

CARBOHYDRATES

1.

P-IV, Ch-3 (Hons.)

Lecture-5

20-05-2020

Ch-3, G-'C'(Sub.)

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Deg-II (Hons. & Sub.)

Topic - Properties Of Glucose

PHYSICAL PROPERTIES

* Glucose is a colourless, odourless, crystalline solid.

M.P = 146°C

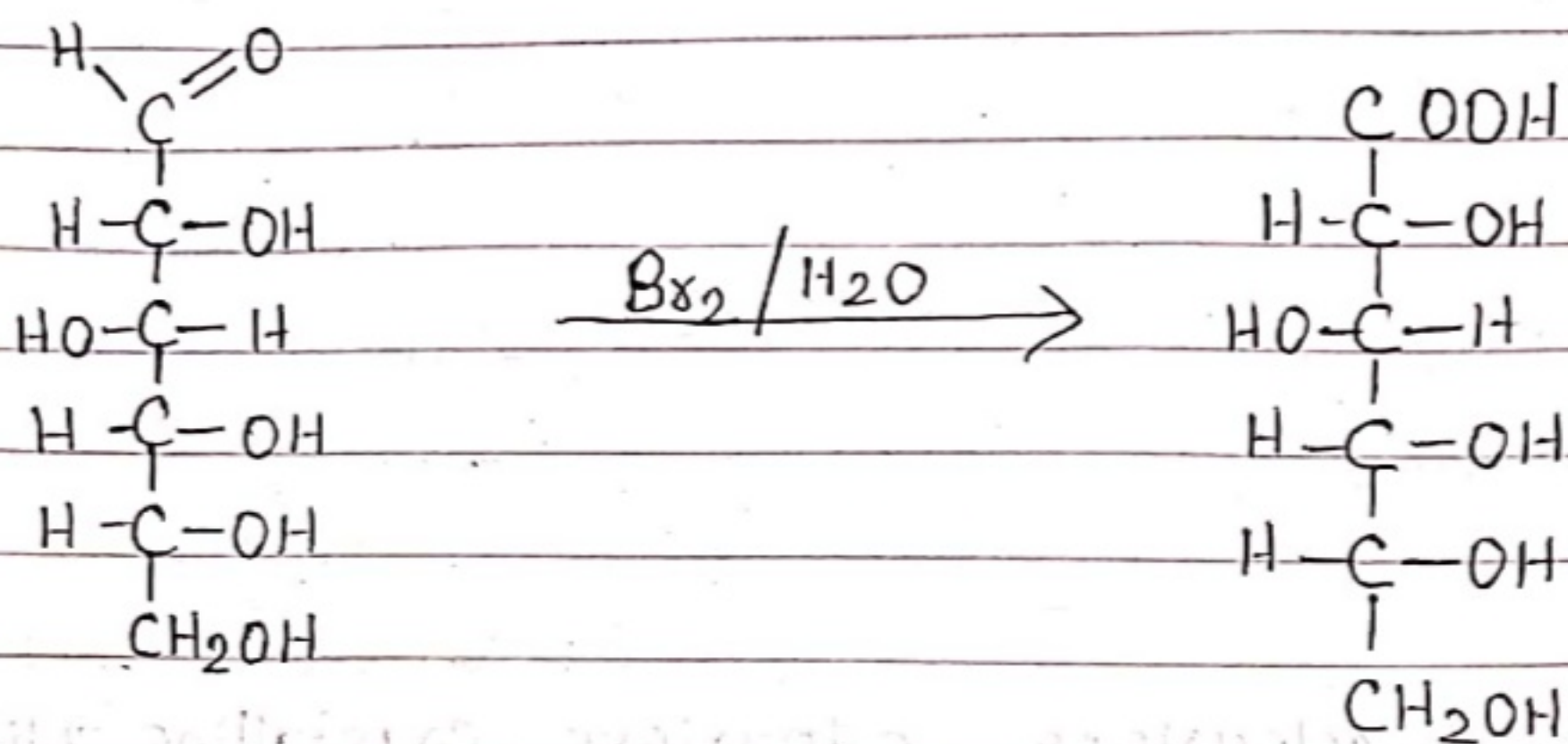
Soluble in water.

CHEMICAL PROPERTIES

- A. Reactions characteristic of the open chain aldehyde form.
- B. Reaction characteristic of the cyclic forms.

