CHM1033 Review Exercises Test 3 Mod 11 2 EC Points Name Key

1. Identify each of the following as: monosaccharide (M), disaccharide (D), or polysaccharide (D):

a. glucose M b. fructose M c. glycogen P d. maltose D e. galactose M
f. amylopectin P g. cellulose P h. lactose D i. sucrose D j. amylose P

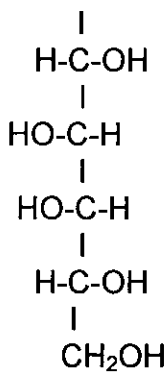
2. For each of the sugars in question 1a, indicate, for the monosaccharides only, whether they are aldoses (A) ketoses (K). For the others please indicate n/a (not applicable).
a. A b. K c. ____ d. ____ e. A f. ____ g. ____ h. ____ i. ____ j. ____

3. For each of the sugars in question 1a, indicate, for the disaccharides and the polysaccharides only, what are the individual monosaccharides of which they are composed:
a. ____ b. ____ c. glucose
d. 2 glucose e. ____ f. glucose
g. glucose h. glucose, galactose i. glucose, fructose

4. For each of the sugars in questions 1a, indicate, for the polysaccharides only, what kind of bond, α or β, and what carbons numbers are linked for each. Indicate the name of the polysaccharide and the linkage for each:
Amylose: α, 1,4 Amylopectin, α, 1,4 and α, 1,6 Cellulose β, 1,4

Glycogen α, 1,4 and α, 1,6

5. Which carbon numbers for the following structure are chiral? 2, 3, 4, 5



6. Is the above monosaccharide a D or and L sugar? D
7. What category of monosaccharide is this? aldohexose (e.g. aldotetrose)
8. A monosaccharide with four carbons and a ketone group is classified as a(n) ketotetrose. One with five carbons and an aldehyde group is classified as a(n) aldopentose.
9. Refer back to question 1. Indicate which of the sugars give a positive Benedict's test (+) and which ones give a negative Benedict's test (-):

a. + b. + c. - d. + e. + f. - g. - h. + i. - j. -

10. Refer back to question 1. Indicate which of the sugars give a positive iodine test (+) and which ones give a negative iodine test (-):

a. - b. - c. + d. - e. - f. + g. + h. - i. - j. +

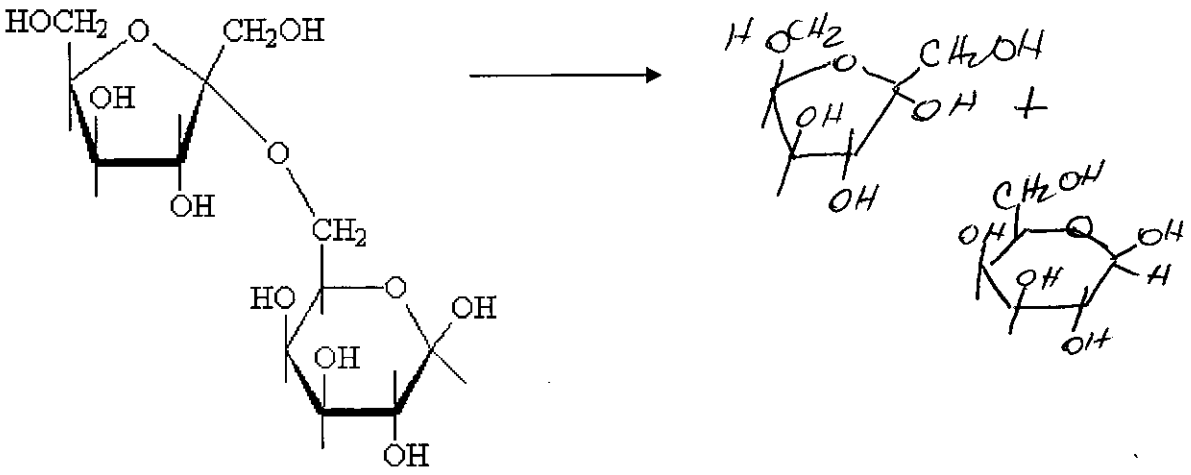
11. The linkage present in disaccharides and polysaccharides that join the individual monosaccharides together is called glycosidic linkage. This type of bond is similar to which of the following bonds? Circle the correct answer. Alcohol, ester, **ether**, aldehyde
12. In order to separate a disaccharide or a polysaccharide into individual monosaccharide units the reaction needed is called hydrolysis.

13. Complete the following reactions:

a. $CH_3CH_2CH_2OH + CH_3C(=O)H \longrightarrow CH_3CH_2CH_2O-C(CH_3)(H)-OH$

b.

H^+, H_2O (acid hydrolysis)



14. Refer to structure 13b:
    a. What linkage exists between the monosaccharides? α (alpha (α) or beta (β))
    b. What category of monosaccharide is represented by the monosaccharide on the upper left side? ketohexose (e.g. aldotetrose)
    c. What category of monosaccharide is represented by the monosaccharide on the lower right side? aldohexose (e.g. aldotetrose)

15. Refer back to the sugars you identified in 9 as giving a negative Benedict's test. What is formed when this sugars undergo acid hydrolysis? Please indicate it for each one you identified as giving a negative Benedict's test

c - glucose
f - glucose
g - glucose
i - glucose and fructose
j - glucose

16. After hydrolysis, will the sugars in 15 give a positive or a negative Benedict's test?

Positive

17. Sugars that give a positive Benedict's test are reducing sugars.
18. When the Haworth projection is shown for an aldohexose, the ring is closed between carbon number 1 and the oxygen on carbon number 5.
19. When the Haworth projection is shown for a ketohexose, the ring is closed between carbon number 2 and the oxygen on carbon number 5.