SUBJECT - CHEMISTRY
CLASS - B.Sc(Hons) PART-II
PAPER - IV
TOPIC - OSAZONE

Dr Hari Mohan prasad Singh
Department of Chemistry
Dr. L.K.V.D College Tajpur Samastipur

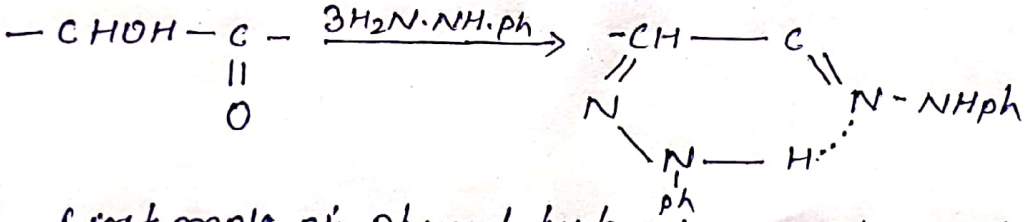
Q (a) Why only three moles of phenyl hydrazine are consumed in the formation of glucosazone or fructosazone?

(b) What is an osazone? How and why do glucose and fructose form the same osazone when treated with excess of phenyl hydrazine? What conclusions do you draw from it?

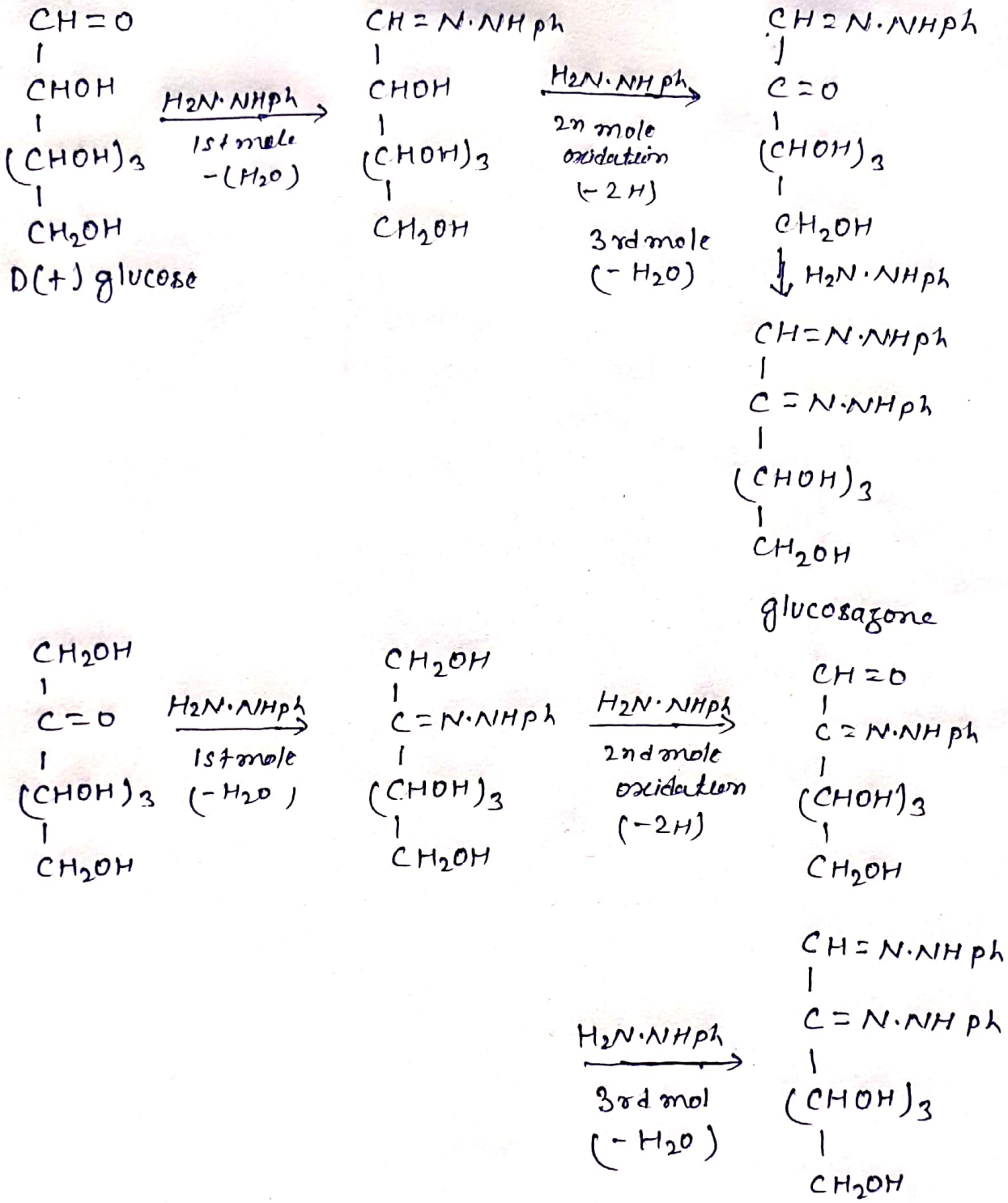
(c) Discuss the osazone formation of glucose and fructose.