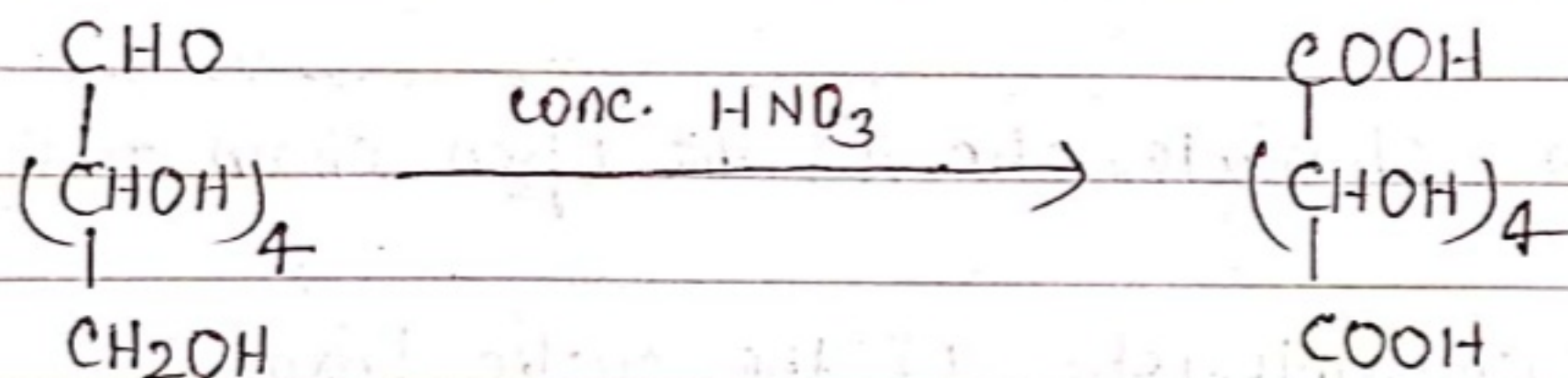
A. Reactions of the open-chain aldehyde form of Glucose :-

i) Oxidation :- mild oxidation of D-glucose with bromine water gives a monocarboxylic acid called D-gluconic acid.



D-glucose

Drastic oxidation of glucose with conc. HNO_3 , yields a dicarboxylic acid called D-glucosic acid.

