

Name: Key Block: _____ Date: _____
 Carbohydrate Review

Match the following metabolic pathways and hormones to their correct description.

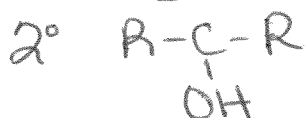
- | | |
|---------------------------------------|---|
| <u>e</u> 1. carbon fixation | a. breakdown of glucose to ATP and pyruvate |
| f 2. glycogenolysis | b. excess glucose is converted to glycogen in the liver |
| <u>i</u> 3. pentose phosphate pathway | e. secreted by the pancreas it stimulates glycogen breakdown |
| <u>a</u> 4. glycolysis | d. secreted by the pancreas it stimulates glycogen synthesis |
| <u>b</u> 5. glycogenesis | e. CO ₂ is reduced to a carbohydrate |
| <u>c</u> 6. glucagon | f. glycogen is changed back into glucose |
| <u>g</u> 7. adrenaline | g. secreted by the adrenals it stimulates glycogen breakdown |
| <u>d</u> 8. insulin | h. |
| | i. hexose is converted into a 5 carbon sugar and NADPH |

Complete the following short answer questions.

9. Define the following:

- a. alcohol - a compound containing an hydroxyl
- b. aldehydes - a compound containing a carbonyl group on a terminal carbon
- c. ketones - a compound containing a carbonyl group on an internal carbon
- d. carbohydrates - a polyhydroxyaldehyde or polyhydroxyketose
- e. monosaccharide - simple sugar, cannot be hydrolyzed to a simpler carbohydrate
- f. disaccharide - a compound composed of two monosaccharides
- g. oligosaccharide - polymer containing 6-10 monosaccharides joined together
- h. polysaccharide - polymer containing many saccharide units
- i. carboxyl group - $\text{-}\overset{\text{O}}{\parallel}\text{C}\text{-OH}$ carbonyl $\text{-}\overset{\text{O}}{\parallel}\text{C}\text{-}$
- j. hydroxyl group - -COH
- k. anomeric carbon - a carbon bonded to one OH + one -O-R
- l. glycosidic bond - the bond from the anomeric carbon of a glycoside to an -OR group

10. Describe the difference between 1°, 2°, and 3° alcohols. Which can be used to create an aldehyde, which can be used to create a ketone?



a primary alcohol
can create an aldehyde
2° alcohol → ketone

11. List two important physical properties of alcohols.

a.) soluble

b.) polar

c.) high boiling pt. (inc. w/ inc. weights)

12. Describe how the sweetness changes between mono and disaccharides to polysaccharides.

very sweet
mono

→

sweet
di

→

little or
no sweetness
poly

13. List the monosaccharides that bond together to form the following disaccharides.

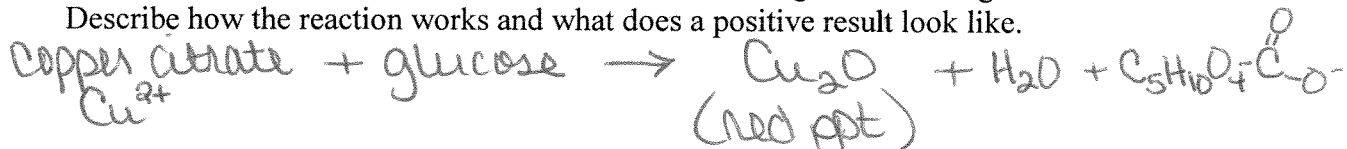
a. sucrose: glucose + fructose

b. maltose: glucose + glucose

c. lactose: glucose + galactose

14. Using Benedict's reagent is one of the most common testing methods for glucose.

Describe how the reaction works and what does a positive result look like.

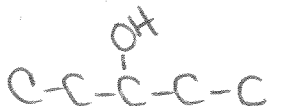


15. Describe what happens in the body when the blood glucose level rises to 200 mg/dL.

Glycogenesis: excess glucose is converted into glycogen in the liver. (promoted by insulin)

Complete the following illustrations.

16. pentan-3-ol



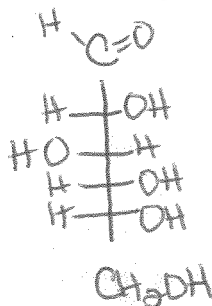
17. cyclohexanone



18. 3-methyl butanal



19. glucose (aliphatic)

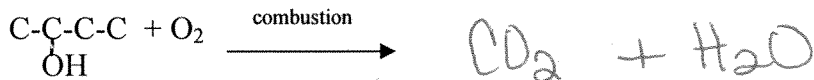


Identify and complete the following reactions.

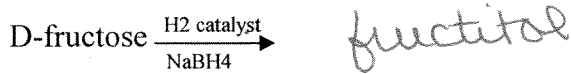
20. type: dehydration



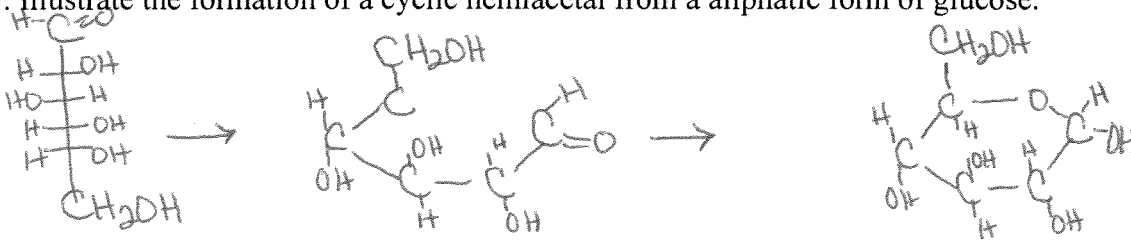
21. type: combustion



22. type: reduction



23. Illustrate the formation of a cyclic hemiacetal from an aliphatic form of glucose.



24. Where is the enzyme amylase formed and what does it do?

Salivary glands, breakdown of polysaccharides to simple sugar.

25. Describe the reaction process by which monosaccharides are linked together to form a polysaccharide.

dehydration reactions form glycosidic bonds between monosaccharides to hook them together into long chains.