acid, Phosphodiester Bond  $\rightarrow$  between two nucleotide

Phosphoester Bond      Glycosidic Bond

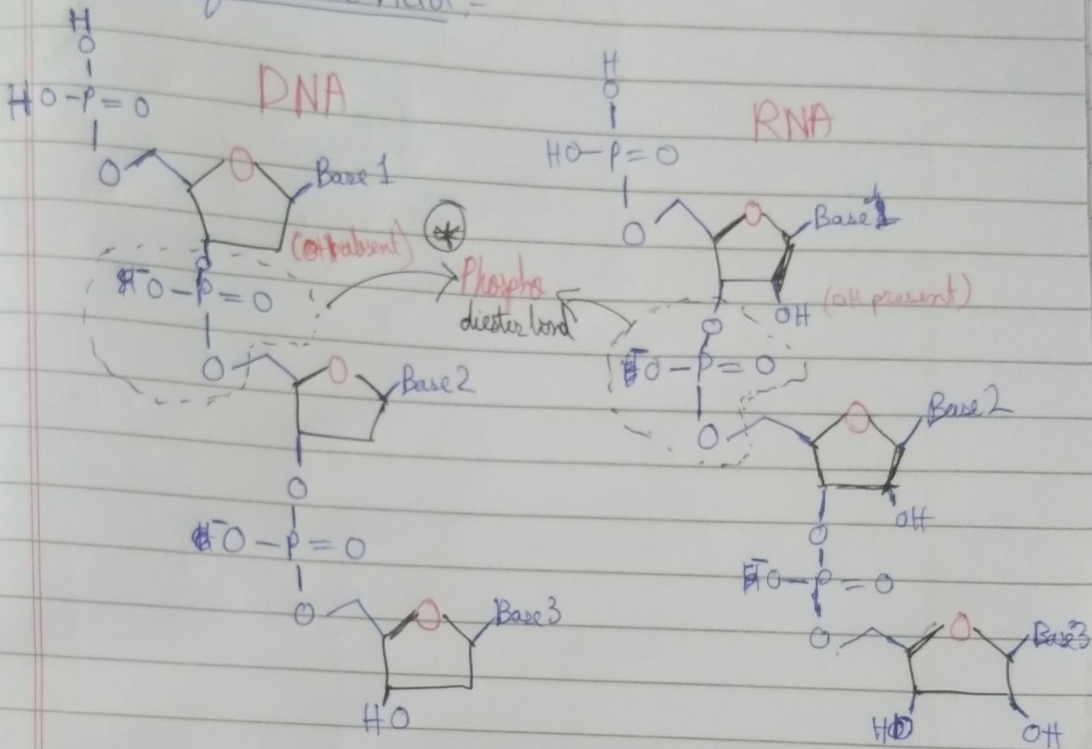


\* Nucleic Acid  $\rightarrow$  Polymer of Nucleotides

Let  $N \rightarrow$  nucleotide

Nucleic Acid  $= N - N - N - \dots$

Structure of Nucleic Acid:-



A chain of nucleotides links together by phosphodiester bond