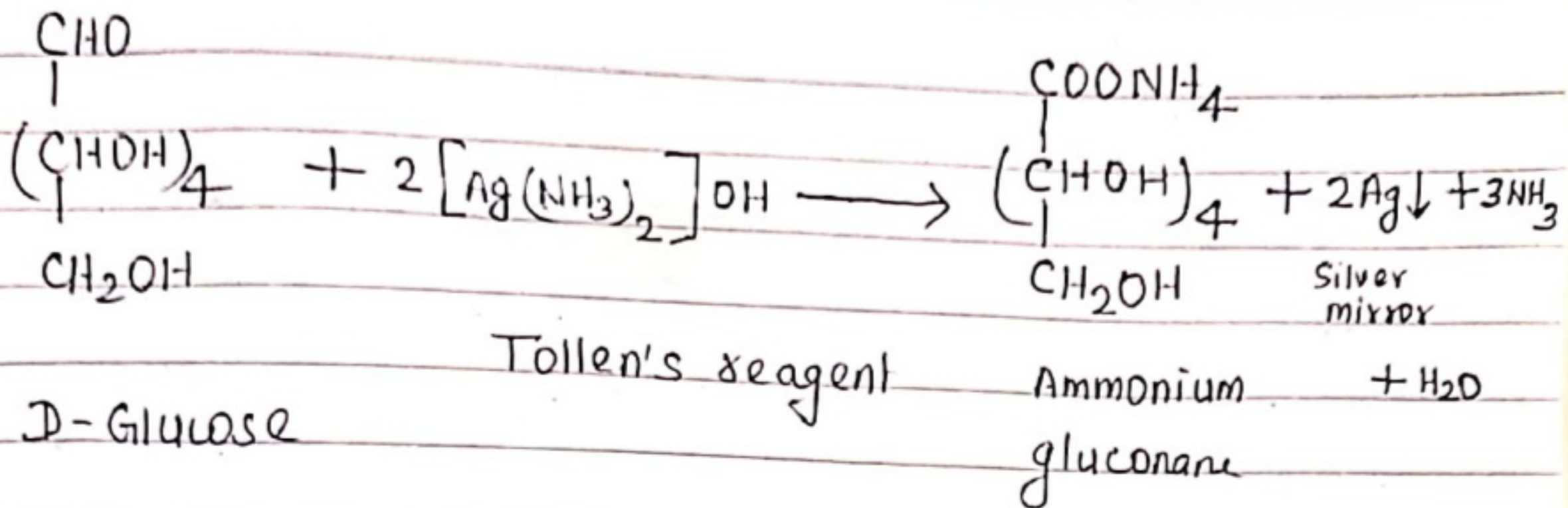


D-glucose

D-Glucosic acid

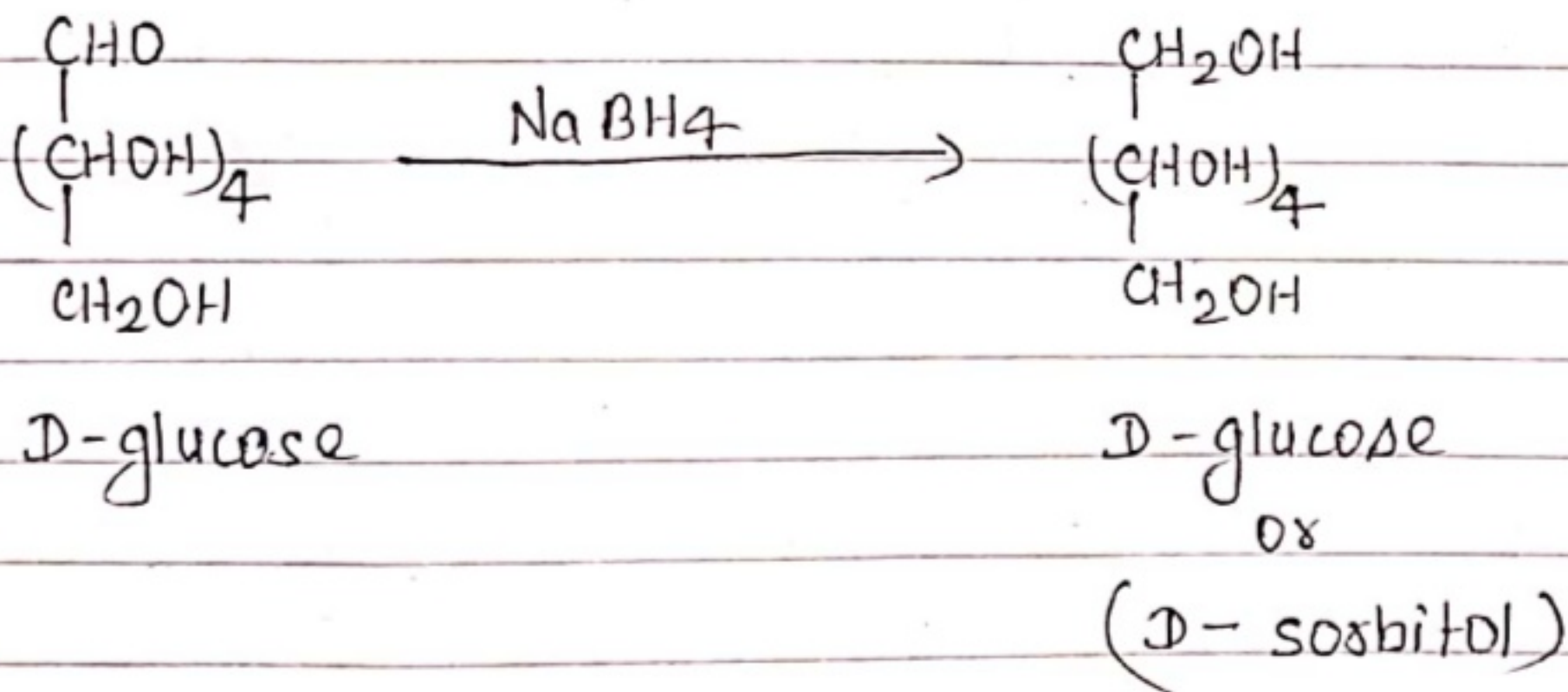
ii) Action as a reducing agent:

D-glucose reduces Tollen's reagent to silver and Fehling's solution to cuprous oxide.