(d) Fructose, being a ketone responds to Fehling solution test-why

Ans (a): The osazone formation is a characteristic reaction of α-hydroxy carbonyl group -



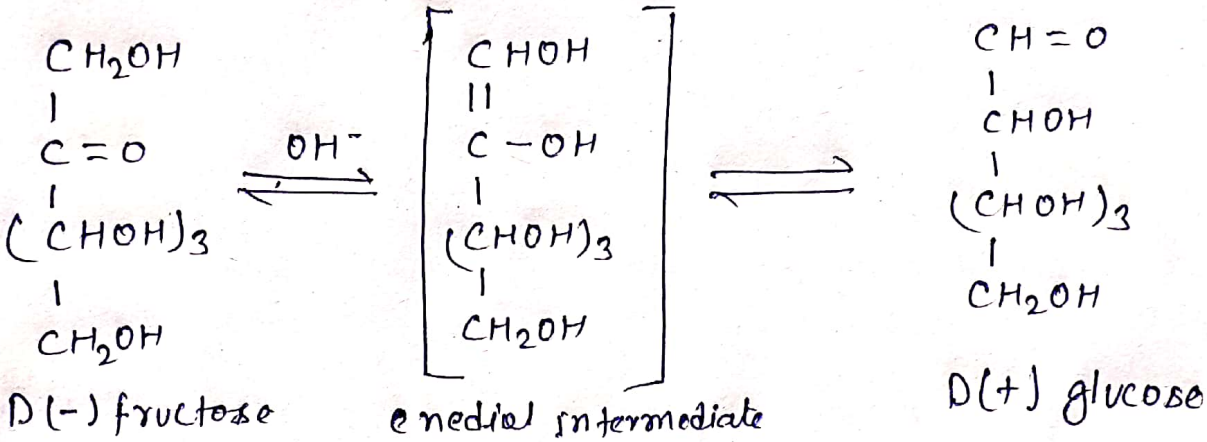
The first mole of phenyl hydrazine reacts with the monosaccharide just as it would react with any carbonyl compound. forming a phenyl hydrazone. A second mole of phenyl hydrazine effectively oxidises the α-alcoholic group to a keto group. The third mole of phenyl hydrazine reacts with the new carbonyl group to form corresponding hydrazone the resultant osazone so formed by the consumption of three mole of phenyl hydrazine are further stabilised through intra molecular H-bonding forming a six membered chelate ring. It therefore resists the further reaction with phenyl hydrazine. Hence; further phenyl hydrazine molecule is not consumed in this very reaction.



(b) The structures and Configurations of glucose and fructose are identical except at top two terminal C-atom. Since osazone formation involves only two such C-atoms, hence glucose and fructose forms identical osazone derivatives.

(d) Normally a Ketone does not respond to fehling solution test which is a diagonostic test of only aldehydes.

Though fructose is a ketone but due to its partial isomerisation into glucose in alkaline solution of the reagent, it responds to fehling solution tests.



D(-) fructose — enediol intermediate — D(+) glucose

$-CHO$ + $2CuO$ (in Fehling Solution) $\longrightarrow \downarrow Cu_2O$ (red ppt) + $-COOH$

aldehyde — Carboxylic acid