Recitation 07 Problems

Unknown to the rest of the world, members of the scientific community have been making their own babies to order for quite some time now.

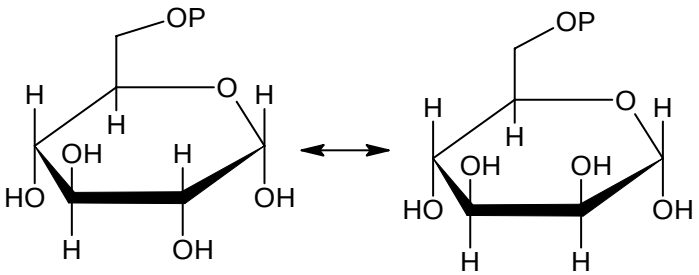
WARM UP QUESTION

Write the structural formula for the following tetrasaccharide:

α-D-glucopyranosyl (1>5) β-D-fructopyranosyl (2>3) β-D-galactopyrranosyl (1>2) α-D-furanose

QUESTION 1 (Modified 1994 Exam Question)

Assume that an organism can enzymatically convert glucose-6-P to mannose-6-P. Show how this might be done enzymatically without the participation of an "epimerase." Hint: Two enzymes are involved, one of which is "hexose-P isomerase."



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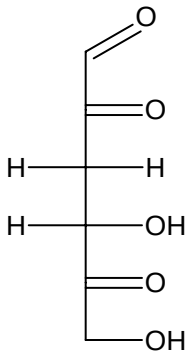
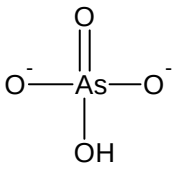
QUESTION 2

Assume that the hypothetical compound shown here can be converted to two 3-carbon compounds by the action of a single enzyme of the type described in class. What would the products be? (No need to show mechanism)



QUESTION 3

Arsenate is a structural analog of phosphate.



However, arsenate esters, unlike phosphate esters, are kinetically as well as thermodynamically unstable. Write an overall balanced equation for the conversion of glucose to pyruvate in the presence of ATP, ADP, NAD+, and either:

a. phosphate or
b. arsenate
c. Explain why arsenate is a poison.

DO AT HOME QUESTION 4

Assume that the compound who structure is shown below can be converted to two-4 carbon compounds by the action in the sequence of two enzymes. What would the products be? Please use structural formulas and give the mechanism for this transformation, including any proposed enzyme-bound intermediates. Indicate where ^{18}O would be found.