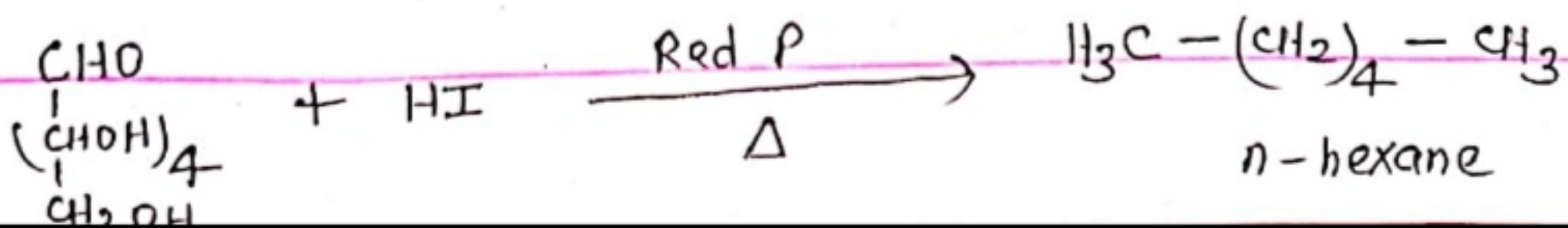


iii) Reduction :-

Mild reduction of D-glucose with NaBH_4 or Na-Hg and water yields a hexahydroxy alcohol called D-sorbitol.

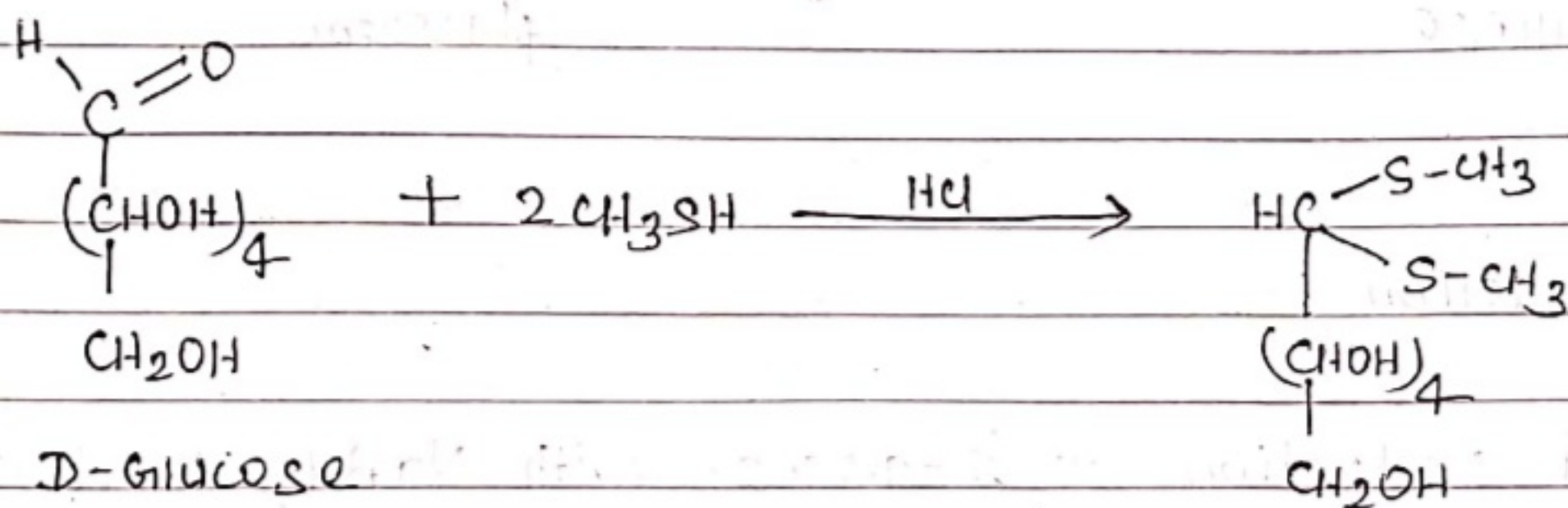


* Drastic reduction of glucose with HI and Red P yield n-hexane.



iv) Reaction with Thiols (Dithioacetal formation)

D-glucose reacts with thiols in a normal way to form dithioacetals.



D-Glucose dimethyl
dithioacetal.

v) Action of Acids (Dehydration)

When D-Glucose is boiled with 12% HCl, it undergoes dehydration to give 5-hydroxymethylfurfural. This furfural further reacts with hot acid to yield a mixture of levulinic acid, formic acid and a dark resinous product of unknown structure called Humins.

To be continued in next lecture...