Chemistry 102 Name KEY

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Exam 2b Spring 2017

Multiple Choice (36 points)

Page 4 (17 points)

Page 5 (22 points)

Page 6 (25 points)

Total (100 points)

Percent Grade \_\_\_\_\_\_\_\_\_\_\_\_

(36 points) Multiple Choice

1. The relationship between the two molecules shown is



1. They are different compounds that are stereoisomers.
2. They are different compounds that are *cis-trans* isomers.
3. They are different compounds that are structural (constitutional) isomers.
4. They are the same compound.
5. When an organic molecule gains hydrogens it is said to be:

|  |  |
| --- | --- |
| 1. reduced | 1. oxidized |
| 1. both oxidized and reduced | 1. neither oxidized or reduced |

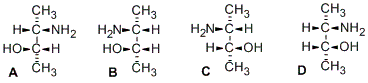
1. Hydrolysis could be correctly described as the
2. Heating of a compound to drive off its excess water and concentrate its volume
3. Breaking of a long-chain compound into its subunits by adding water molecules to its structure between the subunits
4. Constant removal of hydrogen atoms from the surface of a carbohydrate
5. Linking of two or more molecules by the removal of one or more water molecule
6. Which substance would be classified as a ketopentose?

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| A | B | C | D |

1. They are different compounds that are not isomers. The minimum combined kinetic energy reactant particles must possess in order for their collision to result in a reaction is called the

|  |  |
| --- | --- |
| 1. Dissociation energy. | 1. Collision energy. |
| 1. Activation energy. | 1. Orientation energy. |

1. Which of the following pairs of stereoisomers are related as enantiomers?



|  |  |  |
| --- | --- | --- |
| 1. A and B; C and D | 1. A and C; B and D | 1. A and D; B and C |
| 1. B and C; B and D | 1. none of them |  |

1. In which of the following carbohydrates are two different types of glycosidic linkages present?

|  |  |
| --- | --- |
| 1. amylose | 1. lactose |
| 1. glycogen | 1. more than one correct response |
| 1. no correct response |  |

1. Whether a reaction is exothermic or endothermic is determined by

|  |  |
| --- | --- |
| 1. The activation energy. | 1. How reactant and product potential energies compare |
| 1. Whether a catalyst is present. | 1. .The physical state of the reactants. |

1. Which of the following changes will decrease reaction rate for the chemical reaction

2CO + O2  2CO2

|  |  |
| --- | --- |
| 1. raising the temperature of the reaction mixture | 1. removing some CO from the reaction mixture |
| 1. adding some O2 to the reaction mixture | 1. adding a catalyst to the reaction mixture |

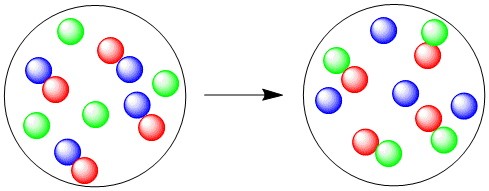
1. Catalysts are correctly characterized by each of the following statements except one. The exception is

|  |  |
| --- | --- |
| 1. They can be either solids, liquids or gases | 1. They are not consumed in a reaction |
| 1. They do not actively participate in a reaction. | 1. They lower the activation energy for a reaction. |

1. Which pair of compounds can react to form a hemiacetal?

|  |  |
| --- | --- |
| 1. Aldehyde and alcohol. | 1. Ether and aldehyde. |
| 1. Carboxylic acid and alcohol | 1. Ether and carboxylic acid. |

1. What type of reaction is illustrated in this diagram?



|  |  |
| --- | --- |
| 1. Single displacement | 1. Double displacement |
| 1. Combination | 1. Decomposition |

1. Which of the following structures is that of an L-monosaccharide? C

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

For each of the reaction types on the left, select from the response list on the right the type of organic compound produced. Responses on the right may be used more than once or need not be used at all.

a) carboxylic acid

b) ketone

c) alcohol

d) no reaction occurs

|  |  |
| --- | --- |
| 1. b Oxidation of 2. d Oxidation of 3. a Oxidation of 4. c Reduction of 5. c Reduction of |  |

(64 points) Problems

1. (6 points) Determine the molecular formula and how many primary, secondary, tertiary and quaternary carbons are present by writing the correct number next to the designation below.

Molecular Formula\_\_C12H24\_\_\_\_\_\_\_\_\_



How many: 1o \_6­­\_\_ 2o \_1\_\_ 3o \_4\_\_ 4o \_1\_\_\_ carbons

1. (7 points) Name the following structures

Name \_\_5-isoproyl-3,4-dimethyloctane\_ Name\_\_trans-1-chloro-2-isopropylcyclopentane\_\_

1. (4 points) Draw structures *cis*-5-tert-butyl-4,4-dimethyl-2-octene



1. (4 points) Place an asterisk (\*) next to each stereocenter in the following molecule.



How many stereoisomers are possible for this molecule? \_\_\_\_\_\_\_\_8\_\_\_\_\_\_\_\_\_\_

1. (6 points) Label the six functional groups enclosed in boxes **include primary, secondary and tertiary on alcohols and alkyl halides**



|  |  |
| --- | --- |
| * 1. ether | * 1. amine |
| * 1. amide | * 1. carboxylic acid |
| * 1. secondary alkyl halide | * 1. tertiary alcohol |

1. (12 points) Draw the structures of the organic products of the following reactions.



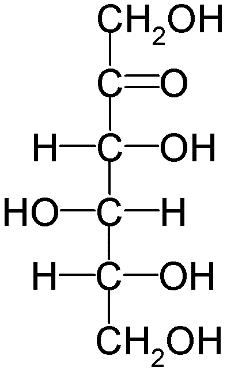
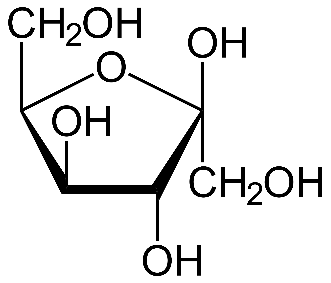




1. (4 points) What does the following mean 18:3Δ9,12,15:

18 carbon fatty acid chain, 3 double bonds in positions 9, 12, 15 from carboxyl side

1. (7 points) Draw the Haworth projection for the ß-anomer mark the anomeric carbon with an asterisk of D-Sorbose.

\*

D-Sorbose

b) (4 points) Draw the Fischer projection for L-Sorbose



1. (10 points) Answer the following questions regarding the following disaccharides that are labeled **A**, **B** and **C**.



a) Circle the acetals place squares around hemiacetals, which of the above disaccharides are reducing sugars?

\_\_\_\_\_\_\_\_\_B,C\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) What type of glycocidic bond is present in carbohydrate **B**? \_\_\_\_ β-2,4\_\_\_\_\_\_

c) What type of glycocidic bond is present in carbohydrate **C**? \_\_\_\_ β-1,6\_\_\_\_\_\_\_

