

B.Sc.-II, Paper-IV. Carbohydrates-1

Carbohydrates

Usually you would have studied
Single Functional Groups.

You would have ~~to~~ also briefly come
across Polymers. Much before Humans
~~at~~ invented ~~to~~ synthetic Polymers in
1930's; Nature did so and figured
out that lots of chemical action
can be obtained by simple ~~Polym~~
Polymerization.

Polymers are also called
Macromolecules (Macro means large)
In Biology you come across 3- types
of Macromolecules.

- ① Proteins made by ~~Minerally~~ Polymerization
of Amino Acids
- ② DNA and RNA (by Polymerization of
~~Deoxy~~ De-oxy Ribonucleic Acids and
Ribonucleic Acids)
- ③ Large carbohydrates such as
Starch/Glycogen/cellulose

Now what is Carbohydrate.

It simply means "C" Carbon + Hydrate
why this name

Because in ~~simple~~ Monomers the

Molecular
~~elemental~~ formula is $C_n(H_2O)_m$

Now since

~~It is~~

For example, ~~the~~ ~~elemental~~
~~formula~~ Glucose (which is kind of
Energy Currency) is $C_6(H_2O)_6$

and Molecular weight determination
Elemental formula ^{is} ~~is~~ ~~the~~ ~~first~~ ^{are} ^{the} things you
determine for any new compound you
come across.

~~well you found that Elemental formula~~
~~is $C_6(H_2O)_6$ what next~~

Now based on elemental formula and
Molecular weight, the Molecular formula
of Glucose turns out to be $C_6(H_2O)_6$

what Next:

Next you have to determine
Structural Formula and Functional
Groups present.

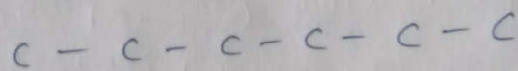
~~with~~ Suppose you did just one
functional group determination and
it turned out to be $-OH$

Now before doing any further
functional group determination in Lab

You started making a hypothetical model in ~~Exp~~ Mind (and Paper).
Indeed this is how it operates in Real Life of Scientist.

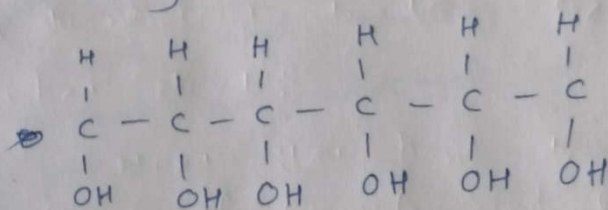
So (while still in the business of determining other functional group)

You ~~do~~ made a chain of ~~carbons~~
Six Carbon



and with merely $(H_2O)_6$ to take care of you ~~do~~ thought

H_2O simply means $-H$ and $-OH$
and you went about adding same to every carbon on the chain



You were aided by fact that two $-OH$ can't reside on same carbon

Now atoms are taken care of.

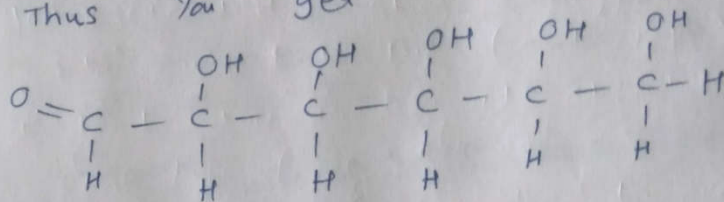
Any Problem? Terminal carbon lack one bond each.

what can you do.

what about oxidising one terminal $-OH$ to Aldehyde ($-CHO$)

Then you relieve one hydrogen which can go to other end.

Thus you get



~~Indeed & hopefully while working~~
in)

This model building (and such Model buildings are useful in any branch of Science and Technology) led you to indicate that an Aldehyde could be present. Hopefully you are not ~~slugging~~ sluggish in your Lab work and quickly determined that an aldehyde is indeed present.

So with this elementary logic you could reach the Glucose structure.

offcourse it is not so simple and one has to rule out permutation and combinations of organic chemistry Logic.