

A) Student dissolved unknown carbohydrate X (empirical formula $C_n(H_2O)_n$, molecular weight 150.1 g/mol) in aqueous solution containing sodium cyanide and added slowly hydrochloric acid until a post-doc in the lab complained about the bitter almond smell in the air. When analyzing the reaction product with TLC, the student observed the presence of two sugars. He separated the two sugars using column chromatography, called one of them Sugar A and the other Sugar B, and went happily home.

When he described his successful lab work next day in the lab meeting, the postdoc asked what was the structure of sugar X.

How could you find the answer to this question assuming that you are allowed to use only a polarimeter and **one inorganic** reagent, and that you have no way of finding out values for specific rotations of any carbohydrates.

Hint: The purpose of this problem is to encourage your independent reading and analysis of Chapter 21.10

B) True or false:

- 1) Fresh solution of D-glucaric acid displays mutarotation?
- 2) α -anomer of D-glucose is more stable than the β -anomer in solution because in the α -anomer the hydroxyl group is in the axial position?
- 3) Fructose does not give positive Tollens's test because it is ketose?
- 4) Ribose and mannose are diastereomers?
- 5) Ruff degradation of D-galactose gives a Sugar Y and subsequent Ruff degradation of Sugar Y gives D-erythrose?