

Name: _____ 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 |
| <u>f</u> 2. glycogenolysis | b. excess glucose is converted to glycogen in the liver |
| <u>h</u> 3. pentose phosphate pathway | c. 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. hexose is converted into a 5 carbon sugar and NADPH |

Complete the following short answer questions.

9. Define the following:

- a. alcohol –

- b. aldehydes –

- c. ketones –

- d. carbohydrates –

- e. monosaccharide –

- f. disaccharide –

- g. oligosaccharide –

- h. polysaccharide –

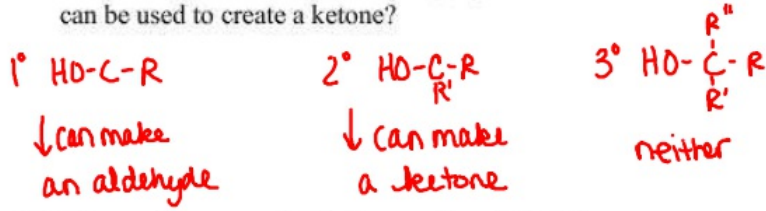
- i. carboxyl group –

- j. hydroxyl group –

- k. anomeric carbon –

- l. glycosidic bond –

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?



11. List two important physical properties of alcohols.

high B.P., good solvent, solubility, alcohols have hydrogen bonds

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

Sweetest → least sweet

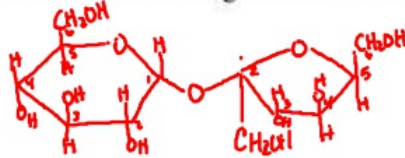
13. List the monosaccharides that bond together to form the following disaccharides.

- 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.

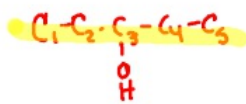
Benedict's Rgt contains Cu^{2+} that is reduced to Cu^{+} in Cu_2O - a red ppt. The more red ppt produced the greater the amt of reducing sugar present.

15. Illustrate a disaccharide made from glucose and fructose. Indicate with a bracket where the glycosidic linkage is

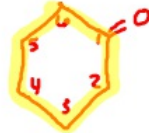


Complete the following illustrations.

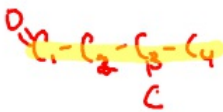
16. 3-pentanol



17. cyclohexanone



18. 3-methyl butanal

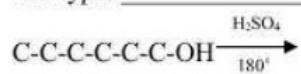


19. glucose (aliphatic)

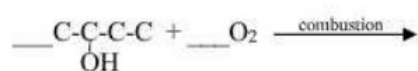


Identify and complete the following reactions.

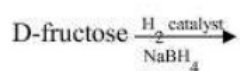
20. type: _____



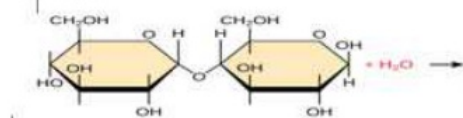
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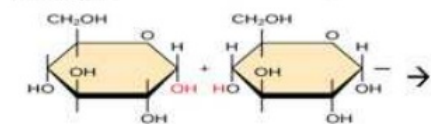
22. type: _____



23. type: _____



24. type: _____



25. Illustrate the formation of the ester methyl butanoate.

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

27. Illustrate the process of going from an alcohol and an aldehyde coming together to form a hemiacetal and then the addition of another alcohol to form an acetal? Please use "R, R' and R" " to represent the parent chains as needed.

28. What organic product is formed when a five carbon sugar is fermented?

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

30. a. Order glucose, fructose and galactose based on sweetness, from least to most sweet.

b. Order lactose, sucrose and maltose based on sweetness, from least to most sweet.

c. Does the order of the disaccharides make sense based on what you know about the monosaccharides?

d. Order glucose, fructose and galactose based on solubility, from least to most soluble.

e. Order lactose, sucrose and maltose based on solubility, from least to most soluble.

Carbohydrate Review-MC

- | | | |
|-------|-------|-------|
| 1. C | 11. B | 23. B |
| 2. A | 12. A | 24. D |
| 3. D | 13. B | 25. D |
| 4. C | 14. D | 26. A |
| 5. A | 15. A | 27. A |
| 6. B | 16. B | 28. B |
| 7. C | 17. D | 29. A |
| 8. B | 18. C | 30. A |
| 9. D | 19. B | |
| 10. C | 20. B | |
| | 21. A | |
| | 22. D | |